One of the great challenges of leading WSU’s Center for Sustaining Agriculture and Natural Resources (CSANR) is articulating a clear and coherent message of who we are and what we do. Stating “we do a lot of different things,” and “it’s complicated,” isn’t very satisfying – or very effective. Even if it’s true! The challenge comes both from our diverse portfolio of activities, and from the fact that we do not have a single, unifying and tangible facility that people can experience in person. Even after more than 25 years of solid and impactful work across the state and region, many people interested in Washington’s food and agricultural system still have no idea what CSANR is or what we do.

And yet, the impacts of our work are very clear. Many people have heard of WSU efforts such as the Bread Lab, the Eggert Family Organic Farm, Cascadia Grains, the Sustainable Seed Systems Lab, the Organic and Sustainable Ag Major, the Food Systems Program, WSU’s deep and broad organic research portfolio, WSU’s deep and broad climate change and agriculture research portfolio, or the Soil Health Initiative. Did you know that CSANR played a key role in helping the pioneering leaders get each of these great ideas off the ground? In many cases we made key early investments when these were merely abstract ideas that had not yet been shaped into what we know them as today.

The role of CSANR is something akin to a “quiet professional” actively working behind the scenes to help WSU faculty and students incubate great ideas and bring them to fruition. By the time these great ideas achieve more celebrated status, CSANR has moved on to help someone else hatch the next great idea. Over the years, I’ve heard many comments from WSU administrators and CSANR affiliate faculty that CSANR “gets things done without a lot of fanfare,” or “what’s good for CSANR is good for us because it will help us achieve our vision.” While this work has been successful and valuable - and while we very much enjoy playing this role - it makes CSANR easy to overlook as a quality investment opportunity.

With this challenge in mind, the faculty and staff working in CSANR came together this past fall to find a more streamlined way to describe our work. We needed something more definitive than “we do a lot of different things,” and more informative than “it’s complicated.” We settled on a set of three lenses that capture what we do – and through which we can describe in greater depth our many and varied programs, projects and activities. The three themes are: Sustaining Agricultural Production, Food Systems Innovation, and Agriculture in the Environment. The themes do overlap and many of our specific activities can be viewed through more than one of the thematic lenses. We have also retained our three-part focus on discovery, extension, and application (see Figure 1).

For example, in the following pages you’ll find a description of a research project evaluating wheat straw that was funded through CSANR’s BIOAg Program that is clearly targeted at providing improved options to farmers for sustaining agricultural production. However, if ultimately successful the project will meaningfully contribute to the larger goal of enhancing the performance of agriculture in the environment and could lead to innovative opportunities to develop new grain varieties for cellulosic ethanol and other new uses in an evolving food system. And that is the magic of CSANR – a virtual place where people come together to incubate and establish great ideas that will propel us forward into a more sustainable future.

I invite you to jump into this annual report and learn more about the work we’re doing. We simply can’t report it all, so this is merely a taste. Please check our website http://csanr.wsu.edu/ and follow us on Twitter @wsuCSANR and Facebook @CSANR to learn more. And, if you like what you see and are interested in supporting our work, please feel free to contribute to the Center, our programs, and our activities. Who knows? Maybe you’ll be the investment that initiates the next great celebrated WSU idea.

Chad Kruger, CSANR Director

Figure 1: CSANR themes diagram

Citizen Advisory Committee

Jim Baird
Baird Orchards

Trudy Bialic
PCC Natural Markets

Kevin Corliss
Ste. Michelle Wine Estates

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Washington State Department of Agriculture

Tim Crosby
Cascadia Foodshed

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Derek Sandison
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Anne Schwartz
Blue Heron Farm

Jill Smith
Pure Eire Dairy

Bill Warren
Warren Orchards

Rachel Wieme
WSU Graduate Student Representative

Andy Wilcox
Wilcox Farms
Rapid Evaluation of Winter Wheat Residue Decomposition Potential

Managing crop residue is essential to reduced and no-till farming systems that enhance soil health and reduce soil erosion. And growers in different parts of the dryland Pacific Northwest are likely seeking different residue characteristics. In most areas with less than 12 inches of annual precipitation, wheat is grown every other year, and land is fallowed in between to conserve moisture. Having a cultivar which has a slow straw breakdown would help reduce soil erosion by wind and retain more of the scarce water in the soil. In contrast, where annual rainfall exceeds 18 inches, wheat yield, and residue production, is much higher. As a result, when growers try to direct seed into the winter wheat stubble in the spring, it can oftentimes be difficult due to the height of remaining residue. Growers in these areas are searching for cultivars with residue that decomposes quickly.

Growers, and the seed dealers they work with, regularly request information on the decomposition of winter wheat cultivars, but none is currently available. Arron Carter and colleagues’ 2017 project, “Rapid Evaluation of Winter Wheat Residue Decomposition Potential,” aims to develop efficient methods to provide this information—and lay the groundwork for future breeding efforts that select for wheat varieties with the decomposition characteristics that growers want. The project explored the adaptability and degradability characteristics of wheat, and how degradability might be dependent on both genetic and environmental factors. It also sought to identify regions of the wheat genome involved in degradability, and to develop new, faster methods for evaluating degradability.

The team analyzed a set of 151 lines created by crossing two varieties with different decomposition characteristics (Ellan and Finch). Based on these preliminary results, Carter and his team have successfully approached Western SARE to support additional work—as results from the BIOAg project indicated that repeating the work with a population that had more genetic diversity would generate more conclusive insights. They are now repeating the work with a large diversity panel of 480 soft white winter wheats lines from the Pacific Northwest that represents maximized allelic and phenotypic diversity.

The results from these studies indicated that both genetic and environmental factors are important for determining degradability—but not all lines respond to the environment in the same way. Thus recommendations for growers in one location who want a degradable wheat residue are likely to be different than recommendations for growers in another location who want a degradable wheat residue. In the results the team acquired from the diversity panel, which includes a large number of wheat varieties currently being grown, Carter is now able to give recommendations to growers across the region about varieties they should consider based on their residue needs. He has also discovered that this information is of interest to researchers working on other types of more sustainable systems across the region. For example, those seeking to develop approaches for using wheat straw to produce cellulosic ethanol.

Carter and his team have identified about 20 genomic regions associated with the degradability traits. Each of these genomic regions contains a small amount of the variation—indicating that the factors that contribute to degradability are likely to be complex. It also means that selecting for any one of these genetic regions in breeding lines may not be enough to ensure degradability—though focusing on a set of multiple regions (for example, 6-8 or more regions) could be beneficial. The team is still working with the larger diversity panel to see if they can identify additional genetic regions that are important. In the process, they hope they will continue to develop a better understanding of the genetic factors that contribute to degradability, with the hope of better informing breeding programs.

Last, the team is working to develop new methods that rely on near-infrared (NIR) spectroscopy for evaluating degradability—methods that would be much faster than the wet chemistry methods currently used. The NIR prediction models generated from their BioAg data were moderately correlated to trait values, and they are hoping to improve the model once they have finished evaluating the diversity panel.

The BIOAg project supported two graduate students, Alejandra Roa and Nathan Nielsen. Building on the work under BIOAg, USDA-NIFA and the Washington Wheat Commission have awarded funds to make NIR testing standard within the WSU winter wheat breeding program. The OA Vogel and Willard Hennings Endowment, and Western SARE, have supported continuation of this work.

Using Natural Defense Responses to Protect Against Pest Damage in Potatoes

Peptide elicitors are naturally occurring signaling compounds that act within plants to induce and amplify defense responses. If specific peptide elicitors could be identified and synthesized, they could be used to maximize plants’ natural immunity, providing a more sustainable approach to controlling disease caused by pathogens and pests. Peptide elicitors do not interact directly with pests, so pests are not expected to develop resistance. As natural compounds, peptide elicitors are unlikely to have negative side effects on human or environmental health.

Making this potential tool a reality requires crop-specific scientific work to identify peptides that induce strong defense responses. Kiwamu Tanaka, Lee Hadwiger, and others have been laying the groundwork for the use of peptide elicitors in potato using a powdery scab disease caused by a protist pathogen, Spongospora subterranea f. sp. subterranea (Sss). Typically, powdery scab can only be studied under field conditions. Within their BIOAg project, the team developed a hairy root culture that could be used as a lab-based powdery scab infection system, and confirmed that the system can be used for rapid, scalable, high-throughput screening of peptide elicitors against powdery scab infection under controlled conditions (Figure 1).

Then Tanaka and collaborators turned their attention to identifying new peptide elicitors that evoked a stronger, and more specific response against powd scab than STPeP1, a known peptide elicitor. Multiple fractions containing active compounds were extracted and purified from infected potato cells. Each fraction was then applied to the hairy root culture system, and researchers monitored early defense response using an extracellular alkalization assay previously developed by the team. The most active fractions contained roughly 17,000 different possible candidate peptides. Narrowing candidates to those peptides that were derived from potato and enriched in powdery scab-infected samples led to about 100 peptides that are finalist candidates. The team is proceeding to test each of these candidates for defense-inducing activity.

This BIOAg project funded one WSU Masters student, and involved two high school interns from Hunters, WA and Yakima, WA. Work completed through the BIOAg project has been leveraged to obtain additional funding from the Northwest Potato Research Consortium and USDA AFRI that will continue the work. Two scientific publications are being prepared.

**Figure 1. A hairy root culture system and Sss infection. Left shows a hairy root culture in petri dish. Middle and right picture shows microscopic images (200x magnification) of the root tissues infected (center) or non-infected (right) by Sss. The pictures were taken 6-8 weeks after application of purified Sss cystosorin (2 x 104).**
I’ve heard that guy talk before. He really knows his stuff.” Anonymous farmer to Chad ~2005

Chad Kruger – CSANR Director

In 1992, David Granatstein was hired as the first staff member for CSANR. The inaugural Director, David Bezdicek, had the wisdom and foresight to realize that for the center to be successful, it needed to have someone like David to generate and implement great ideas. I think it is completely appropriate to credit David with generating many of the best and most productive programmatic ideas in CSANR’s history, including the Organic Cropping Systems Research program, the Climate Friendly Farming Project, and BIOAg (our flagship WSU internal grant program). David and his peers around the country are also the ones who “mainstreamed” sustainability and organic agriculture in the university, and I think David won over many detractors in Washington by the sheer force of his deep and practical knowledge and never-ending list of good ideas. After more than a quarter century of incredible contributions, David brought his WSU career to a close in September of 2018.

For those who don’t know, David was the one who hired me fresh out of graduate school in early 2004, and for much of my tenure as the CSANR Director I’ve turned to David for insight on controversial issues as well as help identifying opportunities where the Center could have significant impact. In early 2005, I was asked to talk with a small group of farmers about a technology we were investigating. I was more than a little intimidated and so I asked David if he would come along. As the robust and vigorous discussion concluded and we were preparing to leave, one of the farmers caught my attention and pointed to David saying “I’ve heard that guy talk before. He really knows his stuff.” (He didn’t say “stuff”.) Throughout my tenure as CSANR Director, I can think of literally dozens of similar situations where I’ve heard colleagues and partners make similar, simple declarative statements. “David is the expert.” “Let’s ask David, he is the one who will know.” In fact, I’ve made similar statements myself dozens of times. As I was considering the question of how to capture David’s career contributions, it was the memory of that farmer meeting that led me to realize that beyond providing my own perspective, I also needed to let some other people state it directly.

Professor David Granatstein has served as Sustainable Agriculture Specialist at Washington State University since 1993 and was hired then as the first full-time faculty member in the newly formed Center for Sustaining Agriculture and Natural Resources. I met David a decade earlier in 1983, when he was a graduate student in soil science and I was just starting out as a new faculty member at Washington State University. David was bright and friendly and already had ideas of making the agricultural world a better and more sustainable place.

Since then, David has eagerly helped many growers move their farming operations toward sustainability. He has helped them find answers to questions on topics such as soil health, biochar, orchard floor management, climate-friendly farming, and organic agriculture. He has also assisted and guided graduate students, postdocs, and faculty with their research projects in agroecology, horticulture, entomology, plant pathology, and soil science.

I have met many of the main players in the sustainable agriculture movement worldwide and David is one of the top and most influential scientists among them. Simply put, he is one of the pioneers in sustainable agriculture. I will greatly miss David’s collegiality, insightfulness, smile, wit, warmth, fairness, and honesty.

John Reganold – Colleague and long-time friend

David’s perspective on food and farming has had a big impact on me and many others. His wisdom of seeing things from the farm perspective is always welcome. He has a great ability to advocate for sustainable soil management, effective pest control, quality crops, and farmer income. He always maintains a pragmatic approach and uses facts and data to make decisions. His data on organic fruit production was more detailed than anything else available for organic crop production in the U.S. for many years.

David contributed to the success of many organic programs including the WSDA Organic Certification Program, Oregon Tilth, and the Washington Tilth Association through his service on boards, policy development and advocacy work. He provided critical information and perspective during the National Organic Standards Board debate on the use of tetracycline in organic tree fruit production.

David’s impact reaches far beyond Washington State. One example is his work on capacity building in West Africa that provided technical specialists with the knowledge and skills needed to support organic agriculture development in their own countries, creating opportunities for farmers and their communities. I am happy for David and also know he’ll still be contributing to the success of the organic farm sector after his official retirement.
and a remarkable legacy across many sectors. We are all the better for it. Within the structure of a Land Grant University, but David has left his mark on the land and the people is not for the faint hearted, especially working on what is needed. This business of working to make agriculture more sustainable for the future could be our success.

Carol Miles – Faculty Peer and Collaborator

From 2000-2007, it was my great pleasure to work with David Granatstein and the CSANR. Together I believe we accomplished great things, and moved the bar at WSU such that today, the programs we created have been institutionalized within the college and within CSANR. One of our first successes was the creation of organic research funding through a USDA special grant. Our vision was to provide $30,000 per project to WSU investigators as an incentive to start an organic research project. We emphasized support for graduate students and diversifying crops and production systems. Projects we funded included small grain research in western Washington and biodegradable plastic mulch. This funding model was adapted by CAHNRs and became the Emerging Research Issues grant.

After the USDA ceased funding our organic research program, David had the brilliant idea that we should create a state-funded grant pool, and he came up with the name Biologically Intensive and Organic Agriculture (BIOAg). It took a few years of submitting this idea to the state, but today this is a hallmark program of CSANR, and has funded many innovative projects at WSU. Together we convened scientists from across the university to document the amount of organic research that was being carried out at WSU. The subsequent report revealed there were a significant number of faculty involved in organic research, and this helped gain administrative support. In reflecting on why David and I were so successful together, I think it is because we shared a vision for creating funding pools and documentation to support the research of WSU scientists, so that their success could be our success.

Anne Schwartz – Farmer and long-time friend

I met David at his farm, Libby Creek Farm, up in the Methow Valley of North Central WA. David and his farm partners were hosting a Tilth Producers Co-operative meeting. It was 1979, late summer, and a group of organic farmers from all corners of WA State were meeting regularly to address a number of topics. This is how the principals and standards for Organic Agriculture, defining specific practices to be used by Organic and Sustainable farming systems, and finding resources to develop organic and sustainable growing practices were meeting regularly to address a number of topics: codifying the principals and standards for Organic Agriculture, defining specific practices to be used by Organic and Sustainable farming systems, and finding resources to develop organic and sustainable growing practices.

Others will cover the details of David’s commitment to work towards a more sustainable agriculture; his study at WSU with Dr. Dave Bezdeick, his time with the Peace Corp in Lesotho, Africa and his years in Minnesota with The Land Stewardship Project, but his capacity to listen to and seek out many viewpoints has always impressed and inspired me to build this into my own work towards the same mission. David’s commitment to considering many viewpoints has guided the focus of his life work: to develop biological solutions, and to get critical information to the growers and businesses to guide planning and decision making. In short: to focus his work on what is needed.

This business of working to make agriculture more sustainable for the land and the people is not for the faint hearted, especially working within the structure of a Land Grant University, but David has left his mark and a remarkable legacy across many sectors. We are all the better for it.

Chris Feise – CSANR Director, Retired

Congratulations, David, on your retirement! I have little doubt that you will pursue this next phase of your life with the same level of purpose and intention you applied the past several decades at WSU. Few people have contributed as much as you have in your working career. But now the time is yours and you can look forward to an entirely new set of experiences and opportunities as you continue to explore the world and carve your way into the future. Have fun. Enjoy! Continue to give to the world as you have done throughout time, but don’t take on too much. And, remember, from now on it is your decision about what meetings, if any, you might want to attend!

On a personal note, David, I want you to know how much I enjoyed knowing you and how much I appreciated and valued working with you. Your partnership throughout the years was integral to everything we accomplished at CSANR. You were there with your insightfulness, your brilliance, and your direct and artfully crafted communications. You had a major hand in all the important proposals, reports, and public communications. Of course, a key to your effectiveness was the critical thinking you brought and your skills in articulating the issues and their implications for society and the ecosystem.

I was amazed at your breadth of knowledge and thrilled at your willingness and sometimes thirst for delving into totally unfamiliar subject matter. When the Paul G. Allen Family Foundation offered us the opportunity to present them with a proposal for addressing agriculture and climate change, you and I together faced a challenge of unknown dimensions. I admired your flexibility in taking a sharp turn in direction, plunging into mostly unfamiliar waters, and figuring out the most promising way to assemble an interdisciplinary faculty team to move forward. Without your leadership that project would not have gotten off to a great start.

Much the same could be said about organic farming, Food Alliance, BIOAg, WAFTA, and our little coddling moth project just to name a few projects having the David Granatstein imprint. I will forever be grateful to you for your vision, your generosity, and your total integrity. You told it like it was. Thank you. No one could ask for a finer partnership or a better collaborator than what I had with you.

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This business of working to make agriculture more sustainable for the land and the people is not for the faint hearted, especially working within the structure of a Land Grant University, but David has left his mark and a remarkable legacy across many sectors. We are all the better for it.
New Research & Experiences for Undergraduates (REEU) Program Kicks Off in 2018

Over the summer in 2018, six undergraduate students participated statewide in the Sustainable High-Value Horticulture and Processing Systems Research and Extension Experiences for Undergraduates (REEU) program funded by the USDA NIFA AFRI REEU grant program. The program was led by CSANR’s Doug Collins and included five additional mentors from across WSU: Laura Lewis at CSANR, Lynne Carpenter-Boggs in Crop and Soil Sciences, and Bri Ewing, Stephanie Smith, and Girish Ganjyal, all from the School of Food Science.

Though located at four sites across Washington State, the students interacted as a cohort throughout the summer. In June, students and mentors spent a week at the Quillisascut Farm School in Rice, WA to learn about agriculture and food systems topics and research strategies including hands-on experience with vegetable production, cheese-making, food preparation, and other daily farm chores. Students reunited in July for a WSU Food Systems Program and Tilth Alliance Farm Walk in Sedro Woolley, WA and again at the end-of-program Undergraduate Research Symposium in Pullman, WA where they presented posters on their research and extension projects.

Working under the guidance of their mentors, students worked on diverse food system-related projects with a focus on:
- Production (Soil Quality Improvements with Biochar and Compost; Determining Organic Herbicide Performance using Canopeo Digital Analysis),
- Processing (Expansion Characterization of Dehulled Faba Beans during Twin-screw Extrusion; Possible Routes of Bacterial Contamination in Shelved Fresh Produce at the Retail Level; Building Extension Resources to Support Washington Fermentation Industries), and
- Waste (Gleaning Network and Its Impacts in Two Rural Counties).

The program was successful on many levels. First and foremost, students reported a deeper understanding of scientific research and an increased appreciation for careers in food and agriculture. Half of the interns worked on developing peer-reviewed publications, and two interns reported being interested in graduate work at WSU as a result of their summer research experience. In addition, the program successfully recruited a diverse student pool as five out of six of the interns were women, and half self-identified as being a member of a racial or ethnic minority. Furthermore, five out of the six interns were non-WSU students, and three of the six were from out of state.

The program will continue in Summers 2019 and 2020 with a total of 9 internship opportunities available per year. During these years, the program will recruit additional mentors and mentees from diverse backgrounds and agricultural disciplines.

Collaborative Study on the Future Production Systems for US Fruits and Vegetables

Fruits and vegetables are important to all of us as part of a healthy, balanced (and delicious!) diet. They are also hugely important to our regional agricultural economy. California is by far the leading state in fruit and vegetable production in the U.S., generating just under $24 billion in farmgate value in 2012 (USDA AgCensus, 2012). Washington State was a distant second, at just under $4 billion. Oregon and Idaho also have important production areas. Climate change has the potential to shift regional competitiveness relating to specific crops – and for fruits and vegetables, the Northwest could become more important.

Climate change-related warming is lengthening the growing season and increasing growing degree days (GDD), which could affect agricultural productivity. Expectations of agricultural productivity are reflected in irrigated land rents; Figure 1 (Potter, Brady, and Rajagopalan, 2018) shows the relationship between average growing degree days and irrigated land rents. The top panel shows this relationship for historical conditions for the five states in the Western Fruitful Rim (California, Washington, Idaho, Oregon, and Arizona). Land rents increase as the GDD increases up to a point (California at highest rents) and decrease in hotter Arizona. The bottom panel uses this same relationship between irrigated land rents and GDD but shifts the states to their projected future GDD regimes. California moves away from optimum and the Pacific Northwest moves towards the optimum. Other trends are also likely to be important as well, including consumer preference for fresh produce grown locally; consumer driven sustainability concerns; and other aspects of the supply chain such as processing infrastructure, cost and availability of labor, and the rise of protected and peri-urban production.

Through the project “Fruit and Vegetable Supply Chains”, led by the International Life Sciences Institute and University of Florida, researchers are using a variety of biophysical, economic, and environmental modeling to understand opportunities for shifts in production regimes of selected fruits and vegetables given expected changes in yield, price, and environmental profiles of the supply chain. Focal crops for the project include potatoes, tomatoes, green beans, and strawberries, among others. Claudia Stöckle, Kirti Rajagopalan and Chad Kruger from WSU are partners on the project working on crop modeling, water availability quantification aspects, and decision support tools that could provide additional insights to stakeholders.

Figure 1. The historical relationship between growing degree days and irrigated land rents (upper panel), and the future projected relationship (lower panel).
Food Systems Program Update

This past year, the WSU Food Systems Program had many exciting opportunities to support innovative food systems across Washington, through collaboration, multidisciplinary expertise, and the development of resources for farmers and other food systems contributors. The Food Systems Program works with communities throughout the state to foster viable farm businesses, optimize sustainable natural resource stewardship, and to promote scaled processing and distribution, always in the pursuit of access to healthy food for all.

Among our many exciting accomplishments, we continue to foster, develop, and support community-based educational programs, including Cultivating Success™ and FARMWALKS. The WSU Food Systems Program supported eight Cultivating Success classes across WA in 2018, with more than 200 participants. We hope to double this for the 2019 program year. The Cultivating Success program, offered through a partnership with the University of Idaho and Rural Roots, was first developed nearly 20 years ago. The curriculum is currently being updated by WSU and our partners to keep it relevant and valuable for beginning farmers and ranchers across the region who are passionate about diversified, sustainable, and organic production systems. We will be introducing the new programming in July 2019.

The WSU Food Systems Program and Tilth Alliance continue to offer FARMWALKS, with eight incredible farmer-led programs in 2018. The FARMWALK series was well attended this year, with standout programs highlighting the success of Latinx farmers in western and central WA, on-farm biochar production in western Washington, and small-acreage specialty grain farming for diversified markets in the Palouse. Over 300 people attended FARMWALKS in 2018, with producers and resource providers connecting and learning together. We are looking to expand the peer-to-peer model of the FARMWALK series to other areas of the food system. Stay tuned for updates.

The WSU Food Systems Program continues to expand our work supporting development of agricultural products and markets outside of conventional, commodity-based models. At the heart of our Food Systems Innovation Events is the Cascadia Grains Conference (CGC). We held our 6th annual CGC in 2018 with more than 450 participants. Through the CGC, we create space for specialty grain producers, processors, and others to connect, learn, and grow. This year, we expanded our CGC work to eastern Washington and western Idaho in partnership with the University of Idaho. We held the CGC East Pilot Program in August of 2018 with 110 participants attending a half-day program. As we continue to foster innovation in the specialty grains sector, we are also planning a niche meat summit for the summer of 2019.

The many programs the WSU Food Systems Program supports are possible because of the amazing FSP Team that is comprised of over 65 thought leaders from across WSU and Washington. The Team continues to grow in number as we add new members - more than 20 in 2018! The FSP Team includes both internal (WSU) and external partners who provide trans-disciplinary expertise to solve food system issues. In 2018, as a Team, we secured nearly $4,000,000 in funding, held 300 workshops with 8,500 participants, and produced 30 publications to support Washington’s food systems.

Building Soils for Better Crops

Farmers are increasingly interested in soil health and soil biology. However, soils in the irrigated Columbia Basin are low in organic matter, making it difficult for farmers to manage soil tilth, wind erosion, low infiltration rates, and low water holding capacity. Since 2006, the Building Soils for Better Crops Extension program led by Andy McGuire has conducted a series of conferences focused on helping farmers in the Columbia Basin improve their soils. Like the book from which it takes its title, these conferences have covered a range of topics and practices involved in managing soil health. Speakers from across the nation have shared their expertise on soil building practices like cover crops, application of manure and compost, and reduced tillage systems. They have covered the biology of soils, tools for monitoring soil health, and using soil health to help manage soilborne pests. By improving soils, the program aims to help farmers improve profits by cutting input costs and decreasing detrimental effects of agriculture on water and air quality.

On-farm research and Extension publications have complemented the conference and extended the work on soil health. From 2014 to 2016, CSANR’s Andy McGuire, David Granatstein, and others conducted an economic valuation of soil improvement practices in the irrigated Columbia Basin. Starting with producer focus groups, they collected information on three soil-improvement approaches: adding soil amendments (e.g. compost, manure); using cover crops/green manures; and high residue farming and reduced tillage. They also made field measurements on nine treated fields, comparing them to nine adjacent untreated fields. The result of this work was an estimate of the benefits and costs of soil improvement practices. The soils work showed that each of these practices can maintain or improve soils in this region, though each practice differs from the others in its specific effects. Results were incorporated into two Extension bulletins: one on soil health (TB41), and one on the economic analysis (TB47E).

Since its start, this program has reached over 1000 people in the Columbia Basin while impacting an estimated 50,000+ acres. The annual economic benefit of changes made on farms in the region is more than $450,000 annually since 2012. Participants report improve soil tilth, increased water infiltration, improved control of wind erosion and reduced fertilizer rates. Over 76% of program participants reported that they planned to increase their use of soil building practices.
Matt Arrington grew up in the Skagit Valley, though the area has a strong agricultural community, he didn’t have a strong connection to that industry when he was young. He first found agriculture as an undergrad through elective courses, and from that point on he knew he wanted to be involved with food production. After graduating he worked as an intern in the San Joaquin Valley in California. His exposure to the complications facing the nut industry were ultimately his driving force to attend Oregon State University for his master’s work. He studied tree fruit there and, towards the end of that work, he connected with Dr. Lisa DeVetter at WSU. Matt chose the (PhD) program in horticulture at WSU because it combined a passion for teaching and sharing knowledge with the ability to solve long term problems improving the agriculture industry. That brought Matt full-circle, back home to Mount Vernon, WA to work on optimizing blueberry pollination and fruit set.

Together with Dr. DeVetter, Matt received funding for a BIOAg project to investigate the impact of border vegetation on blueberry production. They collaborated with WSU faculty to investigate the potential for differences in pest pressure, birds, pollinators and the vegetative impacts on growth of blueberry plants based on hedge material (conifer hedge, grass and complex hedge) bordering the planting. The project was set up to identify and count birds and insects in blueberry plantings bordering the different kinds of vegetation common to our production area. They also conducted pollinator counts and quantified plant performance across nine sites in Whatcom and Skagit counties.

Matt now works as a research scientist with Plenty Unlimited. Their goal is to build a global farm network providing fresh local food to urban areas independent of climate or season. Matt is excited about merging the strengths of field and indoor agriculture to improve food security.

When asked whether his program of study positioned him well for the work he does now that he has graduated, Matt commented: “My experience with Washington State University and Dr. DeVetter’s program prepared me to ask the right questions; the agriculture industry needs problem-solvers and out of the box thinking. Dealing with complex problems, working closely with grower collaborators, solving real world problems and working to improve the quality and economic strength of the industry was excellent preparation for working in a problem-oriented private sector research position with an ambitious and rapidly growing company. The work we conducted with BIOAg funding and all of the other work I was part of as a graduate student would not have been possible without the support and participation of a vibrant agriculture industry and wonderful grower cooperators. I am very grateful to them for their participation and support of initiatives and studies like this one.”
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