

# New Hampshire (University of New Hampshire)

## Plan of Work for 2023-2027

Status: Final (Approved 9/16/2022)

### Executive Summary Overview

Agriculture and natural resources are core contributors to the economy in a state that is 83 percent forested. 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.

Over 95% of 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. 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 make an important contribution to the state's economy. In 2021, for example, the industries contributed over \$25.3 billion to New Hampshire's 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 farms and Community Supported Fisheries.

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 14,100 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.

### Planned Research Activities

Research and innovation is the primary focus of the NH Agricultural Experiment Station. In the 2023-2027 period, the Station expects to support between 44 and 50 research projects across five critical issues—Agriculture; Climate change and sustaining natural resources; Food safety; Nutrition, health, and wellness; and Rural community and economic development—as well as projects within the McIntire-Stennis forestry science areas.

Within the Agriculture area, research will focus on increasing knowledge and technology to support highly diversified agricultural and food system that produces, processes and delivers food, fiber, and myriad environmental services. Efforts will focus on biotechnological and management improvements in crop and dairy production to minimize production and market risks and capturing new marketing opportunities. Research here is expected to grow with the recent hiring of a crop breeder faculty. Focus will also be placed on helping the state and region continue to expand its sustainable aquaculture industry to benefit the Blue Economy.

Work will also continue to target issues related to mitigating and adapting to climate change, especially in the role of agriculture as a solution to climate change. Through basic and applied science, an emerging area of excellence is in soil microbiology, and these efforts will be one of the core of the NHAES research mission in climate science. A second core area is in water quantity and quality management, especially as it relates to the relationships between water and agricultural land and management practices.

Food safety is an area in which less research is expected than in the past. However, the research that will continue will focus on supporting the growing aquaculture industry, especially as it relates to managing pathogens in shellfish. Differentiating strains of pathogens and predicting new strains is critical to ensuring that the northeast aquaculture industry maintains its high quality standards.

Research is expected to grow in the nutrition and health and wellness areas, as early-career faculty transition into being more experienced scientists and new faculty are onboarded. The focus of the research will be on identifying and developing effective recommendations for ensuring nutritional balance and health of underrepresented populations in northern New England. This includes refugee, immigrant, and Latinx populations, which have continued to grow in size in the region. Considerations of

the differences in these populations' eating habits, microbiome compositions, and nutritional behaviors will help inform science-based recommendations.

Lastly, as New Hampshire's communities continue to evolve demographically and socioeconomically, NHAES research will continue to focus part of its research portfolio on characterizing those trends, the impacts of those trends, and how local food systems can be best developed to be successful and support the changing demographics of the state and region. 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.

The NHAES will also continue to grow its outreach and science communication program. After launching in Winter 2021, a new publication, *Inspired*, focuses on presenting research briefs to a broad population of stakeholders in the state and region. This effort will continue with issues published and mailed biannually. Additionally, the station will maintain its highly robust activity of disseminating its research through weekly news briefs (which focus on NHAES research), social media presence, field days, and increasingly more integrated collaboration with Extension.

#### Undergoing a Strategic Planning Process in Extension

The UNH Cooperative Extension mission is to strengthen people and communities by providing trusted knowledge, practical education, and cooperative solutions. UNHCE supports five program teams, including Food and Agriculture; Natural Resources; Health and Well-Being; Education and 4-H Youth Development; and Community and Economic Development.

UNHCE's leadership consists of the Dean and Director; Associate Director of Programs; Assistant Director of Operations; five Program Team Leaders; Marketing Director; Public Affairs Manager; and Project Manager of Strategic Initiatives. Program staff, known as Extension Educators, are located on UNH campuses and in ten county Extension offices throughout the state.

Each county office is supported by an advisory council consisting of 12 citizen volunteers, a county commissioner, and county delegation member. One Extension Educator in each county is appointed County Office Administrator for a period of 2 to 4 years. They work with the county advisory council to determine educational needs of county residents and usher an annual budget for the county Extension office through passage.

Fifteen volunteer programs (with 4,543 volunteers in 2021) help Extension Educators extend their work in communities. UNHCE's newest volunteer program, Master Wellness Volunteers, provides an opportunity for adults to engage in learning sessions focused on creating community change for health.

UNHCE underwent several internal changes in the past year. Staff adapted to the UNH's restructuring of business services and information technology departments and a new reporting system (PEARS). Many staff struggled while returning to work after more than a year working at home due to the pandemic. Affordable, high-quality childcare and housing are cited as grand challenges for staff, as well as many constituents served by UNHCE. Retirements and resignations resulted in 24 searches for new staff in 2021 and 26 searches in 2022.

Leadership made a strategic decision to sunset the Youth and Family Program and replace it with two smaller program teams – Education and 4-H Youth Development and Health and Well-Being. The primary reason for this change is to make team size more manageable, allowing Program Team Leaders to improve staff onboarding, coaching, and training in program development and evaluation.

At the time of writing, the organization is undergoing a strategic planning process. Sixteen staff are working with an external facilitator and internal Project Manager of Strategic Initiatives to plan for public input forums. The purpose of the forums is to hear from constituents, stakeholders, partners, and staff about the issues and opportunities they think UNHCE should address in the next five years. Once the information is collected and synthesized, the leadership team will craft a strategic vision and priorities for the organization to work toward in 2023 to 2028.

## Merit and Scientific Peer Review Processes

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. The eligibility, proposal format, and review process are explicitly provided through the NHAES website.

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 a 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.

## Stakeholder input: Action Taken to Seek Stakeholder Input

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

Consistent communication with CARET representative

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

Meetings with state and federal elected officials

Other (Advisory Councils, comments from research proposals and manuscript reviews)

NHAES encourages input from stakeholders by multiple means and from various target groups. In 2022, NHAES and UNHCE has launched a new, joint External Advisory Committee, which consists of New Hampshire farm, ornamental horticulture, and forestry producers and allied industries. The Joint NHAES-UNHCE Advisory Committee replaces the NHAES External Advisory Committee. The Joint Committee meets formally four times per year to provide direct input and actively guide improvements in the bi-directional communication and engagement among scientists, Extension professionals, and New Hampshire communities. The goal of this newly launched committee is to ensure that NHAES and UNHCE moves forward with an explicit goal of a highly-integrated strategy for seeking stakeholder input.

Additionally, the NHAES Research Information Specialist 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.

## Stakeholder input: Methods to Identify Individuals and Groups

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 through programmatic initiatives 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.

## Stakeholder input: Methods for Collecting Stakeholder Input

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

Meetings with CARET representatives and state and federal elected officials

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 also has 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.

## Stakeholder input: A Statement of How the Input Will Be 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.

## Critical Issues

### **Agriculture**

Initiated on: Nov 26, 2019

State: New Hampshire

Term Length: Long-term (>5 years)

#### **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 helps individuals make informed decisions in the pursuit of sustainable and productive local agriculture.

Science Emphasis Area

Agroclimate Science, Bioeconomy, Bioenergy, and Bioproducts, Education and Multicultural Alliances, Environmental Systems, Human Nutrition, Sustainable Agricultural Production Systems

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

Initiated on: Nov 26, 2019

State: New Hampshire

Term Length: Long-term (>5 years)

#### **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.

Science Emphasis Area

Agroclimate Science, Environmental Systems, Sustainable Agricultural Production Systems

## **Food Safety**

Initiated on: Nov 26, 2019

State: New Hampshire

Term Length: Long-term (>5 years)

### **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

Science Emphasis Area

Education and Multicultural Alliances, Environmental Systems, Food Safety

## **Nutrition, Health and Wellness**

Initiated on: Nov 26, 2019

State: New Hampshire

Term Length: Long-term (>5 years)

### **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 UNH 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 New Hampshire 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 tracks increased incidence of chronic diseases and exposes to greater health uncertainties for emerging diseases such as COVID-19. Understanding the trends in nutrition and health behaviors across diverse populations and communities within New Hampshire and identifying factors that contribute to healthier lifestyles is critical to ensuring the long-term well-being of the state's citizens. Research that focuses on demographic changes, eating behaviors, consumption of foods produced in New Hampshire, effectiveness of a suite 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 the broader state community. NHAES researchers will work directly and with UNHCE to engage with relevant stakeholders and communicate their information effectively.

Science Emphasis Area

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

## **Rural Community and Economic Development**

Initiated on: Nov 26, 2019

State: New Hampshire

Term Length: Long-term (>5 years)

### **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.

Science Emphasis Area

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

## **Youth and Family Development**

Initiated on: Nov 26, 2019

State: New Hampshire

Term Length: Long-term (>5 years)

## **UNHCE**

New Hampshire youth are in critical need of positive youth development experiences where they 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.

Science Emphasis Area

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