

Oregon State University Combined Research and Extension Plan of Work 2022-2026

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I. Plan Overview

1. Executive Summary

Introduction

The Oregon Agricultural Experiment Station (OAES) and the OSU Extension Service (OSUES) at Oregon State University provide the people of Oregon with research-based knowledge and education that focus on strengthening communities and economies, sustaining natural resources, and promoting healthy families and individuals. OAES is Oregon's principal source of knowledge relating to agricultural and food systems, and a major source of knowledge regarding environmental quality, natural resources, life sciences, and rural economies and communities worldwide. The mission of OSUES is to have positive impacts on community livability, economic vitality, natural resources sustainability, and the health and well-being of people. Projects conducted by OAES and OSUES cross disciplinary lines to more fully address critical issues at the local, regional and national level.

The College of Agricultural Sciences OAES reflects these values:

- Value 1: Responsiveness - We react in a timely fashion to the needs of those we serve;
- Value 2: Partnership and cooperation - We collaborate with individuals, organizations, businesses, and agencies outside the University;
- Value 3: Teamwork and coordination - We synchronize our efforts among our units and with other units at the University;
- Value 4: Credibility - We focus on being known as a source of reliable, objective, research-based information and education.

The core values and operating principles of OSUES are:

- Value 1: Community-based - We value community relationships and connect OSU to local people and issues to enhance the present and the future of the people and communities of Oregon.
- Value 2: Accountability - We focus on achieving measurable outcomes, and document and communicate the impact and value of our work.
- Value 3: Credibility - We deliver relevant, research-based knowledge through our educational programs.
- Value 4: Diversity - We exhibit respect, value differing perceptions and world views, and encourage diversity.
- Value 5: Partnerships - We collaborate with academic, public, and private partners to achieve greater results and build community capacity. We value the public good that comes from collaborating with volunteers.
- Value 6: Responsiveness - We engage with community partners to identify priority issues and needs, to design timely responses, and to build future capability.

To carry out its mission in a manner consistent with University goals, OAES uses its resources to advance knowledge in the following areas of emphases:

New value-added products and markets that leverage the economic contributions of Oregon agriculture.
Natural resources management and policy through discovery and learning to improve understanding of nature as a system.
Integrated management systems that help assure economically sustainable, environmentally sound agriculture.

The OSUES goals for advancing the organization's mission to align with the University's strategic plans include:

- Goal 1: Improve access to high-quality learner services - Extension will provide access to the knowledge resources of OSU by being focused and nimble in engaging Oregon's diverse people and communities in high-quality learner services that help build sustainable community futures.
- Goal 2: Invest for excellence and impact - Extension will increase and diversify its funding base and encourage program excellence through strategic investments within three thematic areas: strengthen communities and economies, sustain natural resources, and promote healthy families and individuals. This will create measurable outcomes and impacts that will be reported widely to stakeholders.
- Goal 3: Increase effectiveness with appropriate technology - Extension will use established and new technologies strategically to increase efficiencies, expand outreach and enhance and report the outcomes of its educational services.

This 2022-2026 Plan of Work (POW) is an update of the 2021-2025 POW and brings together the efforts of OAES and OSUES. It focuses on the four high-priority areas defined by strategic planning efforts of the College, its leadership and faculty, and stakeholders. The plan reflects our desire to continually improve our process of responding to the needs and issues facing Oregon communities and people. The plan is also consistent with Oregon State University's strategic plan that identifies three areas of excellence ... Healthy People, Healthy Planet, Healthy Economy.

The OSUES on-line planning and reporting system, SOARS (Stories, Outcomes, and Accomplishments Reporting System) has been replaced by Digital Measures (DM), and allowed us to collect specific OAES and OSUES data related to FTEs for planned programs, program outputs and outcomes, and publications for 2009 and beyond.

OAES continues to provide impact information on the College of Agricultural Sciences (CAS) web page. However, CAS plans to establish a new online reporting system to adhere to the OSU web format. Research results will be shared through refereed journal articles, abstracts, books and book chapters; theses, local, regional, national, and international meetings, symposia and workshops; GIS climate, geophysical and plant maps; and an array of web pages of an array of types.

We have chosen to take a very conservative approach with this plan, not yet knowing where our staffing numbers will stabilize due to budget constraints and lasting impacts of the pandemic. We predict modest increases in the percentage of participants who make changes in practices because we do not yet know how many FTE and resources we will be able to commit. We prefer to be realistic and not promise what we cannot deliver. Data from 2014-2020 has given us the performance records needed to more accurately predict future outcomes. Future plans of work will be modified to reflect these data.

All units in the OAES/OSUES conduct performance evaluation of their faculty members. These reviews are conducted based on workplan objectives established during the previous review and in the faculty member's position description. In addition, all faculty members with OAES FTE are required to establish or participate in at least one station project, and they are required to submit both an OAES report and a REEport progress report. All faculty submit reports through DM to document annual accomplishments.

The Oregon Agricultural Experiment Station (OAES) consists of a central administrative and research center plus 11 branch stations, three of which are located at multiple locations; many of the branch stations are integrated research and extension centers. Oregon State University Extension (OSUES) faculty can be found in all 36 Oregon counties plus the Warm Springs Indian Reservation.

Faculty at each of the 14 station units, which have advisory committees and faculty affiliated with them, and OSUES faculty work closely with local stakeholders including farmers and ranchers, foresters, agency personnel, elected leaders, educators, health professionals, environmental organizations, researchers, and a myriad of other public and private entities to establish need and design appropriate programming. In many cases, stakeholders are directly involved in the programming as volunteers or by permitting demonstrations and applied research trials on their properties. Additionally, faculty members utilize critical demographic and economic data, and examine current research findings to identify societal needs and opportunities for significant social, environmental, and economic impacts. Programming is then planned based upon this input within OAES and in each of the four academic colleges/programs with Extension programs (Forestry, Agricultural Sciences, Health and Human Sciences, and Sea Grant). OSUES provides funding to these colleges on the basis of planned outcomes outlined in a biennial plan submitted by each college. All Extension FTE must be accounted for in these plans. The plans are reviewed annually and span a two-year timeframe. Annual evaluations are conducted by the Director of OSUES to determine how effectively each planned program is addressing key needs and delivering the

anticipated outcomes and impacts described in each plan. OAES projects are reviewed annually on the basis of planned outcomes outlined in a five-year, peer reviewed proposal submitted to OAES and approved by NIFA. Project outcomes are also assessed against the Station's internal Strategic Intents, a strategic directive formulated with input from internal and external stakeholders. Formerly, each of the programs in some way supported objectives from one or more of the strategic challenges identified by NIFA, which targeted Sustainable Energy, Climate Change, Global Food Security/Hunger, Food Safety, and Obesity. OAES has identified four critical issues that will be addressed under the POW: 1) marine conservation and food systems, 2) agricultural competitiveness and resilience, 3) markets and access in food and health innovations, and 4) working and natural landscapes. These four "themes" will drive the research and outreach efforts of the college over the reporting period. An additional critical issue has been added "Animal Health" to address formula funding associated with AHD and other non-formula funding through grants.

2. FTE Estimates

Year	1862 Extension	1862 Research
2022	200.0	200.0
2023	200.0	200.0
2024	200.0	200.0
2025	200.0	200.0
2026	200.0	200.0

II. Merit / Peer Review Process

Internal University Panel; Combined External and Internal University/External Non-University Panel; Expert Peer Review.

The Oregon Agricultural Experiment Station (OAES) consists of a central administrative and research center plus 11 branch stations, three of which are located at multiple locations; many of the branch stations are integrated research and extension centers. Oregon State University Extension (OSUES) faculty can be found in all 36 Oregon counties plus the Warm Springs Indian Reservation. Faculty at each of the 15 station units, which have advisory committees and faculty affiliated with them, and OSUES faculty work closely with local stakeholders including farmers and ranchers, foresters, agency personnel, elected leaders, educators, health professionals, environmental organizations, researchers, and a myriad of other public and private entities to establish need and design appropriate programming. In many cases, stakeholders are directly involved in the programming as volunteers or by permitting demonstrations and applied research trials on their properties. Additionally, faculty members utilize critical demographic and economic data, and examine current research findings to identify societal needs and opportunities for significant social, environmental, and economic impacts. Programming is then planned based upon this input within OAES and in each of the four academic colleges/programs with Extension programs (Forestry, Agricultural Sciences, Health and Human Sciences, and Sea Grant). OSUES provides funding to these colleges on the basis of planned outcomes outlined in a biennial plan submitted by each college. All Extension FTE must be accounted for in these plans. The plans are reviewed annually and span a two-year timeframe. Annual evaluations are conducted by the Director of OSUES to determine how effectively each planned program is addressing key needs and delivering the anticipated outcomes and impacts described in each plan.

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priorities and portfolios.

We have implemented an internal merit review process for all federal, state, and foundation grant proposals. The review is not intended to disqualify but rather provide mentoring and guidance such that all proposals going forward have been vetted with other faculty in that discipline and to ensure that quality takes precedence over quantity. For our newer faculty, we offer grant writing workshops that include specific recommendations on narrative development, budgeting, matching objectives and outcomes, and the importance of clearly defined processes and deliverables.

We have established “red teams” with the Research Office to serve as a pre-proposal peer review panel for larger grant applications. The teams are multi-disciplinary and involve scientists from other colleges to review the proposals and make suggestions for improving methods, research focus, scope of the proposal and to carefully distinguish between applied and fundamental science.

III. Stakeholder Input

1. Actions to Seek

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As described in the Executive Summary we have completed a two year long process of focusing CAS resources and

investment in strategic opportunities. This involved several town hall exchanges to capture input and reaction to these themes. We are also completing a cattle strategic plan that has engaged with all the livestock and dairy producer groups and we will complete this process by allowing each member of each organization to provide feedback through a web survey.

2. Methods to Identify

During the reporting period, OAES and OSUES reassess all programs used to address its internal strategic planning, which was formulated with input from internal and external stakeholders (please see the previous section).

OAES faculty at the eleven branch stations (situated in 15 agro-ecozone locations) ensure that local stakeholder input is transmitted to OAES administrators and that feedback is generated. Each station is highly integrated into the surrounding industries, communities and governing bodies, as well as land management bodies. Representative stakeholders generally hold positions on the station advisory bodies and directly provide guidance on programming and issues and needs. Many of our stations are not only research locations but are integrated research and extension centers. We have expanded the use of social media to attract non-traditional interests in urban settings, for food science and technology, and organic producers and consumers.

OSUES faculty work closely with local stakeholders, including farmers and ranchers, foresters, agency personnel, elected leaders, educators health professionals, environmental organizations, and a myriad of other public and private entities to establish need and design appropriate programming. In many cases, stakeholders are directly involved in the programming as volunteers or by permitting demonstrations and applied research trials on their properties. Additionally, faculty members utilize critical demographic and economic data, and examine current research findings to identify societal needs and opportunities for significant social, environmental and economic impacts. Programming is then planned based upon this input with each of the four academic colleges with Extension programs (Forestry, Agricultural Sciences, Public Health and Human Sciences, and Sea Grant). OSUES provides funding to these colleges on the basis of planned outcomes outlined in a biennial plan submitted by each college. All Extension FTE must be accounted for in these plans. The plans are reviewed annually and span a two-year timeframe. Annual evaluations are conducted by the OSUES Director to determine how effectively each planned program is addressing key needs and delivering the anticipated outcomes and impacts described in each plan.

3. Methods to Collect

Use of media to announce public meetings and listening sessions

Targeted invitation to traditional stakeholder groups

Targeted invitation to non-traditional stakeholder groups

Targeted invitation to traditional stakeholder individuals

Targeted invitation to non-traditional stakeholder individuals

Targeted invitation to selected individuals from general public

Survey of traditional stakeholder groups

Survey of traditional stakeholder individuals

Survey of the general public

Survey specifically with non-traditional groups

Survey specifically with non-traditional individuals

Survey of selected individuals from the general public

Covid-19 forced us to rethink how we provide and collect information. Through the use of Zoom and YouTube we were able to continue to offer substantive opportunities for both input and outreach. Many of our field days were provided through pre-taped presentations by scientists with Zoom used to collect feedback after the presentations.

4. How Considered

OAES, through the Colleges of Agricultural Sciences (College), Public Health & Human Sciences (CPHHS) and Veterinary Medicine (CVM), regularly solicits stakeholder input on program direction. Advisory Committees or Commodity Groups, and a statewide citizen advocacy network to

inform OAES; the latter group represents local constituencies and stakeholders, gathers local impact stories for the statewide programs, and relays critical information back to their peers in both locality and communities of interest. This ongoing network permits fluid, continual information flow back and forth. OAES also hosts a multisectoral stakeholder workshop periodically to gather input. They come from a cross-section of diverse food and natural resources systems across the state. This meeting is used to balance regional perspectives and needs and develop a statewide program. This process also helps our diverse clientele understand the needs of the state in light of their own perspective. Additional input comes from College websites and a general email address, and from the departments and branch stations, as well as posted responses and changes in programs in response to stakeholder input. The deans and directors of the College and OAES informally receive input while attending farm and station field days around the state, visiting county-based Extension offices, and participating in other "road trips" around the state or wherever stakeholders congregate. The

College's External Relations Director organizes alumni and stakeholder events, hosts special events at county and State fairs and a variety of conferences, receives and transmits input from stakeholders, and makes sure responses are delivered. CAS has implemented current social media technological methods for gathering input and relaying information such as blogs and MySpace pages.

Input is solicited by OSUES through a statewide advisory network that directly advises the Vice Provost for Outreach and Engagement and Director of Extension. This advisory committee is made up of individuals representing production agriculture and forestry, environmental groups, county government, youth and family-serving organizations, organizations representing coastal issues, and business and industry. The committee meets 1-2 times per year for two days. Additionally, the committee is connected with the Vice Provost's and Director's office via email, conference calls and webinars throughout the year. In 2009 a similar group was formed to advise Extension leadership on needs and issues primarily related to Oregon's urban populations in the Portland Metro area.

Every county in the state maintains an advisory structure. These include both general broad-based advisory systems and those that are more specific to programming areas. These advisory groups generally meet 4-12 times per year to actively review programming and to provide input to county faculty and Extension leadership. Each academic college with Extension programming maintains advisory structures at the college and departmental level. These inform Extension programming within each of these units.

IV. Critical Issues

1 Marine Food Systems

Description:

Marine Conservation and Food Systems

Seafood. Seafood comprises an important protein source for the world's population. OAES and OSUES faculty will conduct research and outreach efforts at producing sustainable seafood, while improving water usage and processing efficiencies. Aquaculture practices will be improved to protect native species while incorporating a larger share of "farmed" seafood for consumption to preserve natural ecosystems. Research and outreach efforts will also be driven by the need to reduce by-catch and to develop innovations for the use of waste streams to produce new materials including biocides and pharmaceuticals that will establish new markets.

Marine Conservation. The health of our ocean is critical to the future of the seafood industry and is a key indicator of climate change impacts across multiple geographies. Oceans and the ecosystems that depend on them are under increasing stress from multiple fronts; acidification, plastic pollution, hypoxia, and the loss of important estuaries necessary to maintain ocean production.

Faculty will continue to further our understanding of ocean ecosystems including the phytoplankton and zooplankton that supports so much of marine life. Included in this effort is gaining a better understanding of ecosystem structure and how human influences (fishing, pollution, ocean warming) are impacting ecosystem structure. We will also work to improve stock assessments of important fish species and work to recover endangered species of fish, shellfish, crustaceans, and mammals. This work is important to maintain biodiversity, aquatic animal health, and the world's most important protein source.

Term: Long

Science Emphasis Areas

Agroclimate Science

Education and Multicultural Alliances

Environmental Systems

Food Safety
Human Nutrition
Sustainable Agricultural Production Systems

2 Agricultural Competitiveness and Resilience

Description:

Agricultural Competitiveness and Resilience

Competitiveness. A thriving agricultural industry is necessary to feed a growing population. Its success depends on efficient, sustainable, and profitable productivity that is resilient to inevitable change, including those in technology and finance, as well as social and environmental climates.

We will continue development of new varieties and cultivars that are adapted to changing climates, markets, and sustainability demands.

Stewardship. Agricultural production influences and depends on water resources. Watersheds, beginning at the highest elevations and ending in ocean estuaries will be studied to improve efficient use of water while reducing impacts to surface and groundwaters. Fish and wildlife depend on these watersheds and proper management of ocean and freshwater resources is important to maintain these populations and the food supply.

Assessments of contaminants and toxins and their impacts to environmental and human safety are key components of maintaining food security and food safety. We will continue to improve food security through improved nutritional quality of existing crops and adopting harvesting, storage, and processing approaches that improve food safety.

Resilience. New breeding and phenotyping techniques coupled with an expanding understanding of gene editing techniques will produce seafood, meats, crops, and fruits that are better adapted to changing climatic conditions that herald unknown pests and pathogens.

Understanding the impact of agricultural practices on the environment and human health improves agricultural resilience. Agricultural resilience relies on sustainability as well as adopting production techniques that provide ecological services, improved soils, safer foods, and a more secure food supply.

Term: Long

Science Emphasis Areas

Agroclimate Science
Bioeconomy, Bioenergy, and Bioproducts
Education and Multicultural Alliances
Environmental Systems
Family & Consumer Sciences
Food Safety
Human Nutrition
Sustainable Agricultural Production Systems
Youth Development

3 Food Innovation and Market Access

Description:

Markets and Access in Food and Health Innovations

All Scale. Creating new markets will involve working with large, medium, and small-scale producers, entrepreneurs, food processors, and community food groups. By leveraging our scientific expertise in nutrition, food safety, processing, economics, and access to markets and consumers, we can bring new products to market

more quickly, sustainably, and with better nutrition and lower cost.

Sustainable Food Processing. We are innovating practices in value added processing and product development, waste reduction, packaging (biodegradable materials, e.g.), and efficiencies that reduce energy and water consumption. Providing food production answers that address both quality and help address preharvest and postharvest contamination. We are also leading food safety with employee training, regulatory guidance, research, and validation.

Economic Sustainability: OSU scientists are improving access by reducing barriers to markets, both through policy and science in national and international markets. Much of this work will continue to involve ensuring that the world's food supply can be maintained without creating undue environmental impacts or reducing the availability of an adequate food supply to the world's population. This includes the sustainable and responsible use of animals for food, fiber and society services.

Healthy Communities. We will continue to work with our partners in Extension to develop healthy eating habits and diets in disadvantaged populations. We will continue to develop new crops, foods, and processing approaches that can reduce the impact of lack of access to healthy foods.

Term: Long

Science Emphasis Areas

Education and Multicultural Alliances
Environmental Systems
Family & Consumer Sciences
Food Safety
Human Nutrition
Sustainable Agricultural Production Systems
Youth Development

4 Working and Natural Landscapes

Description:

Working and Natural Landscapes

Rangeland Management. Rangelands are important to livestock production and conservation of fish, wildlife, native plants, and recreation. Balancing livestock production with the production of these other uses provides opportunities for science to inform the debate.

Connectivity. Improved agricultural production and yields can reduce impacts to natural systems as more food, fiber, and feed can be produced on less land. OSU will continue to create working relationships with NGOs, tribal governments, industry, and federal, state, and local governments and serve as a source of objective, science-based information.

Water Management. OSU will continue to use science to develop more efficient use of water and improving water quality. An important component of this will be development of new modeling techniques for both surface and groundwater, improved irrigation practices, developing crops that require less water, reducing nutrient use and subsequent loading of surface and groundwater resources.

Fish and Wildlife. OSU will continue fostering an understanding of the contributions fish, wildlife, and natural systems to ecosystem and human wellbeing. This includes threatened and endangered species and the importance of understanding each species contribution to the function and preservation of working and natural landscapes.

Stewardship. Working and natural landscapes require new science to determine how humans can be better stewards of benefits these lands provide. This will require development of new approaches to preserve soil health, improve degraded soils, and adoption of new cropping and tilling practices that can improve carbon

sequestration on these lands.

Term: Long

Science Emphasis Areas

Agroclimate Science
Bioeconomy, Bioenergy, and Bioproducts
Education and Multicultural Alliances
Environmental Systems
Family & Consumer Sciences
Food Safety
Human Nutrition
Sustainable Agricultural Production Systems

5 Animal Health

Description:

This critical issue describes the ongoing work to investigate and provide solutions for the various diseases, pests, and pathogens of animals. The work spans all animals from bees and bi-valves to traditional livestock production. Research and extension activities in this area also include nutrition, dietary supplementation, and some issues associated with human health due to the risk of transmission of diseases from animals to humans.

Term: Intermediate

Science Emphasis Areas

Food Safety
Sustainable Agricultural Production Systems

6 Thriving Youth, Individuals, and Families

Description:

OSUES faculty have the opportunity to prepare individuals and families to actively participate in life's decisions through living and working in a sustainable global society. Specifically, faculty will actively involve individuals, families, and communities in the identification of issues and collaboratively create viable solutions to improve the community. Faculty serving in research, teaching, and/or Extension roles will provide the leadership and expertise to lead the development and implementation of programs that can serve as a catalyst for change.

Only those programs that gather input from stakeholders and the intended audience will be successful at leading to a behavior change. Specific areas of emphasis include behavioral and mental health education for learners of all ages, career and college readiness programs to assist youth in preparing for the future, and nutrition and health programs that reinforce food safety, sustainability, and nutrition and health education.

Term: Long

Science Emphasis Areas

Education and Multicultural Alliances
Family & Consumer Sciences
Food Safety
Human Nutrition
Youth Development

7 Resilient Communities and Economies

Description:

We must invest in our communities to enhance economic opportunity, create resilient food systems, support youth development, increase social connectivity, and help address growing health challenges. OSUES faculty will continue to develop and offer programs that enhance community health and resilience by leveraging our expertise and partnerships to foster economic development, build social cohesion, and help address complex community challenges.

New programs that address poverty and underemployment, health and nutrition, food insecurity, and the growing opioid and mental health challenges in rural communities will be an essential focus of OSUES faculty.

We will enhance economic opportunity and close the achievement gap by providing equitable access to workforce education and youth development in communities across Oregon. This will include programs focusing on enhanced youth development, including 4-H and college and career readiness. Further, OSUES faculty will foster skill development in Oregon's rural workforce in the growing data science and outdoor economy sectors.

Term: Long

Science Emphasis Areas

Education and Multicultural Alliances

Family & Consumer Sciences

Human Nutrition

Youth Development