

Colorado (Colorado State University)

Plan of Work for 2023-2027

Status: Final (Approved 9/30/2022)

Executive Summary Overview

The Colorado Agricultural Experiment Station (CAES) and Extension at Colorado State University are committed to excellence in basic and applied research and translation of this research through Extension programs to crop (including ornamental) and animal (including equine) agriculture. Extension programs also reach beyond agriculture in accordance with our mission to empower Coloradans to address important and emerging community issues using dynamic, science-based educational resources. A statewide community needs assessment was completed in 2021 in order to enable local, regional, and state Extension and CAES resources to align with a systematic understanding of community needs and our potential for impact. We have also developed new program planning tools for both our program teams, called Planning & Reporting Units (PRUs), and individual staff. Group Plans of Work have been refreshed so that each PRU has identified a set of issues for which they are working toward medium- or long-term change. For each issue, PRUs have identified any connections between research and extension, planned multistate activities, a goal/problem/target audience, a theory of change, indicators of success, and a high-level evaluation plan. In their plans, individual staff identify the issues they will address in the coming year.

Extension will continue to emphasize a two-way transfer of knowledge through engagement with audiences throughout the state, based on research information from the CAES and in collaboration with the colleges of Agricultural Sciences, Health & Human Sciences, Engineering, Veterinary Medicine, Natural Resources, and Liberal Arts. In general, our PRUs go through a process of including diverse stakeholders, identifying needs, identifying core competencies, choosing issues to address and intended impact, developing a logic model or program theory of change, developing associated outcome indicators and evaluation tools, and delivering programs. As an organization, we have identified the areas of: youth development; community development; cropping systems; environmental horticulture; food systems; individual, family, and community well-being; livestock and range; natural resources; and nutrition, food safety, and health as the planned programs for which we can make the greatest impact in the state. Extension agents can affiliate with various PRUs over time according to local needs.

CAES is uniquely positioned to aid growers, producers, food entrepreneurs, policy makers, and other stakeholders through the strength of its faculty, extension staff, and (130-year) long legacy of scientific advancement in agricultural sciences. Given this context, programmatic direction for CAES Research Centers is prioritized in strategic areas with opportunities to build on existing strengths. Program planning is guided by the CAES strategic plan, which describes how to leverage this rich history to evolve CAES Research Centers to become CSU's focal point for mission-focused research and extension on: 1) resource based sustainable and integrated food production systems; 2) sustainable utilization of soil and water resources; 3) development and increased utilization of appropriate technologies; and 4) nutritional security and improved human health. This strategic plan, along with local and statewide input, guide program planning that is relevant and responsive to the needs of Colorado.

Merit and Scientific Peer Review Processes

CSU Extension develops and delivers resources and programs at both local and statewide levels. Locally, agents develop and deliver resources guided by county program plans, Extension Advisory Boards, emerging issues as identified by agents and volunteers, local expertise, and expressed needs of existing and potential clientele. CSUE has recently revised our individual program plan so that the document can be used to identify which issues an individual will provide programming for in the coming year and to align with county-based program plans. These documents are reviewed during the annual performance appraisal period by supervisors such as County, Area, and Regional Directors.

At the state level, our nine Planning & Reporting Units (PRUs) focus on addressing widespread issues for which our resources can make a significant impact. Each PRU completes a set of issue canvases in order to document any connections between research and extension, planned multistate activities, a goal/problem/target audience, a theory of change, indicators of success, and a high-level evaluation plan for each issue they choose to address. Staff can affiliate with PRUs according to local needs in order to inform planning efforts and in order to ensure that outcomes identified for aggregation by PRUs are inclusive of local needs when practical and meaningful. Development of PRU issue canvases is a collaborative exercise among peers in order to clearly establish and communicate shared goals and to plan effectively.

CAES conducts research on agricultural and natural resource issues that specifically impact Colorado. An integral unit of Colorado State University, the CAES conducts research in 13 departments at the main campus in Fort Collins, at 8 off-campus research centers (9 sites) throughout Colorado, and with individual cooperators. All research sponsored or conducted by the USDA National Institute of Food and Agriculture (NIFA), which includes all the CAES Research Projects, is required to be documented in the NIFA REEport data collection system. All projects are reviewed and approved by the Research Integrity and Compliance Review Office before they are submitted for NIFA's approval on REEport. The peer review process is conducted within the framework of predetermined criteria whose thrust is that of judging whether an CAES research project incorporates a state-of-the-art scientific approach to the topic investigated.

The peer review process will view individual research projects as the primary unit for planning and accountability by the National Institute of Food and Agriculture (NIFA), USDA. The broad goal of peer review is to subject every project to a rigorous and systematic evaluation for its appropriateness and quality. This broad goal is translated into the following six objectives: 1) ensure completeness of project outlines (all items in the current guidelines for an Agricultural Experiment Station Project Outline should be included); 2) evaluate relevance and potential impact of the proposed research, including stakeholders impacted; 3) evaluate quality and scientific value of the proposed research; 4) consider opportunities for cooperation with other individuals or units; 5) provide opportunity for the Principal Investigator to weigh criticisms with reviewers and make adjustments as appropriate; and 6) provide the Agricultural Experiment Station and USDA/NIFA with an indication, project by project, that the process was followed.

Stakeholder input: Action Taken to Seek Stakeholder Input

CSUE seeks stakeholder input in ways that encourage stakeholder participation via the following methods: Extension Advisory Board meetings; inclusive county- and program-based needs assessments;

focus groups; informal meetings with key informants; electronic and paper surveys; informational interviews; and through professional service that informs Extension programming such as serving on external advisory committees. In the most recent survey of these committees, 62 Extension county programs (in 54 county offices) had 112 advisory committees involving close to 2,000 individuals. Actions such as needs assessments and surveys regularly include use of incentives such as meals and gift cards to incentivize participation. Our 2021 statewide community needs assessment also included translation of surveys into Spanish, seven focus groups help in languages other than English (six in Spanish; 1 in Somali) and deliberative outreach to traditionally underrepresented groups. For the statewide Colorado Extension Advisory Committee (CEAC), which represents program recipient groups and programmatic collaborators at the state level, Extension administration pays travel expenses to two meetings each year to encourage participation.

The CAES regularly participates in meetings held by CSUE where current and future program needs are discussed. A variety of joint research programs are conducted with USDA-ARS programs in Fort Collins, Akron, and other locations as well as collaborative programs with USDA-FS, USDA-NRCS and USDA-NASS. Numerous programs are also conducted in cooperation with individuals. Regional listening sessions led by the CAES and Extension are held in the various regions of the state. Additionally, many CAES research centers around the state have advisory committees that provide feedback on program direction. Both CAES and Extension programs are modified to reflect the input received where appropriate and feasible.

Stakeholder input: Methods to Identify Individuals and Groups

In general, CSUE uses a mix of snowball sampling, direct client/volunteer input, and targeted

outreach to identify groups and individuals from whom to collect input. Snowball sampling occurs when an existing stakeholder suggests outreach to new stakeholders. Targeted outreach occurs when a county Extension office or program area recognizes that they have not included a given stakeholder in the input process. Prompts to stimulate recognition of such gaps include: our core value of “inclusive” and PRU issue canvases that ask for stakeholder input “from a diverse network”. Our statewide community needs assessment has included use of a demographic county profile for every county in the state. County Extension offices identified key informants based in part on use of this demographic data.

The CAES research program is modified based on input from stakeholders. Methods largely are planned in-person interactions with groups representing various sectors of Colorado agricultural, and horticultural sectors. Examples include working with an external, multidisciplinary stakeholder group on the science and policy of soil health; an external advisory committee specific to the livestock industry; and the utilization of research committees for wheat and potato industries to make sure breeding programs that reflect their needs. In essence, ongoing interaction with stakeholders through formal and informal means is used to ensure program relevancy. Results from Extension’s statewide needs assessment will be communicated across both Extension and CAES, as well as to engaged faculty, to promote opportunities for integrated research and extension.

Stakeholder input: Methods for Collecting Stakeholder Input

Input is collected at Extension Advisory Board meetings; inclusive county- and program-based needs assessments; focus groups; informal meetings with key informants; electronic and paper surveys; informational interviews; and through professional service that informs Extension programming such as

serving on external advisory committees. Depending on the purpose, input from those activities is documented and collected at the local or state level. Local input is fed into statewide planning via the Director's Advisory Council (which includes Regional Directors and county representatives from each region), meetings of Extension Regional Directors, informal teams working collaboratively to address important statewide issues, and through the PRUs themselves during their regular communications and annual meetings.

Our statewide community needs assessment utilized a secondary data analysis, key informant interviews, and a survey to provide us with robust data from a wide array of community members. Also included were seven non-English language focus groups in six counties. Six of those seven focus groups were conducted in Spanish, and one was conducted in Somali for members of that community in Morgan County, CO.

For CAES, each year the off-campus research centers hold local advisory meetings where research results are presented and proposed programs are discussed. Public input is solicited on all proposed programs and local agricultural needs. It should be noted that many of the programs discussed involve faculty and staff located on the Fort Collins campus as well as at the off-campus research centers and Extension county or area offices.

Stakeholder input: A Statement of How the Input Will Be Considered

For individual staff, input used to inform program plans is documented in annual performance appraisals. For county Extension offices, regular discussions between County Directors and Regional Directors are used to ensure that local input is considered in program planning. In addition, individual staff are encouraged to show how they've utilized input from county strategic plans when planning programs. For statewide PRUs, our current Issue Canvas template asks them to identify targeted condition change and a logic model for program planning based on needs assessment and stakeholder input. Results from the statewide community needs assessment will continue to be integrated to the evolution of county program plans. These local plans will continue to inform both statewide Issue Canvases and individual issue selection.

CAES faculty and staff at research centers utilize input from advisory committees and other stakeholders to develop 5-year project outlines. After review by the Deputy Director, these are entered into the USDA/NIFA REEport database.

Critical Issues

4-H Youth Development

Initiated on: Nov 26, 2019

State: Colorado

Term Length: Long-term (>5 years)

Communities in Colorado depend on quality, contributing members of society. Fostering productive community members begins with our young people. 4-H is Colorado State University's premier youth development program. Positive youth development addresses broader developmental needs of youth, in contrast to deficit-based models which focus solely on youth problems. Positive youth development occurs from an intentional process that promotes outcomes for young people by providing

opportunities and relationships and externally, through the delivery of projects and curriculum designed according to the best practices of youth development. Specific issues to be addressed by Colorado 4-H in coming years include: building civic capacity through volunteerism; youth access, equity, and opportunity; youth career or school pathways; and youth community service and leadership.

Program delivery is via one of six different delivery methods 1) Organized clubs, 2) School enrichment, 3) Short term/special interest, 4) School-age child care, 5) After school programs, 6) Camping.

Multistate efforts include: collaboration with the Western Region Program Leaders and the National Program Leader Working Group; participation in the work of the Access, Equity, Belonging Committee; working with other states on Juntos 4-H; and group educational events such as the National Western Roundup, shooting sports championships, and the National 4-H Livestock Quiz Bowl. Integrated activities include collaboration with research faculty from Human Development and Family Studies on projects such as "Identifying Generation Z (1996-2010) Volunteerism".

Science Emphasis Area

Youth Development

Community Development

Initiated on: Nov 26, 2019

State: Colorado

Term Length: Long-term (>5 years)

The goal of community development work is to develop and conduct educational programs/ research that contributes to healthy and vital communities. Specific issues to be addressed by the CD team include: diversity, equity, and inclusion; community health; community connectedness; and emergency management. Multistate work includes: community and economic development for SW Colorado in partnership with Utah; collaboration with eXtension to identify other states that have developed webinars/trainings and supports for building capacity in community health.. Integrated activities include: the Senior Access Points project; work on Economic Development Committees; active work with the Extension Disaster Education Network (EDEN), and collaborations with the CSU/CO School of Public Health, the College of Health & Human Sciences, CSU's One Health Institute, NACDEP, and Rural Development Centers (USDA and CO state offices) on projects such as the development of a validated Civic Capacity Index for use with communities and Colorado and beyond.

Science Emphasis Area

Education and Multicultural Alliances

Cropping Systems

Initiated on: Nov 26, 2019

State: Colorado

Term Length: Long-term (>5 years)

The goal of work on cropping systems is to enable farmers to adopt and implement improved production practices that strengthen the economic, social, and environmental condition of farms and local communities. Producer actions that improve the ability of farm operations to persist and thrive

though successive generations is a primary consideration. Individuals, families and communities will benefit by having a safe, secure and sufficient food supply. Colorado farmers will be equipped to accommodate increased demand for local and global food supply without compromising the natural resource base on which we all depend. Specific issues to be addressed in the area of cropping systems include: soil health; pest management; alternative crops; ag business sustainability; and regenerative agriculture.

Multistate activities include on-farm crop research and group educational events such as field days and research presentations with states in the Midwest and intermountain west. Integrated activities include field testing of crop varieties. Integrated activities include a wide range of research such as: evaluating organic crop systems; variety trials for milo and other crops; identifying soil physical, chemical, and biological properties soil health; insect, disease, and weed pests; and high altitude research and demonstration projects.

Science Emphasis Area

Agroclimate Science, Sustainable Agricultural Production Systems

Energy

Initiated on: Nov 26, 2019

State: Colorado

Term Length: Long-term (>5 years)

Our energy work facilitates sustainable energy decisions in order to achieve an environmentally sustainable and economically resilient energy system. Multistate work consisted of contributing to the organization and execution of National Extension Energy Summits. Integrated activities include testing specialty crops growth under solar panels at AES stations.

Science Emphasis Area

Agroclimate Science, Environmental Systems, Sustainable Agricultural Production Systems

Environmental Horticulture

Initiated on: Nov 26, 2019

State: Colorado

Term Length: Long-term (>5 years)

Environmental horticulture work provides education and services to encourage the adoption of research-based best management practices (design, plant selection, establishment, and management practices) and diagnostic techniques/services by green industry professionals and the home gardener. Our goal is that professional and lay practitioners will use reasonable inputs of labor, water, fertilizers and pesticides to produce attractive, functional, cost-effective and sustainable ornamental landscapes. Specific issues to be addressed in the area of environmental horticulture include: sustainable landscapes; pollinator promotion; integrated pest management and horticultural diagnostics; and urban agriculture.

Multistate work consists of activities including publication of articles and group educational events in collaboration with colleagues from other states. Integrated work includes: projects on orchards for

Colorado Master Gardeners; Kermes scale research; Plant Select demonstration gardens and variety trial research used for the development and release of best-adapted plants/vegetables for use in Colorado and the western U.S.; the Native Bee Watch citizen science program; and invasive species (emerald ash borer, Japanese beetle) and other common landscape/horticultural pest problems.

Science Emphasis Area

Education and Multicultural Alliances, Environmental Systems, Sustainable Agricultural Production Systems

Food Systems

Initiated on: Nov 26, 2019

State: Colorado

Term Length: Long-term (>5 years)

Food systems work results provides technical assistance for agricultural and food producers, which improves existing or exploring new marketing channels, production practices, and alternative business approaches. We also provide facilitation of community discussions around the interface between food and agricultural issues and broader social issues including public health, food safety, the environment and community development. Specific issues to be addressed in the area of food systems include: strengthening the meat value chain; cottage foods; and business management for new and beginning farmers.

Multistate work consists of: collaborations with other states on agritourism and food systems research; a Rocky Mountain Meat Summit; and publications with other western states on backyard livestock and community-supported agriculture. Integrated work consists of: agricultural economics research on meat supply chains; integrating research from Food Science and Human Nutrition that helps cottage foods producers better understand nutrition, labeling and safe point-of-sale handling; and developing financial performance benchmarks using USDA ARMS data to understand differences in financial metrics and on-farm resource use between beginning and non-beginning farmers and ranchers.

Science Emphasis Area

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

Individual, Family, and Community Well-being

Initiated on: Nov 26, 2019

State: Colorado

Term Length: Long-term (>5 years)

When people are in a state of financial and relational wellness, they are in control, confident and focused. They have greater balance and stability so they can concentrate on the most important tasks at hand such as weathering difficulties and making progress toward their goals. Educational programming in these realms of individual and family well-being helps creates strong communities. Specific issues to be addressed in the area of individual, family, and community well-being include family financial stability and healthy aging.

Multistate activities include the GRANDcares Project (funded by USDA/NIFA) with the University of Hawaii. Integrated activities include the GRANDcares Project; “Strengthening Families – SFP 10-14 Opioid Prevention project”; and a partnership with Human Development and Family Studies faculty to evaluate healthy aging programming.

Science Emphasis Area

Family & Consumer Sciences

Livestock and Range

Initiated on: Nov 26, 2019

State: Colorado

Term Length: Long-term (>5 years)

Livestock and range work strives for rangeland health, improved animal health and production, industry policy and regulation awareness, and economic sustainability using a broad array of methodologies that provides information, skills, and technology to producers and Extension agents. Our target audience is livestock producers, ranchers, and rangeland managers who have, or are striving for, a significant portion of their personal income coming from the farm/ranch. These may be small farms/ranches or larger scale operations. Livestock producers may also integrate cropping production systems into their operations. Specific issues to be addressed in the area of livestock and range include: ranch analysis and planning; drought; and soil health.

Multistate activities include: researching soil health treatments in New Mexico, Arizona, and California; hosting conferences; working with the national Extension Disaster Education Network; and other activities. Integrated activities include: work on a healthy soils initiative; adaptive management on rangelands through Total Ranch Analysis Colorado (TRAC) and other programs; and integrating research findings from the USDA-ARS Central Plains Experimental Range.

Science Emphasis Area

Agroclimate Science, Sustainable Agricultural Production Systems

Natural Resources

Initiated on: Nov 26, 2019

State: Colorado

Term Length: Long-term (>5 years)

Natural resource efforts are focused on how to best manage our landscapes from the perspective of plants, animals, soils, water, and pests. Our goal is to protect these resources through our programming efforts, with special emphasis on native species. Specific issues to be addressed in the area of natural resources include ecosystem sustainability and emergency management.

Multistate efforts include group educational events such as Northern Plains Climate Hub Outreach Exchange workshops and participation in the Extension Disaster Education Network. Integrated activities include water balance and other studies as well as integration of site-specific research on watershed vulnerability into recommendations for landowners through the Watershed Assessment and Vulnerability Evaluations (WAVE) program.

Science Emphasis Area

Agroclimate Science, Environmental Systems, Sustainable Agricultural Production Systems

Nutrition, Food Safety & Health

Initiated on: Nov 26, 2019

State: Colorado

Term Length: Long-term (>5 years)

Nutrition, food safety and health promotion programming provides research-based education to a variety of audiences across Colorado in an effort to promote safe and healthful eating habits and a physically active lifestyle. Adoption of these behaviors may reduce the incidence of foodborne disease as well as chronic diseases, such as diabetes, heart disease, obesity and cancer. Specific issues to be addressed in the area of nutrition, food safety, and health include: diabetes prevention and management; cottage foods; and food insecurity in low-income families.

Multistate efforts include: professional development, curriculum updates, new initiatives, and evaluation support related to the national Dining with Diabetes (NDWD) Program; group educational events such as food safety conferences; and national planning sessions on food safety education. Integrated activities include projects such as research and Extension on uncured meat and involving K-12 students in service learning when growing food at AES stations (and donating surplus to local food banks).

Science Emphasis Area

Food Safety, Human Nutrition