

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

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I. Plan Overview

1. Executive Summary

The Vermont Agricultural Experiment Station (AES) and UVM Extension (EXT), housed within the College of Agriculture and Life Sciences (CALs), integrate higher education, research and outreach to meet the changing needs of Vermont citizens, communities and organizations. Together, we work to protect and enhance a quality of life characterized by a healthy natural environment, vibrant economy, strong sense of community, resilient youth and a deeply ingrained connection to agriculture.

Through multidisciplinary work and that integration of education, research and outreach, our efforts address the following critical issues in our state:

- Sustainability of Vermont Agriculture, Food and Forests
- Resilience of Families and Individuals
- Development of Communities
- Quality of the Natural Environment
- Foundational and Exploratory Research in Agriculture
- Nutrition, Food Safety and Food Security
- Animal Health and Production

Vermont is fundamentally rural. Only one metropolitan area and three micropolitan areas lie within the state; 10 of 14 counties lie outside these areas, yet still account for 46 percent of the state's households. Geographic isolation, low density settlement patterns, dependence on agriculture, continued population loss and economic distress characterize these rural communities. Impoverished individuals and families, who experience the greatest risks related to health, housing and food, have the least capacity to recover from shocks to their financial security.

Consequently, rural community development is a natural priority for the state, especially through promoting small-scale agriculture, forestry and outdoor recreation. We are the only research university in the state, and as a land-grant institution, we are charged with serving Vermonters year after year, through effective outreach at the community level. We can also play a critical role in increasing the resilience of families and individuals by conducting research and providing programs that promote health, education, and personal and family well-being.

Agriculture and forestry are at the heart of Vermont culture and heritage. Vermont's commitment to quality, integrity and sustainability has brought the state national fame in many agricultural sectors, and the Vermont brand is respected across the food and forestry industries. Vermont is a national and regional leader in agriculture. Of all the maple syrup produced in the country, 50 percent is produced here, and agricultural sales (including milk production) outstrip those of all other New England states. Vermont has more per-capita organic farms and cheese awards than any other state and is a leader in the local-food movement through its farmer's markets and local-foods programs in schools as well as in overall local food purchases. Remarkably, Vermont's landscape is 74 percent forested—this forested state accomplishes these agricultural feats on about one-fifth of its land area. In contrast, timber-industry activity is a lower priority for forest landowners.

Though we cherish our farms and farmers, only about 20,400 (8 percent) of Vermont's employed workforce are farmers. However, in recent years, both the number of farms and the number of farmers have been increasing, and the Vermont farmers new to agriculture account for about one-sixth of the total. The local foods movement is a key part of the explanation for this growth. Local food sales accounted for \$310 million (13.9 percent) of total food sales in Vermont in 2017, leading to over \$430 million dollars remaining in Vermont's economy. From 2009 through 2018, Vermont

experienced 11 percent job growth in the farm and food sectors of the economy (+6,529 jobs).

Increased demand for local food means more family farms and small businesses can be successful and will make more local food available at regular grocery stores and small-town convenience stores. In this rural state of Vermont, attention to number, not size, of distributors is key to providing for our rural population. AES and EXT provide research, education and technical assistance tailored to the specific needs of Vermont farmers and producers. Our efforts support many industries that produce signature Vermont products such as maple, apples, milk, artisan cheese, hard cider, wine, artisan beer and ice cream. Ensuring the safety of locally grown, produced and processed foods is critical to protecting Vermont's reputation and markets. We invest significant effort to help grow and maintain a viable market for local and regional food producers and processors of vegetables, meat, and manufactured food products.

Vermont's agricultural working landscape symbolizes a way of life strongly cherished by its residents. These stakeholders recognize the value of Vermont's agriculture and the need to protect our air, water, soil, and human health resources. We address these critical stakeholder issues by conducting research and disseminating essential current science-based information to a broad range of audiences. This increases their knowledge and skills and encourages implementation of cost-effective, environmentally sound sustainable agricultural practices.

From economic development to environmental protection, we follow the needs of our communities and stakeholders and rely on the expertise of our faculty and staff to meet them. The CALS mission of research-based service and educational outreach focuses on contemporary problems, needs and challenges of a changing state and world.

2. FTE Estimates

Year	1862 Extension	1862 Research
2021	60.0	40.0
2022	60.0	40.0
2023	60.0	40.0
2024	60.0	40.0
2025	60.0	40.0

II. Merit / Peer Review Process

Hatch and Multistate projects give the Vermont Agricultural Experiment Station (AES) seed funding to enable researchers to pursue research and to apply for additional funding. A call for Hatch/Multistate proposals is issued in January and proposals are due the last week of April. A Hatch Committee is charged with reviewing the proposals and assessing how the research proposed relates to Vermont's issues. The committee is made up of the College's research faculty from each unit and scores proposals based on the following criteria: significance of work based on the planned programs (now critical issues), scientific and technical feasibility, past progress, and innovation. The committee weighs each project with the availability of funding and decides which proposals merit funding.

UVM Extension's purpose is to "cultivate healthy communities." To make progress on the purpose, UVM Extension orients its work towards four Result Areas. These provide organizational focus and direction. A number of limited, time-bound strategies implemented over a three- to five-year period, will support each Result Area. When completed, these strategies will make significant progress towards addressing our state's critical issues. When taken together, this results framework is designed to provide boundaries for decision making about future investments and effort while remaining flexible enough for Extension to adapt to unforeseen challenges and opportunities.

UVM Extension plans programming and measures success annually through the lens of the Result Areas and has internal processes that increase transparency and participation in decision making. The Director's Cabinet is an administrative leadership committee that supports human resource, financial, operations and programmatic decision making. The Cabinet is organized to support decisions in the context of aligning Extension's work with the Result Areas, funding

strategy and overall organizational strategy. In addition, Extension faculty and program staff have the opportunity to participate in Result Area teams that meet regularly and provide overarching guidance on programmatic direction in support of alignment with the Result Areas.

III. Stakeholder Input

1. Actions to Seek

In order to gain insight from industry leaders, elected officials, students and Vermonters, the Dean of the College of Agriculture and Life Sciences (CALs) appoints an advisory board which meets twice a year to provide feedback and advice. The Board reviews the College's strategic plan and provides information on future trends of agriculture and life sciences.

Many UVM Extension (EXT) programs have advisory committees of one form or another that provide a sounding board and input on current issues and help prioritize programmatic direction. This advisory function will be added to our Result Area conversations by inviting advisors to serve with each Result Area Team. This input helps in all aspects of programming, including delivery method, outreach and content. Most events ask participants if the programming met their needs and expectations. Post-event evaluations, including six-month follow-up check-ins about behavior change, are standard practice for EXT programs. This effort also provides an opportunity to gather further input informing future program effort.

Partnerships with communities, public and private organizations, and businesses are important to reaching and serving clients with appropriate programming. These relationships remain a critical part of identifying needs and gaps for programming.

2. Methods to Identify

The CALs Dean/AES Director looks at a wide range of expertise and appoints individuals in the advisory committee who have experience in the area of dairy farming, state legislation, research, finance and marketing, to name a few.

UVM Extension faculty and staff identify logical external partners who work closely with their programs or generally within the scope of the Result Areas. Program participants are engaged in developing future programs through on-site data collection feedback tools.

In a small state, relationships are critical in accessing key individuals with knowledge of current relevant issues for Vermonters. For example, ongoing and regular participation in the Vermont Agricultural Water Quality Partnership (VAWQP) helps us identify and gain access to key individuals. Stakeholders currently include leaders from USDA Natural Resources Conservation Service, Vermont Agency of Agriculture, Food, and Markets, Vermont Association of Conservation Districts, USDA Rural Development, USDA Farm Service Agency, representatives from all three Congressional offices, and other organizations as available or interested.

3. Methods to Collect

Individuals on the AES advisory board meet twice a year and provide information on future trends of agriculture and life sciences. In addition, AES uses the following methods:

- Meeting with traditional stakeholder groups
- Survey of traditional stakeholder groups
- Meeting with traditional stakeholder individuals
- Survey of traditional stakeholder individuals
- Survey of general public
- Meeting with invited selected individuals from the general public
- Survey of selected individuals from the general public

The Center for Rural Studies (CRS), housed in the College of Agriculture and Life Sciences, works with people and communities to address social, economic, and resource-based challenges through applied research community outreach, program evaluation, and consulting. CRS conducts the "Vermont Poll" each year. This survey incorporates selected

questions from researchers, non-profits and state and local governments.

UVM Extension program personnel engage partners and stakeholders at multiple stages in the design and delivery of their programs. Stakeholder activities include:

- facilitating ongoing stakeholder groups (e.g. farmer watershed coalitions)
- program-level advisory groups
- inviting stakeholders to programmatic meetings
- conducting surveys and evaluations at and after programming events
- collaborative relationships with individuals at partner organizations

At a cross-program level, external stakeholders with general expertise have been identified and will be invited to participate as advisors at the Result Area level.

4. How Considered

The CALS Board of Advisors provides expertise and experience to the Dean, College leadership, and faculty to enhance the mission and goals of the college. The objectives of the Board are to:

- Identify trends, issues and new developments in areas significant to the College,
- Cultivate relationships and to serve as ambassadors of the College to prospective students, employers of graduates, alumni, policymakers, and others,
- Engage the College with state, regional, national, and international organizations and agencies.

UVM Extension uses stakeholder input to develop and refine research and education programs that serve the needs of each program participants. This may result in the pursuit of new research topics, changes to the content of educational programs, or changes to how information is delivered to participants.

IV. Critical Issues

1 Sustainability of Vermont Agriculture, Food and Forests

Description:

Focus: Improve the financial, environmental and social sustainability of Vermont's agriculture, food and forest sectors.

Vermont's agriculture, food and forest sectors are fundamental to the existence of a vibrant economy in our small, rural state. The 2017 USDA Census of Agriculture (<https://www.nass.usda.gov/AgCensus/>) indicates that Vermont's agriculture sector is the largest in New England from an economic perspective, with dairy and maple dominating. However, ongoing low milk prices are eroding the financial stability of the dairy industry.

As the number of dairy farms decreases, other types of farms (i.e. specialty crops, vegetables, grazing production) are growing and diversifying with value-added products, agritourism and innovations that increase viability. Innovations in the Vermont food system have been recognized across the region and nation, particularly those related to small- and mid-scale operations. With these significant advances in Vermont's agriculture and food sectors, comes an opportunity for greater education, technical assistance and research to further promote financial, environmental and social sustainability.

Vermont is 74 percent forested, the fourth most forested state in the country. Vermont's forests play a significant role in the vitality of our economy, our communities and our environment. Our engagement and investment is needed as our forested landscape faces threats such as climate change, the introduction and spread of new invasive pests and diseases, forest land development, an aging landowner population, a struggling forestry workforce and a forest products industry in decline nationwide.

A thriving economy, functioning natural systems and high quality of life for Vermonters rely on maintaining healthy forests and agricultural lands across the state's landscape.

Term: Long

Science Emphasis Areas

Bioeconomy, Bioenergy, and Bioproducts
Environmental Systems
Food Safety
Sustainable Agricultural Production Systems

2 Resilience of Families and Individuals

Description:

Focus: Increase the resilience of families and individuals around health, education and personal and family well-being.

Geographic isolation, low-density settlement patterns, dependence on agriculture, continued population loss and economic distress characterize Vermont's rural communities. The percentage of food insecure households in Vermont increased from an average 9.1% between 1999-2001 to an average of 13.2% between 2011-2013 (Vermont Sustainable Jobs Fund, 2014). Impoverished individuals and families, who experience the greatest risks related to health, housing and food, have the least capacity to recover from shocks to their financial security.

Although considerable research and policy attention has focused on problems associated with substance use and abuse in urban settings, studies show that rural youth also are at risk for early onset of substance use and its associated negative consequences (Cronk & Sarvela, 1997). Providing youth with opportunities to build connections to neighbors, schools, community organizations, or activities that support healthy behaviors, is central to helping them build a sense of belonging, a necessary ingredient for resilience.

Building that connection is even more critical, however, with a declining population. According to "Advance Vermont", "... current demographic declines and college enrollment trends will lead to a net loss of 6,664 working-age Vermonters with a degree or credential of value by the year 2025. Vermonters need to be competent in both life and job skills to be successful and economically stable, yet Vermont has not yet taken significant steps to increase the educational level of its youngest adults.

Term: Long

Science Emphasis Areas

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

3 Development of Communities

Description:

Focus: Engage with communities to support leadership development, capacity building and diverse voices in decision making.

Vermont is a small state, with an economy historically driven by agriculture. In the 21st century, Vermont finds itself in a difficult spot. It ranks 34th in per capita GDP and ranks second for the oldest population. Most of the state's 251 towns and cities are rural—characterized by geographic isolation, low-density settlement patterns, dependence on agriculture, continued population loss, and, all too often, economic distress. These communities have long known that they must find common cause and share resources to advance their well-being. Tough economic realities, severe challenges to the agricultural economy (particularly dairy, which is 75 percent of the sector), and a dispersed and aging population make this increasingly difficult.

Communities must identify their assets and address their challenges. By learning the skills of effective leadership, how to develop the capacity to get things done, and the importance of ensuring a variety of voices are engaged, together we can create community solutions that are comprehensive and serve the public good.

Term: Long

Science Emphasis Areas

Education and Multicultural Alliances
Family & Consumer Sciences
Youth Development

4 Quality of the Natural Environment

Description:

Focus: Integrate business and conservation to improve the quality of the natural environment where Vermonters live, work and play.

The quality of Vermont's natural environment is critical to the health of some key industries associated with Vermont's identity: agriculture, forestry and tourism. Key resources—such as clean water, toxin-free soils and bucolic landscapes—are all vulnerable to compromise without sustainable management, arising from high-quality research and the support of Vermonters informed about the issues.

The natural environment is also key to the quality of life for Vermonters in a broader context. Climate change impacts include more frequent and more intense weather events such as Hurricane Irene, as well as changes in average annual temperatures. These impacts directly affect the welfare, public health and financial well-being of Vermonters. Hence, attention to long-term solutions, grounded in research and education about climate change adaptation and mitigation, will lead to greater security for all the state's residents.

Finally, Vermont is blessed with a unique and diverse natural heritage, which is as unperturbed as that of any state in the region; preservation of this biodiversity is an investment in the future. Our forest and lake ecosystems harbor resources with potential value to public health and human enterprise that are, as yet, completely unknown to us, to be discovered in future inquiries.

Term: Long

Science Emphasis Areas

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

5 Foundational and Exploratory Research in Agriculture

Description:

This area will support science to help agricultural researchers to plan and make decisions in adapting to changing environments, sustaining economic vitality, and taking advantage of emerging economic opportunities.

Term: Long

Science Emphasis Areas

Sustainable Agricultural Production Systems

6 Nutrition, Food Safety and Food Security

Description:

Supports research, education and extension that supports and identifies effective measures to make informed, science-based decisions that will reduce disease, improve health and ensure the safety of our food supply. This area improves global capacity to meet the growing food demand and in fighting hunger by addressing food security for vulnerable populations.

Term: Long

Science Emphasis Areas

Food Safety

Human Nutrition

7 Animal Health and Production

Description:

Supports research that improves animal welfare, well-being and protection. Agricultural production research includes the reproductive performance of animals, nutrient utilization in animals, animal diseases and animal genome.

Term: Long

Science Emphasis Areas

Sustainable Agricultural Production Systems