

University of Maine Combined Research and Extension Plan of Work 2021-2025

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I. Plan Overview

1. Executive Summary

The University of Maine Cooperative Extension and the Maine Agricultural and Forest Experiment Station (MAFES) have served the people of Maine for over 100 years. Over 190 faculty and professionals contribute to the outreach, research, and development programming benefiting the people of Maine. We ensure our research and extension outreach programs meet local needs by grounding them with input from a variety of advisory groups, regular meetings with constituency groups at field days and other events, county extension advisory committees, and through direct faculty and administrator interaction with cooperators and constituents.

UMaine Extension is a partnership of county, state and federal funding. By conducting Extension programs in every Maine county, we support UMaine's public education and service role as a land grant and sea grant institution. Extension helps support, sustain, and grow the food-based economy, and conducts the most successful out-of-school youth educational program in Maine through 4-H.

MAFES is the College of Natural Sciences, Forestry, and Agriculture's center for applied and basic research. MAFES faculty and scientists use cutting-edge tools to address new challenges for Maine's natural resource-based industries and develop the new knowledge that fuels innovation.

In 2021, UMaine Extension and MAFES programs will continue to focus on five critical issues (succeeding planned program areas):

MAINE FOOD SYSTEM through research and outreach related to agriculture, aquaculture, food processing and distribution, business education, food safety, and human nutrition to create a safer, healthier, more accessible and increasingly productive food system.

POSITIVE YOUTH DEVELOPMENT through 4-H programs with a focus on the STEM disciplines to boost youth educational, career and life success.

SUSTAINABLE COMMUNITY AND ECONOMIC DEVELOPMENT through programs related to small & home-based businesses, household resources, community assets, farm business management, natural resource-based industries, and commercial fisheries to increase the profitability and sustainability of Maine's natural resource-based industries and provide research support to rural communities to understand and adapt to economic and demographic challenges.

CLIMATE CHANGE by delivering new knowledge and technologies to help mitigate and adapt to the effects of climate variability and change.

SUSTAINABLE NATURAL RESOURCES in agriculture and food sciences, forestry and wood products, fisheries and aquaculture, wildlife, outdoor recreation, and rural economic development to increase our understanding of and knowledge about Maine's natural resources to help the state manage these resources sustainably.

Cooperative Extension

Cooperative Extension has developed programming priorities to address the expressed needs of Maine people. Chief among our current priorities is broad work within the Maine food system, which includes a strong focus on agricultural sustainability and interrelated work in policy, research, production, processing, commerce, nutrition, food security, and food safety. Maine agriculture is diverse with important sectors that include potatoes, wild blueberries, maple, dairy, grains,

livestock, poultry, fruits, vegetables, and ornamental horticulture. Even though Maine is 90 percent forested, the state has 7,600 farms, the largest number of any New England state. UMaine Extension will continue to play a pivotal role in supporting a majority of these farms. Many of the recommendations to Maine's agricultural community come directly from research conducted at Maine Agricultural and Forest Experiment Station farms.

We will continue to expand programming through our University of Maine Cooperative Extension Diagnostic and Research Laboratory, a 28,000-square-foot commercial laboratory building located a few miles from campus, and housing our Veterinary Diagnostic Lab, Aquatic Animal Health Lab, Arthropod Lab, and Plant Disease Diagnostic Laboratory. Built in 2018, this facility is the most bio-secure location within the UMaine System, and brings together scientists researching animals, agriculture, insects, and plants under one roof. By allowing for research contributions to agriculture, public health, communities, and wildlife, the lab will benefit Maine in a variety of ways, including protecting the natural resource- and food-based economies, adding to food safety and human health, and providing unique diagnostic and testing services to farmers and the public.

An equally strong and traditional focus for Cooperative Extension is 4-H Positive Youth Development. Our program provides experiential educational and leadership programs for over 25,000 Maine youth, emphasizing the building of life skills necessary to be successful adults. Youth ages 5-18 participate in 4-H through clubs, camps, schools, and afterschool programs. Within the wide variety of 4-H programs we have a special focus on science, technology, engineering, and math (STEM) to help foster interest in these areas as avenues to successful careers. In all programs, youth are actively involved with their own learning, choosing which project areas they would like to learn about and working with volunteers and educators to further their own learning. Our four 4-H Camp and Learning Centers provide outdoor, experiential learning for clubs, schools, and community, and we will continue to expand Extension's youth programming through these venues. As always, volunteers are key to the success of Maine 4-H. Our volunteers work in partnership with youth to focus on citizenship, leadership, and life skills development through "hands-on" learning experiences. In addition to making a difference in the lives of young people, volunteers also gain skills for their own personal and professional development.

Our work also continues to include a focus on sustainable community and economic development. Much of our sustainable community development work is integrated within our programming in the Maine Food System, and 4-H Positive Youth Development. It also includes community leadership, facilitation, and volunteer management. Our economic development work includes community economics and education through small business and community development programs where participants learn how to effectively manage and sustain small and home-based businesses, household resources, and community assets. This work contributes to viable businesses, households, and communities by contributing to gainful employment, quality of place, and more effective use of limited public resources.

Maine Agricultural and Forest Experiment Station

The Maine Agricultural and Forest Experiment Station is the University of Maine's center for applied and basic research in agriculture and food sciences, forestry and wood products, marine systems, fisheries and aquaculture, wildlife, outdoor recreation, and rural economic development. The station's programs strive to enhance the profitability and sustainability of Maine's natural-resource-based industries, protect Maine's environment, and improve the health of its citizens.

In addition to identifying and addressing agricultural and natural-resource research needs of Maine, the programs of the Maine Agricultural and Forest Experiment Station strive to address today's most serious threats in foods and agriculture. These threats are reflected in the USDA National Institute of Food and Agriculture's six challenge areas for research: food security, climate variability and change, water, bioenergy, childhood obesity, and food safety. Maine's plan of work for 2021 engages in all of these priority areas, and supports economic development in Maine's agricultural and natural resource sectors. The research described in this plan of work falls under four broad program areas: Sustainable Community & Economic Development, the Maine Food System, Climate Change, and Sustainable Natural Resources.

Agriculture, forestry, aquaculture, and marine fisheries are important sectors of Maine's economy. The industries and small businesses at the core of these sectors are the foundation for allied businesses in food processing, wood products, and other goods and services. Maine's natural resources also attract millions of tourists each year who support an important hospitality sector. Maine has unique advantages in these sectors, but as in all business arenas, research and development are continually needed to remain competitive in regional, national and international markets. In the case of

agriculture, Maine is relatively close to major markets in Boston and New York. In forestry, Maine is the most forested state in the nation and is well positioned to compete in emerging bioenergy markets. And Maine's more than 3,500 miles of coastline provides unique opportunities for aquaculture, fisheries, and tourism industries. This updated plan of work is part of the Maine Agricultural and Forest Experiment Station's efforts to continually adjust research programs to help Maine businesses and producers seize new opportunities and meet current and anticipated challenges.

Research to protect Maine's environment and promote public health are important goals within this plan of work, including, for example, research and mitigation for threats from new invasive species such as browntail moth, emerald ash borer, wooly adelgid, spotted wing drosophila, green crab, northern pike, and ticks. High-priority environmental research in this plan focuses on aquatic systems (ground water, lakes, rivers, inland and coastal wetlands, and the Gulf of Maine), endangered species, and ecosystem sustainability. Maine has the potential to be a prime testing ground for research on adapting to global climate change because the climatic variation within Maine is expected to be generally greater than other states in the U.S. For example, the Gulf of Maine is warming faster than 99% of the rest of the ocean. This plan of work continues our focus on food safety technologies, health benefits of agricultural foods, and research to promote healthy eating and lower obesity rates in youth.

Administrators of the Maine Agricultural and Forest Experiment Station recognize the value of regional collaboration and coordination of research activities. MAFES faculty members are encouraged to coordinate with scientists at other stations in the Northeast Region and nation in partnership with the USDA National Institute of Food and Agriculture. In addition, station administrators are actively involved in initiatives of the Northeastern Regional Association of State Agricultural Experiment Station Directors to encourage regionally coordinated research. These initiatives include planning grant programs and hosting research forums on high priority issues.

2. FTE Estimates

Year	1862 Extension	1862 Research
2021	99.0	42.5
2022	100.0	43.0
2023	100.0	43.0
2024	100.0	43.0
2025	100.0	43.0

II. Merit / Peer Review Process

UMaine Extension faculty and professionals engage in an ongoing process to plan and adjust programs in ways that meet the needs of Maine citizens. To maintain relevant programming, faculty and staff engage in formal and informal review by discipline-specific review panels and advisory groups. This results in defined programming intentions for the near- and long-term, while ensuring it is dynamic allowing us to address emerging issues. The process involves independent review within local advisory structures, and collaborative review within statewide programmatic teams. Programming merit and success for faculty members is also reviewed by faculty peers through reappointment, promotion, and post-tenure processes established by the faculty and administration and codified in employment contracts. A unique process exists for non-faculty programming professionals who undergo annual reviews by supervisors, and peer reviews every 4 years.

We partner with regional Extension programs in the Northeast Region whose active vision is to coordinate translational research, education, outreach, and diversity programming to address problems, opportunities, and workforce development. Our primary mission is to enhance institutional cooperation and improve coordination of regional Extension program initiatives for the Northeast. Partners include the following universities: Connecticut, Cornell, Delaware, Delaware State, District of Columbia, New Hampshire, Maine, Maryland, Maryland Eastern Shore, Massachusetts, Penn State, Rhode Island, Vermont, Rutgers, West Virginia, and West Virginia State.

The Experiment Station uses its standard external scientific review process for continuing faculty proposing new five-year

projects and a fast-track project approval process for new faculty. The fast-track process is intended for new faculty, where an accelerated approval process and a shorter two-year project period better meets the needs of the faculty member and station.

For the standard process, Experiment Station faculty prepare a pre-proposal reviewed by the MAFES Research Council, which is comprised of senior faculty. Following Research Council review to ensure that the proposed work falls within the purview of MAFES, addresses an important need identified by stakeholders, and that the project director possesses the expertise to conduct the research, full proposals are developed. The full research proposals are sent out for external, expert peer review. Upon completion of the external reviews, proposals are returned to the researchers, who make changes based on the comments of the reviewers. Finally, the proposals are reviewed and approved by the Research Council before being submitted to USDA for final approval.

The fast-track process goal is to complete project development and obtain USDA approval in four months. The shorter timeline for fast-track projects is achieved by using an abbreviated and internal proposal review, reducing proposal requirements, and expediting processing. Proposals are reviewed by a member of the Research Council and a faculty member to ensure that the proposed work meets all the expectations inherent in the standard process.

III. Stakeholder Input

1. Actions to Seek

The Extension and MAFES Plan of Work is based on updated needs assessment that includes multiple components to encourage direct participation through targeted solicitation of stakeholders, evaluation of current first-source data, and public input. Extension and MAFES have learned from our constituents that high-quality engagement is best when the issue is current, and we engage stakeholders as needs and issues arise. Our matrix of programs involves citizen and volunteer group input, and our work is guided by the community, and commodity stakeholders with whom we have close working relationships. Selected examples:

Partnerships with 16 county executive committees that provide direction and advice to extension programs and help to prioritize regional efforts.

Interactions with the UMaine Board of Agriculture, formed by state statute, that advise us on agricultural research and extension priorities.

Participation at monthly meetings of the Agricultural Council of Maine (AGCOM) as a way to maintain effective communication with the wide array of agricultural organizations in the state.

The Maine Wild Blueberry Commission that represents growers and processors.

The Maine Potato Board that is composed principally of Maine potato farmers who offer advice and support for research.

The Maine 4-H Foundation Board that is a partner with Extension's 4-H Program.

Advisory boards that guide the work of our most important programs. Examples: Maine Sea Grant Policy Advisory Board, Tanglewood 4-H Camp Board, Bryant Pond Learning Center Board, the Maine Board of Pesticides Control, Forest Resources Advisory Committee, and the Coordinating Committee of the Maine Fish and Wildlife Research Unit.

We partner with discipline-specific groups such as the Maine Organic Farmers and Gardeners Association; Maine Science, Technology, Engineering and Math Collaborative; and the Sportsman's Alliance of Maine.

We have an ongoing dialogue with Maine Legislators and County Commissioners to communicate our extension and research focus areas and to respond to the needs that have been identified through their constituents.

Our research facilities host field days for apples, small fruits, and vegetables, potatoes, grains, wild blueberries, and other growers, that allow researchers and administrators to learn more about stakeholders needs.

2. Methods to Identify

UMaine has deep historical connections to the fabric of life in Maine communities. Extension and MAFES stakeholders are primarily identified through:

Historical and ongoing connections with traditional stakeholders, and ever-evolving interactions within our communities.

Informal and formal interactions with coordinating and advisory committees, and traditional stakeholder groups, including using them as sources of referral for new stakeholder groups and individuals with an interest in research and extension programs.

The budget appropriations process with funders such as county commissioners and the Maine state legislature.

Active recruitment and retention of people who are traditionally underserved and underrepresented in our programs and employee groups.

New groups and individuals will be identified through focus groups internal to Extension and the university, as well as external focus groups comprised of federal and state officials and traditional and nontraditional stakeholders.

MAFES maintains a list of all known stakeholder groups, and these groups are contacted on a regular basis.

3. Methods to Collect

Extension staff work within program teams to maintain a connection to stakeholder and citizen issues and continuously reassess needs. Our staff review their programming intentions for upcoming years and maintain a five-year vision. As part of the process, they review information from ongoing merit review processes and the needs assessment, and update programming priorities as needed.

MAFES collects input through formal organization processes (Board of Agriculture, Forest Resources Advisory Committee, and Maine Cooperative Fish and Wildlife Research Unit Coordinating Committee), and feedback on research programs of faculty via stakeholder grant review programs (Wild Blueberry Commission of Maine Advisory Committee, Maine Potato Board, Cooperative Forestry Research Unit). Extension and MAFES staff meet with and collect input from both traditional and non-traditional stakeholders at the group and individual level.

4. How Considered

Extension and Experiment Station administrators will use needs assessment data, that includes stakeholder input, to help prioritize our programs relative to our budgetary capacity, and to inform extension and research teams and individuals about emerging issues that will help them prioritize and focus research and extension programs appropriately and effectively.

IV. Critical Issues

1 Positive Youth Development

Description:

In Maine we use 4-H experiential learning to provide opportunities to educate and empower youth, and to support youth and adults in creating sustainable community change. Of the three national 4-H mission mandates - citizenship, healthy living, and science - Maine's program emphasizes science. We use proficiency-based education to support students in acquiring knowledge and skills essential to success in school, higher education, careers, and adult life. Extension's youth development programs support youth to learn skills that help them build positive relationships, gain knowledge, explore career aspirations, and engage effectively in their communities.

Term: Long

Science Emphasis Areas

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

2 The Maine Food System

Description:

Advancing global food security requires educational outreach, and ongoing research and development in new technologies and production systems to ensure the availability of sufficient, nutritionally-adequate food that allows all people to maintain active and healthy lives. In Maine, this critical issue involves an inter-related matrix of work that comprises all aspects of the food system including policy, research, production, processing, commerce, food safety, and nutrition. The goals of this extension and research work include a safer, healthier, more accessible and increasingly productive food system resulting in better land and water management practices, enhanced individual and public health, and stronger Maine and regional economy.

Term: Long

Science Emphasis Areas

Agroclimate Science
Environmental Systems
Family & Consumer Sciences
Food Safety
Human Nutrition
Sustainable Agricultural Production Systems

3 Sustainable Community and Economic Development

Description:

Maine's economy, and key industries (agriculture, aquaculture, forestry, marine fisheries, and tourism and recreation), face ongoing and new challenges in competitive national and international marketplaces. There are also a range of issues confronting Maine's rural residents and communities including the decline and closure of long-standing, natural resource-based businesses and resulting societal effects. The goals of this extension and research work include boosting the profitability and sustainability of Maine's natural resource-based industries along with providing technical and research support to rural communities to understand and adapt to economic and demographic challenges. Success means more vibrant and resilient communities.

Term: Long

Science Emphasis Areas

Bioeconomy, Bioenergy, and Bioproducts
Environmental Systems
Family & Consumer Sciences
Sustainable Agricultural Production Systems

4 Climate Change

Description:

As concern about the timing, magnitude, and rate of future climate change increases, understanding how such change might impact Maine becomes crucially important. UMaine is a recognized leader in discovery research on global climate change, and the Experiment Station investigates the effects of climate on Maine's natural resource-based industries, particularly agriculture, forestry, marine fisheries, and outdoor recreation and tourism.

Experiment Station scientists develop new knowledge and technologies to address the effects of climate variability and change and they enhance the adaptive capacity of production and natural systems to reduce exposure and vulnerability to climate change.

Term: Long

Science Emphasis Areas

Agroclimate Science
Bioeconomy, Bioenergy, and Bioproducts
Environmental Systems
Sustainable Agricultural Production Systems

5 Sustainable Natural Resources

Description:

Maine enjoys worldwide renown for its natural resources: its lakes, streams, and rivers, its scenic coastline, its forests, and the fish, animal, and plant species these areas support. Maine citizens value these resources highly, as do people from across the country and around the world who support the state's \$6.2 billion tourism industry. Experiment Station research is critical to conserving and preserving these resources. Station scientists conduct discovery research that focuses on aspects of Maine's natural resources: water, soil, and air quality and conservation of Maine's plant and wildlife species. This collective research effort aims to increase our understanding of and knowledge about natural resources and to help the state manage these resources sustainably.

Term: Long

Science Emphasis Areas

Agroclimate Science
Environmental Systems
Sustainable Agricultural Production Systems