

# University of New Hampshire Combined Research and Extension Plan of Work 2022-2026

**Status: Final**  
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## I. Plan Overview

### 1. Executive Summary

Between 2022 and 2026, New Hampshire will have an estimated population of 1.359 and 1.372 million people, with over 10 percent and rising of people of color (Weldon Cooper Center for Public Policy, Population Projections). Agriculture and associated natural resources are core contributors to the economy in a state that is 83 percent forested ([https://www.fs.fed.us/nrs/pubs/ru/ru\\_fs124.pdf](https://www.fs.fed.us/nrs/pubs/ru/ru_fs124.pdf)). While most of New Hampshire is rural, the southern tier is home to several small cities (30,000-112,000 people). The attractive, open spaces maintained by predominantly pastoral, small-scale agricultural operations combine with the state's abundant natural resources support a large tourism sector.

Many New Hampshire farms are small and diversified, and agricultural diversity is growing to encompass the commodity mix of both Northern and Southern New England. Beekeepers raise bees for honey and provide pollinator services. "Pick Your Own" berry and fruit operations are widespread. There are 97 farmers markets across the state, some of which run through the winter (National Agricultural Statistics Service), USDA). Specialty livestock, including goats, rabbits, sheep, and other animals, are grown for wool and fiber. Greenhouses and nurseries producing annuals, perennials, shrubbery, and trees for landscaping is another productive sector of the state's economy. Larger commodities include Christmas trees, apples, maple syrup, and livestock (forage crops, beef, sheep, swine, poultry, and dairy) raised for home, local restaurants, and commercial sales. And while the number of dairy farms has decreased over recent years, the amount of milk produced is stable and as of 2020, NH-produced milk is sold with a local premium.

The agricultural and food industries makes an important contribution to the state's economy. In 2019, for example, the industries contributed over \$22 billion to New Hampshire's economy (US food and agriculture industries economics impact study, 2019, Feeding the Economy). In part, this is due to the strong farm-to-table movement in New England. The proximity of agricultural operations to U.S. population centers represents a unique facet of the Northeast region and a distinctive feature relative to education, research, and extension within other regions. New Hampshire ranks at top in the nation with farms that have direct sales to consumers (31 percent), with summer and fall farmers markets (more than 52), farm stands (more than 70) are widespread, winter farmers markets, and increasing participation in Community Support Agriculture (CSA) farms and Community Supported Fisheries (CSF).

Challenges and untapped opportunities, however, remain. New Hampshire has 31 percent beginning producers, compared with the national average of 27 percent. These new and beginning farmers are younger with smaller-scale operations, with approximately 70 percent of farms producing less than \$10,000 in yearly sales. This implies that producers may not be able to take advantage of economies of scale, have established business networks, know about lending opportunities, or have well-established risk management strategies. Additionally, maintaining and growing agricultural land in New Hampshire is a significant challenge given the high land costs and taxes, and the increasing effects of climate change present new, more volatile challenges.

To overcome these challenges and discover new opportunities, many in the agricultural, food, and natural resources industries in New Hampshire look to the state's public research, development, and engagement agencies—the New Hampshire Agricultural Experiment Station (NHAES) and the UNH Cooperative Extension (UNHCE)—to provide guidance that is science-based, objective, and forward-looking. The NHAES and UNHCE are both located within the University of New Hampshire (UNH) in Durham, the state's flagship, public, land-grant university, conducting instruction, research, and outreach to people beyond the formal classroom. Approximately 15,300 students study at the Durham campus. The NHAES resides within the UNH College of Life Sciences and Agriculture and is responsible for stewarding the Hatch and Hatch-Multistate agricultural research and McIntire-Stennis cooperative forestry research programs. UNHCE is the primary outreach department of UNH, stewarding funds from Smith-Lever program as well as from county contributions.

## NHAES

The NHAES is led by Director and Associate Dean Dr. Anton Bekkerman, who began serving as the Station's Director in June 2020 after transitioning from the Associate Director role at the Montana Agricultural Experiment Station. The NHAES focuses on local, national, and international research challenges. NHAES is closely mindful of the Hatch Act directive to allow each state's experiment station to prioritize specific research needs for their respective states but do so in a way that ultimately addresses the key focus of agricultural advancement for economic and societal well-being. The NHAES has a rich history of facilitating integrated, highly relevant research that is inspired by local issues and needs, and that has long-lasting impacts for moving forward global scientific communities. NHAES scientists continue to use novel scientific techniques and work across a multitude of topic areas that help us better understand the complexities of the modern food system and ensure its resilience through data-driven, objective knowledge. NHAES research is helping answer questions that have not yet been answered.

The diverse funding portfolio of our researchers demonstrates the success of NHAES foundational support and investments, leading to strong productivity and the ability of scientists to further leverage their research findings into federal grants activity. This results in strong added value for New Hampshire taxpayers. Hatch capacity funds provide a critical baseline capability to support agricultural and natural resources programming, as well as providing opportunities to train the next generation of agricultural scientists and citizen-consumers. Located near the Gulf of Maine, UNH also provides an opportunity to support a small but growing industry of coastal marine aquaculture through research and engagement with producers, harvesters, and other stakeholders.

Research at the farms and dairies address both conventional and organic research, and management needs. Results of these research projects are disseminated to our varied stakeholders. NHAES supports the Woodman Horticultural Research Farm, Kingman Research Farm, Macfarlane Research Greenhouses, Organic Dairy Research Farm, Fairchild Dairy Teaching and Research Center (a conventional dairy), and other properties within a six-mile radius of Durham. These facilities are available to both NHAES researchers and Extension Specialists.

Beginning in Spring 2021, NHAES is facilitating an on-boarding program for recently hired scientists who are interested in developing NHAES projects. The program provides Station-specific information about a variety of topics relevant to faculty. The group will focus on topics such as developing a successful NHAES proposals and effective annual and final reports, graduate student and post-doctoral scientist recruitment and management, engaging with non-academic audiences and integration with Extension, leveraging NHAES funds for external grants, and working with USDA NIFA. The goal of the on-boarding series is not only to unpack the "AES blackbox," but also to create a cohort of researchers across departments and Extension.

## UNHCE

UNHCE is led by Director and Vice Provost of Outreach and Engagement Dr. Ken La Valley. The organization's mission is to strengthen people and communities by providing trusted knowledge, practical education, and cooperative solutions in Food and Agriculture; Natural Resources; Community and Economic Development; and Youth and Family. Specialists based in Durham and in county Extension offices design and deliver research-based educational programming to people throughout the state. 4,022 volunteers of Extension's fifteen volunteer programs extend the reach of Extension specialists and staff. Extension's volunteers reached 53,091 people in 2020. In total, volunteers contributed 158,881 hours of volunteer time in 2020, representing \$4.2 million worth of value to New Hampshire communities.

UNHCE's strategic plan (2016-2021) has three priorities. Examples of programs initiated since the implementation of the strategic plan follow each priority.

Meet people where they are with relevant, high-quality programming.

Examples of Initiatives:

Formation of a task force on cultural proficiency and training for staff in fair and inclusive hiring practices, implicit bias and the value of diversity in the workplace.

New system for collecting and reporting demographic data on race, ethnicity, gender, age, and geographic location.

Bring people together to find practical solutions to the issues they care about.

Examples of Initiatives:

BioBlitz – Scientists and trained volunteers collect data on wildlife species on a given property in a short amount of time. This project increases community engagement and informs towns for stewardship planning.

Schoolyard SITES –Volunteers and elementary school teachers partner to improve educators’ self-efficacy, science content knowledge, and instructional practice.

Cultivate a team of innovative, energized, and connected staff and volunteers.

Examples of Initiatives:

Formation of a staff professional development committee.

Diversification of state and county advisory councils.

Both UNHCE and NHAES collaborate with the Northeast Regional Climate Hub in Durham, under the direction of David Hollinger with the USDA Forest Service. The hub provides a network for information sharing that addresses important regional and local farming and forestry challenges. NHAES also collaborates with UNH’s Institute for the Study of Earth, Oceans, and Space (EOS), an internationally known center for research on climate change and its impact, and NH Sea Grant, which supports research, education, and outreach to help balance the conservation of coastal and marine resources with a sustainable economy and environment. NHAES has an extensive portfolio of agricultural, natural resources, and forestry research related to climate change’s driving factors and impacts, and the adaptations needed to limit its effects. UNHCE works with communities to plan for changing climate and its impacts.

## 2. FTE Estimates

Year	1862 Extension	1862 Research
2022	75.0	22.0
2023	75.0	22.0
2024	75.0	22.0
2025	75.0	22.0
2026	75.0	22.0

## II. Merit / Peer Review Process

The NHAES carries out a formal, competitive, internal peer-review process for proposed research projects. The competition for NHAES research support is announced to eligible faculty via email at the beginning of the academic year.

Faculty are encouraged to submit a one-page prospectus and discuss this prospectus with the Director. If the prospectus is consistent with NHAES guidelines, the faculty member is asked to develop a full proposal for competitive review. Full proposals are due during the Fall academic semester.

An internal panel of NHAES researchers review proposals. Similar to USDA competitive grants review panels, the committee is selected based on the expertise of scientists as it relates to the submitted proposals. Review panelists are assigned a number of proposals to review in detail and then meet as a full panel to discuss each proposal for several criteria: 1) fit and potential contributions to the objectives identified by the Hatch and Hatch-Multistate programs; 2) scientific and technical merit; 3) soundness of approach and methodology; 4) likelihood of significant contributions and/or innovative advances to the missions of the NHAES and the SAES; 5) previous and current research productivity and accomplishments (or potential, for new investigators). 6) the likelihood of significant enhancement in project directors research capability and competitiveness. The NHAES Director considers panel reviews and discussion prior to the recommendation of proposals, communicates with project directors about requests for revisions, and works with the project directors to ensure a smooth submission to NIFA final evaluation.

Qualitative overview of the internal NHAES merit review process comes via the scholarly peer-review process, which evaluates the manuscripts originating from NHAES research projects; outreach and engagement activities to communicate the science to relevant stakeholders; and the ability of project directors to leverage NHAES funding to compete for external funding. Over a course of meetings during the Spring semester, the group will focus on topics such as developing successful NHAES proposals and effective annual attention.

As appropriate, UNHCE coordinates with the NHAES for outreach, training of undergraduates and graduate students, and incorporation into University courses.

### **III. Stakeholder Input**

#### **1. Actions to Seek**

Both NHAES and UNHCE use a number of similar approaches to seek input from relevant stakeholders:

- Use of traditional and social media to announce public meetings and listening sessions
- Targeted invitation to traditional stakeholder groups and individuals
- Targeted invitation to underrepresented stakeholder individuals
- Surveys of stakeholder groups and individuals
- Other (Advisory Councils, comments from research proposals and manuscript reviews)

NHAES encourages input from stakeholders by multiple means and from various target groups. The NHAES facilitates an External Advisory Committee, which consists of New Hampshire farm, ornamental horticulture, and forestry producers and allied industries. The Committee meets formally three times per year to provide direct input. The Committee plays an active role in guiding improvements in the bi-directional communication and engagement among scientists and New Hampshire communities. As the Station embarks on developing a strategic plan, the Advisory Committee will be a critical contributor to developing strategic direction for the Station.

Additionally, the NHAES Communications Manager maintains a dynamic dissemination program via weekly postings distributed via Constant Contact and YouTube videos. The NH Weekly Market Bulletin, local newspapers, the Associated Press, USDA-NIFA newsletters, and national trade outlets often republish these press releases. These often lead to researcher interviews on regional radio programs and TV news. These interactions encourage further input from stakeholders about the direction of the Station's activities.

The NHAES Director is also a member of the Durham Agricultural Commission and the Seacoast Eat Local Board of Directors, both of which help bring together communities of stakeholders. Lastly, while the COVID-19 restrictions have not allowed for travel and direct interaction between the Director and stakeholder communities around the state, this face-to-face engagement will be implemented when it is safe to do so.

UNHCE engages county advisory councils, comprised of program users, decision-makers, and community leaders to annually review updates to programs and plans of work. These councils meet with staff and Extension administration

between six and ten months per year. Furthermore, a State Extension Advisory Council meets two or three times per year to discuss new programming initiatives and make recommendations to the Dean and Director of UNHCE. Stakeholders and state and federal partners are engaged with UNHCE professionals on a regular and on-going basis. They contribute to needs assessment, program development, program implementation, and program evaluation.

The NHAES and UNHCE are working to partially integrate the advisory councils to ensure that there is greater feedback about how the two units can operate more effectively together.

## **2. Methods to Identify**

Both NHAES and UNHCE use a number of similar approaches to identifying relevant stakeholders:

- Recommendations and members of Advisory Committees
- Recruitment and communications with external focus groups
- Surveys and needs assessments

NHAES identifies stakeholder groups through interaction with UNHCE, NH Department of Agriculture, Markets and Food, NH Department of Environmental Services, NH Farm Bureau, New England Farm Union, and Northeast Organic Farming Association, as well as various trade organizations and community groups across the state and region. Special efforts are made to solicit feedback from members of the New Hampshire state legislature's Environment and Agriculture Committee, as well as the New Hampshire's congressional delegation. Stakeholders are also identified through their work with individual faculty members and private-public relationships that may be developed. Lastly, the NHAES is making a conscious, deliberate effort to engage a greater number of stakeholders from underrepresented populations in the state, with a focus to increase the diversity, inclusion, and access of ideas that help guide the future of the Station.

UNHCE employs several methods to identify individuals and groups with whom to work. Methods vary according to the program focus. Specialists interact with clients, potential clients, stakeholders and partners through participation in meetings of several agricultural associations and the NH Department of Agriculture, natural resources groups focused on conservation or the nature-based economy, coalitions focused on well-being and health, economic development councils, issue-based advisory committees, youth associations and many more.

## **3. Methods to Collect**

Both NHAES and UNHCE use a number of similar methods to collect information from relevant stakeholders:

- Meetings with stakeholder groups
- Survey of stakeholder individuals
- Meeting with the general public (open meetings advertised to all)
- Meeting specifically with groups and individuals who are underrepresented

For NHAES strategic planning and priority setting purposes, input is collected through discussion with stakeholder groups and individuals, including growers, farmers, citizens, agricultural organizations and councils, natural resources professionals and managers, state and federal agency representatives, and neighboring state AES and extension administrators. The NHAES is introducing a research project manager and analyst, whose responsibilities will include assessing current information-collection methods, their effectiveness in providing the information on input collection effectiveness, and, if needed, proposing potential alternative methods that are science- and data-based and will strengthen information collection.

The UNHCE program plan of work addresses high priority needs in New Hampshire identified through on-going counsel with local and state-wide advisory councils. In addition, advisory council members, county and state staff, faculty, and other stakeholders take part in ongoing specific program reviews. Results of program reviews and input from stakeholder groups determine priorities. These program reviews include focus groups, web-based stakeholder surveys, and staff surveys as well.

## **4. How Considered**

NHAES and UNHCE are continually working to facilitate constituent input, focus available resources on priority issues, and improve our delivery of research findings to end-users. Both NHAES and UNHCE use a number of similar approaches

for considering collect information: Inputs are used to: Set strategic priorities, Identify emerging research and Extension issues and needs, Direct and redirect the research and Extension programs, Inform the budget prioritization process, Inform personnel hiring priorities and processes.

NHAES' strategies, activities, and priorities are dynamic and evolve with consideration of stakeholder input, institutional, and societal goals and funding, and additional factors. Formal and informal stakeholder input to project directors, Extension specialists, staff, and administrators helps gauge the changing needs, constraints, and opportunities for research needs, personnel gaps, and engagement. These influence the short- and long-term strategic goals of the NHAES.

UNHCE is continually working to facilitate constituent input, focus available resources on priority issues, and improve our delivery of research findings to end-users. Stakeholder is sought in the budget process, to identify emerging issues, to develop new Extension programs, in the staff hiring process, and to set organizational priorities.

Stakeholders indicate they are concerned about similar issues receiving attention across the nation and region. Many worry about agricultural market uncertainty, job security, and accessing health care and educational resources in their communities. Agricultural producers are concerned about a positive profit margin, combating detrimental pests and diseases, increasing soil quality and management practices, increasing food safety and direct-marketing reputation, finding skilled farm labor, and improving mental health. In those areas where education and research can help address issues, Granite Staters look to NHAES and Extension as trusted sources of information to help make choices and decisions that are best for their families, businesses, and communities.

## **IV. Critical Issues**

### **1 Rural Community and Economic Development**

#### **Description:**

UNHCE

Community & Economic Development program seeks to cultivate civic leaders; foster participation in community decision-making, and build the capacity of communities to grow the local and regional economy. To achieve the mission, Extension Community and Economic Development staff provide civic leaders with training, educational resources, and technical assistance in community engagement, economic development, leadership development, and community-based natural resources stewardship.

NHAES

New Hampshire's rural communities continue to evolve and contribute in different ways to the state's economic success and societal welfare. Local food systems (from production to consumption), tourism, and natural resource management have been continue to be critical to maintaining the vibrancy of rural communities in the state. However, with changing demographic and socioeconomic characteristics in rural communities; consolidation of the food processing sector; changes in local, state, and federal policies; and the structural changes prompted by the COVID-19 pandemic have created challenges to rural communities maintaining economic resilience. Using science-based, data-driven methods to identify key factors stressing economic and social welfare in rural communities and providing research-informed recommendations at the individual, firm, municipality, and state levels are crucial for short- and long-term community sustainability. NHAES researchers will work directly and with UNHCE to engage with relevant stakeholders and communicate their information effectively.

**Term:** Long

#### **Science Emphasis Areas**

Education and Multicultural Alliances

Environmental Systems

Family & Consumer Sciences

Sustainable Agricultural Production Systems

## 2 Agriculture

### Description:

NHAES

NHAES undertakes research toward generating knowledge and technology to support the state's highly diversified agricultural and food system that produces, processes and delivers food, fiber, and myriad environmental services for our citizens. We do this in the context of protecting environmental quality and helping to maintain the resilience and vitality of rural communities. Both basic and applied research are supported to ensure that we address shorter and longer-term needs. NHAES researchers will work directly and with UNHCE to engage with relevant stakeholders and communicate their information effectively.

UNHCE

UNHCE's Food and Agriculture specialists deliver education and technical assistance to residents of New Hampshire, the state's agricultural and horticultural industries, and the state's food system. Specialists are trusted partners, providing current, research-based educational programming to farmers, gardeners, and businesses. UNHCE enables individuals to make informed decisions in the pursuit of sustainable and productive local agriculture.

**Term:** Long

### Science Emphasis Areas

Agroclimate Science

Education and Multicultural Alliances

Human Nutrition

Sustainable Agricultural Production Systems

## 3 Food Safety

### Description:

NHAES

Ensuring a safe food supply is critical to maintaining a healthy population and trust in New Hampshire's food producers. With New Hampshire and the region having a robust local food economy, identifying factors that can increase the risk of food safety issues and determining methods that can prevent and mitigate adverse health outcomes is critical. Research will provide insights and recommendations for crop, aquaculture, and animal and animal product producers about safely growing and storing products; for food processors; for direct-to-consumer marketers; and for food consumers. The research ranges from basic, which will identify genetic components to food safety, to highly applied. NHAES researchers will work directly and with UNHCE to engage with relevant stakeholders and communicate their information effectively.

UNHCE

The CDC estimates that each year about 1 out of 6 Americans or 47.8 million people get sick from foodborne illness. About 128,000 of them are hospitalized and 3,037 die. According to the 2010 publication of Georgetown University, the annual cost of foodborne illnesses is \$152 billion. For New Hampshire, the estimated annual cost of foodborne illness was \$681 million with a per-case cost estimate of \$1,892. Restaurants are projected to record \$2.3 billion in sales between 2012 and 2022. However, more than 63,800 people and many employees have no or limited training in food safety. The UNHCE Food Safety program addresses these needs with food safety education targeting each sector of the food system, including production, foodservice, and consumers, with research-based educational programs, resources, and information

**Term:** Long

### Science Emphasis Areas

Education and Multicultural Alliances

#### **4 Climate change and sustaining natural resources**

**Description:**

UNHCE

Healthy and sustainable lands, waters, and wildlife are critical to NH's natural resource-based industry, tourism, recreational activities, and the quality of life experienced by our residents. Climate change not only threatens our seacoast communities but will challenge our stormwater management and impact our forestry practices and wildlife stewardship efforts. Working through Areas of Expertise that include Forest and Wildlife Stewardship, Community Natural Resource, Citizen Science, and Fisheries and Aquaculture, our staff provide research-based natural resources information and assistance to private landowners, natural resources professionals, logging and forest products industry, agencies, municipalities, local decision-makers, researchers, schools, volunteers, and organizations.

NHAES

Big problems require targeted, multi-disciplinary solutions. Advancing resilient agricultural, food, and natural resources must be balanced with addressing challenges posed by a changing climate. This balancing requires informed, strategic management and stewardship of resources, including land, water, forests, wildlife, domesticated crops and animals, social equity, community sustainability, among many others. Research within NHAES helps identify key factors contributing to climate change, quantify those impacts, and provide data-informed insights about strategic management of natural resources to ensure long-term economically, socially, and environmentally sustainable stewardship of natural resources. NHAES researchers will work directly and with UNHCE to engage with relevant stakeholders and communicate their information effectively.

**Term:** Long

**Science Emphasis Areas**

Agroclimate Science  
Environmental Systems

#### **5 Nutrition, Health and Wellness**

**Description:**

UNHCE

The health of New Hampshire's citizens has profound long-term implications for the state's economy and the population's well-being. Poor understanding of nutrition, inactive lifestyles, and systems-level food access issues have led to chronic public health problems such as obesity and diabetes. These issues, when not prevented and/or when untreated, result in significantly higher health care costs, loss of workforce productivity, and reduced quality of life. Data from the CDC, the State of New Hampshire, and the Carsey Institute suggests that important behaviors such as physical activity and fruit and vegetable consumption are below recommended levels, particularly for lower-income youth and families. Furthermore, because NH is one of the oldest and fastest aging states in the country, the natural vulnerability and declining health of an older population will exacerbate this critical issue.

NHAES

Increasing obesity among Americans is associated with increased incidences of chronic diseases and greater health uncertainties for emerging diseases such as COVID-19. Understanding the trends in nutrition and health behaviors across diverse NH populations and identifying factors contributing to healthier lifestyles is critical to ensuring long-term well-being of the state's citizens. Research focusing on demographic changes, eating



behaviors, consumption of local foods, effectiveness of state and federal policies, among other factors, will provide science-based insights and recommendations for ensuring a healthier workforce, cost-effective stewardship of public program funds, reduced stress on the state's healthcare system, and economic sustainability for individuals and communities. NHAES researchers will work directly and with UNHCE to engage with relevant stakeholders and communicate their information effectively.

**Term:** Long

**Science Emphasis Areas**

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

**6 Youth and Family Development**

**Description:**

UNHCE

New Hampshire youth are in critical need of positive youth development experiences where they both feel a sense of belonging and are engaged in extended and meaningful ways. Feedback from recent focus groups and key stakeholder interviews, data from National Academy of Sciences, National Institute of Mental Health, and the Youth Risk Behavior Survey, and research by the UNH Institute on Disability and the Carsey Institute all suggest that multiple problems make up this critical issue. They include: increased needs for a workforce that is sufficiently and equitably prepared with both leadership skills and STEM content knowledge, youth who do not feel valued by their communities, rising suicide rates across the state, elevated drug misuse and overdoses by young adults, and increased levels of mental illnesses in teens such as anxiety and depression.

**Term:** Long

**Science Emphasis Areas**

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