Montana (Montana State University)

Plan of Work for 2023-2027

Status: Final (Approved 9/20/2022)

Executive Summary Overview

The Montana State University College of Agriculture (COA), the Montana Agricultural Experiment Station (MAES) and MSU Extension have collaborated with the people of Montana for more than 100 years to address problems and prepare for an improved future through research and the delivery of timely, applied science and information to stakeholders. The 2023-2027 Plan of Work highlights how this partnership will continue. The COA and MAES are led by Vice President of Agriculture, Dean, and Director Dr. Sreekala Bajwa.

The College of Agriculture has an enrollment of more than 2,000 students, including over 300 graduate students, in six departments: Agriculture and Ag Economics, Agricultural and Technology Education, Animal and Range Sciences, Microbiology and Immunology, Land Resources and Environmental Sciences, and Plant Sciences and Plant Pathology. MSU, along with University of Idaho and Utah State University, are partners with Washington State University in the Washington Idaho-Montana-Utah (WIMU) Regional Program for Veterinary Medicine. The College also hosts MSU's Peace Corps Prep program.

The MAES mission is to "generate and disseminate superior knowledge and technological solutions to increase the competitiveness of communities capturing value from Montana's agricultural and natural resources, preserve environmental quality, and improve the quality of life for all our citizens." To fulfill this mission, MAES research focuses on addressing timely and relevant challenges facing Montana's agricultural sector and effectively communicating that research across a broad range of audiences. This ensures the research is both informed by, and informs, the stakeholder groups who will most benefit from new knowledge.

All Hatch projects at MSU are based within the COA/MAES. Hatch projects have an integrated focus on developing state-of-the-art solutions to short- and long-term challenges facing Montana, the mountain west region of the United States, the nation, and the world. Some of the top issues include water use and changes in availability, measuring and understanding the impacts of region-specific climate change on food production and security, assessing barriers and opportunities to increasing productivity and economic returns with scarce inputs, improving cost-effective management of land and natural resources, and identifying and managing risks in food production and processing.

In addressing these issues and communicating knowledge to stakeholders, COA/MAES is using a broad range of science-based approaches. These include the implementation of precision and data-intensive agriculture; innovations in plant breeding, pest management, cropping systems, animal genetics, and animal nutrition; assessments of environmental quality, economic and social sustainability, and the use of pioneering microbiology and infectious disease research to address animal and human safety.

Eighty percent of MAES faculty are located on the main MSU campus in Bozeman. In addition, MAES has seven off campus Research Centers (Northern Ag Research Center, Havre; Central Ag Research Center, Moccasin; Eastern Ag Research Center, Sidney; Northwestern Ag Research Center, Kalispell; Southern Ag Research Center, Huntley; Western Ag Research Center, Corvallis; and Western Triangle Ag Research Center, Conrad) and six campus farms (Bozeman Agricultural Research and Teaching Farm, Arthur H. Post Agronomy Farm, Lutz Farm, Red Bluff Research Ranch, Fort Ellis Research Farm, and the Horticulture Farm). Many students and on-campus faculty work in collaboration with research center and farm personnel to conduct teaching, research, and outreach.

MSU Extension's mission is to improve the lives of Montana citizens by providing unbiased, research-based education and information that integrates learning, discovery, and engagement to strengthen the social, economic and environmental well-being of individuals, families, and communities." Extension is led by Dr. Cody Stone. Dr. Stone reports directly to President Waded Cruzado and both he and Dr. Bajwa are part of the President's Executive Council.

Extension has always had a grassroots structure, with agents living and working across the state to ensure deep engagement with producers, families, businesses and communities. Extension also includes campus-based specialists and associate specialists who bridge international, national, and state expertise to communities, state and federal agencies, and other stakeholder groups. Most projects are born directly from the challenges and desires of the state's people. Often, projects have tremendous local impact. Many are tightly linked with local, regional and national priorities from a diversity of supporting agencies. For management and leadership purposes, the state is divided into three regions-East, Central and West—with Extension department heads leading each region. Extension leverages Smith Lever dollars with county contributions to support salaries and operational costs for Montana's 94 County and Reservation Extension Agents. Extension's main program areas are Agriculture and Natural Resources, Family and Consumer Sciences, 4-H Youth Development, and Community Development.

Many MSU faculty members have appointments that span teaching, research, and outreach, with their FTE split between COA, MAES, and Extension. Extension also has faculty in the College of Education, Health and Human Development and the College of Letters and Science. Collectively, Hatch, Smith-Lever, State of Montana, and county and local funding continue to allow MSU's faculty to meet the changing needs of Montana, explore unique solutions to pressing questions, and solve global problems. These funds provide a foundation for COA/MAES and Extension to successfully compete for complementary grant funding.

MSU continues its role as the hosting institution for the Western Sustainable Agricultural Research and Education (SARE) program. SARE is a USDA program that operates with competitive grants conducted cooperatively by farmers, ranchers, researchers and ag professionals to advance farm and ranch systems that are profitable, environmentally sound, and good for communities. All SARE-funded projects are required to include research, education and outreach components in their design.

Montana is home to the most land-grant institutions of any state in the nation. In addition to MSU, which is part of the original Morrill Act of 1862, there are seven tribal colleges that received the designation through the Elementary and Secondary Education Reauthorization Act of 1994. These institutions and their tribal affiliations are: Aanijih Nakoda College (Gros Ventre and Assiniboine), Blackfeet Community College (Blackfeet), Chief Dull Knife College (Northern Cheyenne), Fort Peck Community College (Sioux and Assiniboine), Little Big Horn College (Crow), Salish Kootenai College

(Bitterroot Salish, Kootenai, and Pend d'Oreille Kootenai of the Flathead Nation) and Stone Child College (Chippewa-Cree). In addition, four of the reservations partner with MSU Extension through the Federally Recognized Tribal Extension Program (FRTEP). The Blackfeet, Flathead, Fort Belknap and Fort Peck reservations all have Extension agents who live and work in the community and perform duties much like county agents.

MSU recently adopted a new 2019-2024 Strategic Plan: Choosing Promise http://www.montana.edu/strategicplan/index.html. The plan includes three central priorities: Transformational Learning, Scholarship that Improves Lives, and Expanding Engagement. In addition, the plan identifies four grand challenges of particular focus for MSU. These are: Caring for our environment: environmental science, design, engineering, architecture and social structure; Promoting wellness in our communities: access and equality in education and health outcomes, community-based participatory research, biomedical sciences and entrepreneurship; Food and fuel security: sustained food systems, precision agriculture, energy production, transmission and storage; and Securing the future of Montana: cybersecurity, photonics and optics, defense, governance and public policy.

In February 2020, the COA/MAES adopted its College and Experiment Station-specific strategic plan, http://ag.montana.edu/strategicplan.html. The five-year plan was developed over a 9-month period with input from faculty, staff, students, alumni, and Montana community members who look to COA/MAES to provide impactful research and education. The plan is intended to guide the College and Experiment Station over the next five years and sets out goals that will ensure the growth and success of transformative education, translational research, and engaging outreach programs that benefit Montana and beyond. The plan has seven focus areas, with 2-3 specific objectives for each focus area. The focus areas include: A people-driven environment; Impactful research and development; Transformational teaching and learning; Effective and inclusive engagement and outreach; Strengthening and growing internal and external partnerships; Strategic stewardship of resources; and Transparent and effective communication.

The COA/MAES strategic plan was developed to provide direction for the College and Experiment Station to make significant advances toward meeting its missions, and to align with the MSU Choosing Promise strategic plan.

The critical issues identified by MSU align with the basic program areas that have traditionally been part of COA/MAES and Extension. The specifics will continue to be refined with the new plan of work process. The critical issues are Agriculture and Natural Resources, Family and Consumer Sciences, Community Development, and Youth Development.

Merit and Scientific Peer Review Processes

Department heads within COA/MAES review Hatch projects at the department level. A committee of peers then reviews the project and pass it to the director for final approval. The peer review committee, selected by the director after consultations with COA department heads, includes the principal investigator's (PI) department head, MAES administrator, one department peer reviewer and two additional faculty external to the PI's department. Researchers present seminars to the review committee and interested stakeholders including faculty, staff, students and constituents.

Reviewers of MAES projects provide written recommendations on project relevance and importance; relationship of the project to previous research; objectives; approach and methods, scientific and technical quality; resources; and environmental, economic, and/or social impacts. The MAES administrator and department head share responses with the PI. If projects do not meet expectations, the director does not approve them and will defer them until the researcher meets the key elements satisfactorily. The director requires researchers to propose new projects for a three-year period, while researchers with favorably reviewed, ongoing projects continue for five years. Annual and long-term guidance are provided to faculty and administrators via local and project-based advisory committees to individual projects and research center faculty. Additional input is obtained from the MAES Advisory Board and Montana Extension Advisory Council.

The COA/MAES has an on-boarding program for recently hired COA/MAES and Extension faculty. The program provides College and Experiment Station-specific information about a variety of topics relevant to faculty. One of the topics covered in the on-boarding program is the Hatch project process. The session covers information about the purpose of Hatch projects, how to effectively write proposals, the importance of providing descriptive annual summaries of activities, and tips for effectively describing impacts of research and outreach efforts. The goal of the program and the specific session on Hatch projects is to more quickly develop faculty's ability to contribute effective information to COA/MAES, USDA, and other funding agencies.

Extension faculty are required to complete at least one Engagement Plan within Activity Insight, a web-based faculty activity reporting program used by Montana State University. The Engagement Plan requires information including assumptions, target audience, needs assessment, inputs, outputs (activities and methods), evaluation studies, data collection, and anticipated outcomes. These plans are reviewed at least annually as part of the performance review. Needs assessments include stakeholder and peer input from local, county, state, regional and national sources, depending on the project.

Extension faculty are also required to complete at least one annual Engagement Results report for their active plans, and for other projects that happen during the year based on emergent needs of communities and constituents. The Engagement Results report includes a summary of the issue/need, what was done about it and the actual measured quantitative and qualitative results as well as a list of community partners who were involved in design, implementation and evaluation of the project. These reports are part of annual performance reviews and are reviewed by supervisors, department heads, Extension administration and, as needed, by the university administration. Faculty also report to county commissioners, college department heads, community partners, 4-H foundations and other partners who provide funding and other resources.

Stakeholder input: Action Taken to Seek Stakeholder Input

COA/MAES and Extension continually seek and obtain stakeholder input on program priorities. People who attend Extension or MAES programs or are referrals from other agencies are asked to indicate which issues are important to them, their families, and communities. Radio, newsletters, newspapers, and electronic distribution lists are used to inform clientele about the opportunity to make requests for assistance. Informational booths are set up at agricultural trade shows, home and garden shows, farmers' markets, county fairs, and health fairs to reach people who are not regular clientele. Staff also give presentations at community clubs and other events. Conversations with attendees reveal

concerns/issues that might not be heard otherwise. When common issues surface through these methods, they are considered in the program planning process.

Stakeholder committees include the sustainable agriculture focus group, MAES State Advisory Council, Ag Coalition (includes representation from the Agricultural Business Association, Farm Bureau Federation, Montana Stockgrowers, Montana Grain Growers, Montana Farmers Union, Montana Water Users, Montana Wool Growers, Seed Growers and Seed Trade), Montana Extension Advisory Council (MEAC), additional commodity or programmatic advisory committees, Montana Association of Counties (MACO), county commissioners, Montana League of Cities and Towns, health and human service groups, 4-H Foundation, disaster planning and recovery and other state and local groups. Faculty routinely participate with these groups and the Natural Resources Conservation Service (NRCS) to provide training and expertise. The Ag Coalition meets periodically with the vice president of agriculture to review program priorities, new initiatives, fundraising efforts, and legislative activities. Faculty create or work with representative groups to gain input on their own research and engagement priorities.

Extension agents also use county profile information to make sure that participants in planning and evaluation sessions reflect the diversity of the area. Input is considered throughout the planning, development, implementation, and evaluation process.

Stakeholder input: Methods to Identify Individuals and Groups

Advisory committees

Internal focus groups

External focus groups

Open listening sessions

Formal and informal constituent interviews

Key informant interviews

Needs Assessments Surveys

MAES's seven agricultural research centers have local advisory groups that meet multiple times per year. A state MAES Advisory Council meets three times per year to discuss program focus and direction, Montana legislative priorities, and productivity/impact of research and outreach revolving around program priorities. These meetings are open to the public. Administrators and faculty in the COA, MAES and Extension serve on agricultural association committees that annually direct and fund research and outreach activities. These committees use a variety of collection methods, but the most common are face-to-face meetings and telephone or video conferencing. The newly implemented COA/MAES strategic plan also includes several objectives to build and maintain enduring partnerships to inform and advance the land-grant mission. This includes increasing communication and interaction with commodity and allied organizations by increased engagement between faculty and external stakeholders and making a concerted effort to increase input from historically under-represented stakeholder groups.

For Extension, membership on county advisory councils is generally achieved by sending an invitation to stakeholder groups requesting the name of an individual who can represent their views and provide input for Extension programming. A similar invitation is sent to non-traditional groups, with personal contact made to explain the role of the representative. Programs that serve specific clientele, such as SNAP-Ed and EFNEP, ask clientele directly for input or may ask them to serve on a specific advisory committee for the program area.

Membership on the Montana Extension Advisory Council (MEAC) is based on geographic representation, areas of interest, and some previous relationship with Extension. Recruitment from specific sectors such as health care, government agencies and community development are also targeted. County Extension agents, state specialists, program leaders and regional department heads are asked to make recommendations for membership to MEAC. Those who are selected serve a 3-year term and meet biannually.

Stakeholder input: Methods for Collecting Stakeholder Input

Through direct participation with stakeholder groups, broad participation in committees, and directed meetings, COA/MAES and Extension listen to and consider defined problems or questions that research, outreach, and education programs can address. Each institution also targets select meetings with non-traditional groups on a regular basis.

The most common method of gathering stakeholder input is through interviews with regular clientele of MSU Extension and MAES. Often this occurs in intentional program planning sessions. Examples of these groups may be county/reservation councils, 4-H councils, livestock associations, weed boards, human resource coalitions, local and state agricultural organizations, Ag Research Center advisory committees, or special interest groups. Some of these groups have leadership boards that are asked for specific input.

Individual program, county, and state advisory committees are also used to gather input. Advisory groups are generally comprised of a cross section of the leadership and citizens in the county or program of interest. Efforts are made to involve underserved and underrepresented clientele by contacting agencies and organizations that regularly work with those groups. They are asked for input or for names of people who can provide input. Local extension faculty follow up with personal conversations to explain the goals of the organization and the process.

At the state level, one of the most valuable sources of input is the Montana Association of Counties. Extension makes presentations during MACo's Annual Meeting, followed by an open session for mutual dialogue. These types of discussions also happen during newly elected county commissioner orientation and have proven very beneficial. Extension administration, through regional department heads, also gathers stakeholder input from county commissioners through regular and systematic visits at the county level.

Surveys are used to gather information at the state or local level. Additionally, Montana's open meeting law requires inviting the public, and the organizer must publish an agenda per Montana Code Annotated 2-3-101.

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

As a land-grant institution, Montana State University has a solid foundation of program initiatives that promote stakeholder input and strong interactive dialogue through which COA/MAES and Extension administrators, faculty, scientists and staff set the tone for this collaborative environment. MAES and Extension serve jointly as the primary conduit for connection and delivery of education and new knowledge throughout Montana.

Information gathered through the stakeholder input process is used to determine program needs and direction. In some cases, educational teams made up of county Extension agents, specialists, clientele and researchers are formed to develop and implement programs.

The statewide Montana Extension Advisory Council (MEAC) meets twice per year. MAES Advisory Committees and the Ag Coalition Committee meet several times throughout the year to offer input and feedback. The Director of Extension and Vice President, Dean, and Director of COA and MAES meet at least monthly and provide system-wide updates and discussion about program priorities and funding.

Montana stakeholders indicate they are concerned about issues that are receiving attention across the nation. Many worry about agricultural market uncertainty, job security, and accessing health care in their communities. Agricultural producers are concerned about a positive profit margin, trade and agricultural policy interventions, combating detrimental pests, increasing soil quality and management practices, and improving mental health. Rural families are concerned about mental health, disproportionately high youth and adult suicide rates, and wonder if local schools will remain open or conversely if overcrowding and transiency will continue to cause issues.

In those areas where education and research can help address the issue, Montanans look to Extension and MAES as a trusted resource so they can make choices and decisions that are best for their families, businesses and communities. Budgets and staffing decisions are influenced and aligned to input provided by the aforementioned groups.

Critical Issues

Agriculture and Natural Resources

Initiated on: Nov 26, 2019
State: Montana

Term Length: Long-term (>5 years)

COA/MAES and Extension are focused on providing timely, relevant and local research, resources, education and opportunities in support of Montana's leading economic, cultural and traditional industries related to agriculture and natural resources.

The USDA 2019 Montana Agricultural Statistics Report ranked Montana first in the U.S. in production of garbanzo beans and lentils; second in production of barley, canola, dry edible peas, flaxseed, honey, safflower, durum wheat, and other spring wheats; and third in production of alfalfa hay, and winter wheat. In addition, Montana ranked seventh in lamb crop and breeding sheep, and wool production and eighth in the U.S. in calf crop and seventh in beef cows. Collectively, crop and livestock production was valued at $4.4 billion dollars in 2018. Basic, fundamental and applied research related to improving the sustainability and profitability of animal and crop production are a primary emphasis. Additional focus is

placed on pest and invasive species management, small acreage management, horticulture, climate science, farm and ranch management and agricultural economics, and mental health/stress.

Montana has more than 60,000 miles of perennial streams providing irrigation, drinking water and recreation; as well as 25 million acres of forest that provide open space, clean water, wildlife habitat and recreation. Montana also has a long history of oil and mineral extraction, boom and bust cycles and boom towns that turn into ghost towns. As appropriate, COA/MAES and Extension pursue opportunities to better understand and support projects related to coal deposits, oil, windfarms and geothermal energy potential. An emphasis is placed on projects that support the health of soil, water, range, forests and watersheds.

Science Emphasis Area

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

Community Development

Initiated on: Nov 26, 2019
State: Montana

Term Length: Long-term (>5 years)

COA/MAES and Extension are focused on providing timely, relevant and local research, resources, education and opportunities in support of Montana's leading economic, cultural and traditional industries related to agriculture and natural resources.

The USDA 2020 Montana Agricultural Statistics Report ranked Montana first in the U.S. in production of garbanzo beans, lentils, dry edible peas, and alfalfa hay; second in production of barley, canola, flaxseed, safflower, durum wheat, and other spring wheats; third in production of all wheat types; and fourth in honey production. Montana again led the nation in the acres of organic spring wheat, durum wheat, lentils, and dry peas; second in winter wheat; and eighth in barely. In addition, Montana ranked seventh in beef cows, lamb crop, breeding sheep, and wool production and ninth in the U.S. in calf crop. Collectively, crop and livestock production were valued at $4.6 billion dollars in 2019. Montana ranks second for land in farms and average farm size. Basic, fundamental and applied research related to improving the sustainability and profitability of crop and animal production are a primary emphasis. Additional focus is placed on pest and invasive species management, small acreage management, horticulture, climate science, farm and ranch management and agricultural economics, and mental health/stress.

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Science Emphasis Area

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

Family and Consumer Sciences

Initiated on: Nov 26, 2019
State: Montana

Term Length: Long-term (>5 years)

Societal costs of poor health related to nutrition and physical activity, are on the rise in Montana. Accessing healthy, nutritious and affordable foods is a major challenge for many families in Montana. Almost 20% of Montana children live in poverty (higher on reservations). Montana has an abundance of nutritious, seasonal, wild, and homegrown foods appropriate for food preservation.

Family economic education can extend financial resources and increase the ability of families to meet their own needs, thereby reducing costs to society. Understanding estate law can prevent tremendous financial loss for families.

Montana's population is aging, with unique needs for elderly citizens. Changes in health, self-sufficiency, access to nutritious food, and appropriate healthcare are challenges for the elderly. Over 6,000 Montanans are the primary care providers for their grandchildren. Approximately 118,000 unpaid caregivers provide 110 million hours of care to loved ones at a value of $1.4 billion.

Montana has ranked in the top five in the U.S. in suicide rates for more than 40 years. This alarming statistic and the previously mentioned stresses on individuals and families are increasing citizen's recognition of the importance of mental health.

Extension, COA/MAES will continue to conduct research, education, and outreach that improves healthy living, nutrition education, food preservation skills, food safety knowledge and practice, food accessibility, individual and family economic and estate planning education, caregiver support and resources, and mental health support.

Science Emphasis Area

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

Youth Development

Initiated on: Nov 26, 2019
State: Montana

Term Length: Long-term (>5 years)

During stakeholder input processes, youth issues continue to surface as a priority for Montanans. The MSU Extension 4-H program provides opportunities for life skill and competency development focused on helping youth to become strong, contributing members of their families, communities, and world. Stakeholders recognize the 4-H program as an effective, proven venue for youth to explore topics related to citizenship, healthy living and science, as well as to learn about leadership, volunteerism, and community service. Youth involved in 4-H learn how to lead, follow, and be contributing members of a

team, and to apply their knowledge and skills in other environments. MSU researchers provide mentorship and learning opportunities to youth through Ag Research Center activities, school field trips and Field Days.

Science Emphasis Area

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