Connecticut (Connecticut Agricultural Experiment Station New Haven, University of Connecticut Combined) Annual Report -... FY2023

Review Report

Contributing Organizations

Connecticut Agricultural Experiment Station New Haven

University of Connecticut

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Executive Summary

Overview

Connecticut is the 29th most populous state in the nation, but the 5th most densely populated state. Nearly a third of the state's residents live in the geographic region of Fairfield County. However, there are no county governments and each of Connecticut's 169 municipalities is independently governed. The state's population distribution and government structure are features contributing to unique needs not seen elsewhere in New England.

The Connecticut Agricultural Experiment Station (CAES) and the University of Connecticut (UConn) Extension System and Storrs Agricultural Experiment Station conducted work in 2022-2023 consistent with their strategic plans and the Federal Plan of Work. Efforts were aligned with (a) a sustainable agriculture and food supply, (b) enhancing health and well-being, (c) sustainable landscapes across urban-rural interfaces, and (d) adaptation and resilience to a changing climate. These issues were identified by UConn through an extensive stakeholder engagement process conducted in 2019 and involving over 10,000 data points.

The Connecticut Agricultural Experiment Station is a state governmental agency with 71 full-time scientific staff performing research, surveillance, and outreach activities related to crop, environmental, and human health. In the state fiscal year 2023, CAES received $5.08 million in extramural funding support, totaling 40% of its total operating budget. Scholarly output included over 70 peer-reviewed publications in addition to several technical and outreach bulletins. Staff also contributed more than 850 scientific presentations, outreach visits, and media interviews, and fielded over 22,000 public service inquiries for diagnostic or testing services. In total, more than 40,000 state residents received in-person or remote assistance from CAES staff.

In January 2023, the new Associate Dean for Extension, Dr. Amy Harder, began at UConn. Dr. Harder initiated a multi-step process that led to the development of a list of statewide evaluation indicators aligned with Extension's Critical Issues and 4-H. Pilot data were self-reported by UConn Extension faculty and staff to reflect programming conducted in 2023 (calendar year) and is included in the Executive Summaries for each Critical Issue. UConn Extension anticipates rapid growth in the adoption and implementation of the statewide indicators this year due to the addition of a data analyst (January 2024) and an evaluation specialist (April 2024) to build reporting and evaluation capacity.

UConn Extension continues offering virtual and online options, including website visits, courses and

certifications, webinars, trainings, and social media engagement. Use of Extension's news site increased 68% in 2023, with over 253,795 visitors in more than 673,000 events, which includes pageviews, sessions, a user's first visit, engagement, form submission, clicks, and scrolling. Information about food labels, gardens, trees, landscapes, and food safety ranked highest among users again. Video remains a popular learning medium, with a 7% increase in the number of viewers on Extension's YouTube channel. These viewers spent 5,098 hours watching Extension content, which is consistent with 2022. UConn Extension launched a new publications page in March 2024, incorporating the news site to enhance and streamline user experience.

During the state fiscal year of 2023, UConn excelled at research productivity, receiving $36.7 million in extramural grant support and nearly $33 million in research expenditures. Researchers had 481 scholarly contributions of peer-reviewed research articles, books, book chapters, scientific presentations, abstracts, and posters as well as one patent. Five faculty became fellows of prestigious professional societies, 13 faculty received national awards and five received teaching awards. Two PI's received awards/recognition as highly cited researchers.

Critical Issue: Adaptation and resilience to a changing climate

Extension professionals reported the following impacts for their Extension work in 2023:

- **Climate Preparation Actions for Communities**: 40 climate preparations were taken, including climate vulnerability assessments, climate resilience action plans, or climate mitigation actions taken by communities.
    - 10 Climate Vulnerability Assessments completed.
    - 12 climate mitigation actions taken by communities.
    - 18 Climate Resilience Action Plans adopted by communities.
- **Climate Adaptation Benefits to the Environment**: 1 thousand acres were protected from forest loss, had actions implemented to control invasive species and pests, or had adopted climate adaptation practices.
    - 57 public and/or private acres were protected from forest loss from any type of threat.
    - 123 public and/or private acres on which recommended actions were implemented to control invasive species and pests.
    - 826 acres on which recommended climate adaptation practices were adopted.
- **Improved Knowledge on Climate Adaptation**: 1.1 thousand participants demonstrated improved knowledge of climate adaptation, disaster preparedness, disaster mitigation, or disaster recovery strategies.
    - 510 participants demonstrated improved knowledge of climate adaptation.
    - 606 participants demonstrated improved knowledge of disaster preparedness, mitigation, and/or recovery strategies.
- **Applying Climate Adaptation Education**: 828 participants utilized information from environmental literacy and sustainability programs in their work or personal stewardship.
    - 372 participants used information from environmental literacy and sustainability programs in a professional or work-related context as volunteers or employees (including docents, teachers, park rangers, ecotour guides, etc.).
    - 456 participants used information from environmental and sustainability programs to adopt personal stewardship behaviors (e.g., conservation of natural resources in one's home or residential community).
- **Change in Climate Adaptation Practices**: 986 participants indicated or reported a change in practices, including climate mitigation strategies, climate adaptation practices, personal stewardship behaviors, disaster preparedness, disaster mitigation, or disaster recovery strategies.
    - 206 participants reported adoption of at least one recommended climate mitigation strategy.
    - 128 producers indicated adoption of recommended climate adaptation practices.
    - 196 participants reported adoption of at least one disaster preparedness, mitigation, and/or recovery strategy.

Additionally, the Connecticut Agricultural Experiment Station had the following impact:

- Dr. Clare Rutledge has used Hatch funding to track the Emerald Ash borer, which has killed millions of ash trees in Connecticut since 2012. She has discovered that the density of the insect in ash trees decreases over time at each affected site, declining in the period 7-12 years after infestation. Dr. Rutledge has released over 200,000 parasitoid wasps to study their biocontrol potential against EAB, and has found that the wasps established well, spread widely, and persist over generations, and

parasitize EAB at a consistent rate even in lower density sites. This knowledge is encouraging and will help land managers and scientists make decisions that can hopefully one day revive populations of ash in the northeast forest canopy.

Critical Issue: Enhancing health and well-being

Extension professionals reported the following impacts for their Extension work in 2023:

- **Positive Health Behaviors and Outcomes for Youth**: 3.8 thousand children and youth reported adopting healthier eating patterns, eating more healthy foods, eating more locally grown food, increased physical activity, or reduced sedentary time.
    - 1040 children and youth reported adopting healthier eating patterns.
    - 916 children and youth reported increased physical activity.
    - 718 children and youth reported reduced sedentary time.
    - 1040 children and youth reported eating more healthy foods.
    - 90 children and youth reported eating more locally grown food.
- **Increased Knowledge and Life Skills for Youth**: 4 thousand youth showed increased knowledge and life skills, demonstrated improvement in higher order thinking skills, demonstrated knowledge gain and behavior change in a subject matter area, and practiced citizenship life skills and leadership skills through community service projects and elected 4-H positions.
    - 649 youth demonstrated improvement in higher order thinking skills (e.g., decision making, critical thinking, goal setting).
    - 1,425 youth demonstrated knowledge gain in a subject matter area.
    - 1,023 youth reported behavior change in a subject matter area (e.g., adoption of best practices, implementation of a new skill).
    - 477 youth practiced citizenship life skills by participating in a community service project.
    - 470 youth practiced leadership skills by participating in an elected 4-H position (club, county, or fair association).
- **Positive Health Behaviors and Outcomes for Adults**: 14.5 thousand adults reported adopting healthier eating patterns, eating more healthy foods, eating more locally grown good, making changes that improved their physical mobility or safety within their home, increased physical activity, or reduced sedentary time.
    - 4,843 adults reported eating more healthy foods.
    - 4,543 adults reported adopting healthier eating patterns.
    - 4,230 adults reported increased physical activity.
    - 25 adults reported reduced sedentary time.
    - 521 adults demonstrated increased awareness of personal health risks (e.g., high blood pressure, prediabetes).
    - 300 adults reported eating more locally grown food.
    - 69 participants reported they made changes that improved their physical mobility or safety within their home.
- **Improved Financial Expertise**: 788 participants developed expertise in important financial-related topics, including learning about financial capability, demonstrating money management skills and financial capability, or adopting effective financial management/consumer economics practices.
    - 321 participants learned about financial capability (e.g., earnings/income, spending, saving and investing, borrowing, protecting assets).
    - 239 participants demonstrated improvement in money management skills or financial capability (e.g., earnings/income, spending, saving, investing, borrowing, protecting assets).
    - 228 participants adopted an effective financial management/consumer economics practice or behavior.
- **Positive Social Behaviors, Relationships, and Environments**: 200 participants increased positive interactions with others or adopted one or more behaviors to improve community living, 122 volunteers reported implementing best practice to positive developmental relationships with youth or providing youth with a safe and inclusive environment, and 2.4 thousand youth reported evidence of a safe and inclusive environment and the presence of positive developmental relationships or demonstrated improvement in communication skills and appreciation of differences.
    - 165 participants adopted one or more behaviors to improve their community living.
    - 35 participants increased positive interaction with others.
    - 975 youth reported evidence of a safe and inclusive environment (sense of belonging).
    - 893 youth reported the presence of one or more best practices of positive developmental

relationships (e.g., express care, challenge growth, provide support, share power, and expand possibilities).
    - 92 volunteers reported implementing best practices that provide youth with a safe and inclusive environment (sense of belonging).
    - 30 volunteers reported implementing one or more best practices of positive developmental relationships (e.g., express care, challenge growth, provide support, share power, and expand possibilities).
    - 491 youth demonstrated improvement in communication skills.
    - 61 youth demonstrated improvement in appreciation of differences.

Additionally, the Connecticut Agricultural Experiment Station had the following impact:

- Hatch funds supported the Passive Tick Surveillance efforts in Connecticut led by Dr. Phillip Armstrong of CAES. 2,950 ticks were tested for three major tick-borne diseases; and 31.1% submissions carried the Lyme disease pathogen Borrelia burgdorferi, and 12% carried pathogens for Babesiosis and Anaplasmosis. Passive surveillance programs complement CAES active surveillance efforts and case reporting, and are important to estimate the public health risk each year.

Critical Issue: Sustainable agriculture and food supply

Extension professionals reported the following impacts for their Extension work in 2023:

- **General Change in Best Practices:** 950 clientele adopted practices or reported intention to adopt a practice, with practices having been adopted on 1.3 thousand acres of land.
    - 404 clientele indicated adoption of recommended practices.
    - 546 clientele reported intention to adopt one or more recommended practices.
    - 1,315 acres on which recommended practices were adopted.
- **Increased Knowledge and Best Practices for Agricultural Production**: 3.2 thousand clientele (including producers, farmers, etc.) reported increased knowledge of Connecticut agriculture and practices, positive changes in attitudes about agriculture, adoption of a new crop variety or animal breed, or adoption of practices for supporting CT agriculture, self-reliant food systems, forage management practices, fertilizers and pesticides, or production agriculture risk factors.
    - 828 program participants reported increased knowledge of Connecticut agriculture.
    - 733 small farm operators, processors, or beginning farmers increased knowledge of recommended practices.
    - 342 program participants reported positive changes in attitudes about agriculture (e.g., increased appreciation for ecosystem services, valuing agriculture's contribution to food security, valuing protection of agricultural lands).
    - 34 small farm operators, processors, or beginning farmers adopted one or more recommended practices.
    - 15 producers adopted a new crop variety or animal breed.
    - 310 program participants reported adoption of at least one new practice that supports CT Agriculture (e.g., buying more CT Grown products, consuming more CT Grown products, visiting agritourism sites, using information gained in decision making, advocating for policies that support CT agriculture, or pursuing a career in agriculture).
    - 74 participants adopted self-reliant food system practices, including creating a home or community garden, hydroponic systems, reducing food waste, preserving food, etc.
    - 104 producers adopted recommended forage management practices (e.g., nutrient management, weed and pest management, species selection, etc.).
    - 488 clientele adopted appropriate fertilizer and pesticide recommendations.
    - 351 producers adopted best practices for production agriculture related to invasive species, pest management, pollutant loads, and wetlands.
- **Increased Expertise in Agricultural Economics and Business**: 573 participants reported increased dollar returns or reduced costs for agricultural production, accessed financial resources and opportunities for agricultural production, increased in knowledge and skills in the economics of agricultural production, adopted management and marketing practices, or participated in programs on the management or sustainable use of fish and wildlife.
    - 30 producers reported increased dollar returns or reduced costs.
    - 9 producers accessed financing or cost-share, accessed farmland, accessed new markets, or started or expanded a business.

    - 37 participants increased awareness or knowledge of topics related to farm economics, agribusiness management or marketing, the agricultural industry, or policy issues.
    - 37 participants increased skills, ability, or confidence in performing tasks or making decisions related to farm economics or agribusiness management or marketing.
    - 21 participants reported adopting recommended agribusiness management or marketing practices.
    - 439 participants in programs regarding management or sustainable use of fish and wildlife and wildlife habitat, including control of invasive species and pests, on agricultural lands.
- **Increased Knowledge and Best Practices for Water Conservation**: 195 producers adopted water quality or conservation practices.
    - 70 producers adopted one or more water quality practices (e.g., proper pesticide application, reduced animal waste, and/or other pollutants).
    - 125 producers who adopted one or more water conservation practices (e.g., reduced irrigation, use of water-saving technologies).
- **Increased Knowledge and Best Practices for Food Systems and Safety**: 406 participants demonstrated improved knowledge of food systems, accessed certifications and educational programs on food safety, or adopted food safety practices.
    - 338 participants demonstrated improved knowledge of food systems including food labels, production practices, hydroponics, food production and preservation, food waste management, etc.
    - 10 growers, producers, food workers completed GAPs, GMPs, HACCP, PSA, PC, food safety certification (i.e., ServSafe), or farm food safety educational programs.
    - 58 participants in food safety programs adopted one or more recommended practices (i.e., handwashing, cross contamination, time and temperature controls, refrigerator temperature).

Additionally, the Connecticut Agricultural Experiment Station had the following impacts:

- Dr. Sara Nason used Hatch support to develop the FluoroMatch software for detection of per- and polyfluoroalkyl substances (PFAS) during non-targeted screening in environmental, agricultural, and clinical samples. PFAS are an emerging class of OMCs that are common contaminants in agricultural wastewater, sludge, drinking water, and soil, and are present in the blood of an estimated 95% of Americans. This software enables comprehensive PFAS analysis in many scientific areas.
- To address the dual agricultural problems of soil micronutrient deficiency and phosphate runoff, Dr. Christian Dimkpa tested phosphate-zinc nanoparticle fertilizer formulations that use chitosan to increase nutrient availability and stability. He found that a tripolyphosphate (TPP)-chitosan formulation provided adequate phosphate to plants with significantly less phosphate leaching from soil, and growth benefits were increased in the presence of zinc. This demonstrates that nano-enabled TPP fertilizers can serve as a fertilizer source that reduces phosphate pollution.

Critical Issue: Sustainable landscapes across urban-rural interfaces

Extension professionals reported the following impacts for their Extension work in 2023:

- **Positive Landscape Outcomes**: Recommended actions for controlling invasive species and pests were adopted on 11.7 thousand public or private acres, sustainable practices were adopted on 17.9 thousand acres, pollinator pathways or tree canopies were added/preserved on 35 acres, 1.6 million gallons of stormwater runoff were diverted from entering water bodies, 61.4 thousand square feet of impervious cover disconnected from local storm water systems, 400 trees were planted, 4 green stormwater infrastructure practices installed, 105 households had taken action to promote or improve well water supply, and 4 new or revised plans or policies were implemented in a community, agency, local government, or business.
    - 11,725 public and/or private acres on which recommended actions were implemented to control invasive species and pests.
    - 17,985 acres on which sustainable practices were adopted.
    - 15 acres of pollinator pathways added.
    - 25 acres of tree canopy preserved or added.
    - 1,618,697 gallons of stormwater runoff diverted from entering water bodies.
    - 61,470 square feet of impervious cover disconnected from local stormwater systems.
    - 400 trees were planted.
    - 105 households took action to protect or improve private well water supply.

    - 4 green stormwater infrastructure practices installed.
    - 4 new or revised plans or policies implemented in a community, agency, local government, or business.
- **Cost-Savings and Funding/Resources Generated**: 206 thousand dollars value of in-kind resources were contributed by organizations/communities and 23 new alliances were formed.
    - $206,180 value of in-kind resources were contributed by organizations and communities.
    - 23 new alliances formed through an informal agreement without an MOU.
- **Knowledge and Training Gained in Landscape Sustainability**: 4 thousand participants increased knowledge of practices, completed programs that promote environmental literacy and sustainability, or earned professional certifications.
    - 2,448 Green Industry professionals had increased knowledge of recommended practices.
    - 1,611 participants completed programs that promote environmental literacy and sustainability, including water conservation and protection programs.
    - 86 participants earned professional certifications (e.g., Supervisory Applicator license) following completion of a certification review program.
- **Change in Landscape Sustainability Practices**: 8.7 thousand participants (including green industry professionals) used information from environmental and sustainability programs in their work or personal stewardship, adopted best management practices, adopted fertilizer and pesticide recommendations, adopted sustainable practices, adopted practices related to landscape risk factors, adopted water quality and conservation practices, or adopted turfgrass management practices.
    - 4,550 participants used information from environmental and sustainability programs in a professional or work-related context as employees or volunteers (including docents, teachers, park rangers, ecotour guides, etc.).
    - 530 participants used information from environmental and sustainability programs to adopt personal stewardship behaviors (e.g., conservation of natural resources in one's home or residential community).
    - 656 residential participants adopted one or more best management practices for landscaping, home water conservation, stormwater run-off, water quality protection, septic safety, drinking water safety, etc.
    - 450 landscape professionals or other Green Industry professionals adopted one or more best management practices (e.g., GI-BMPs).
    - 402 clientele adopted appropriate fertilizer and pesticide recommendations.
    - 450 Green Industry professionals indicated adoption of recommended sustainable practices.
    - 433 Green Industry professionals adopted recommended best practices related to invasive species, pest management, pollutant loads, and wetlands.
    - 453 Green Industry professionals adopted one or more recommended practices.
    - 252 Green Industry professionals adopted one or more water conservation practices (e.g., reduced irrigation, use of water-saving technologies).
    - 250 Green Industry professionals adopted one or more water quality practices (e.g., proper pesticide application, reduced pollutants).
    - 350 growers adopted recommended turfgrass management practices (e.g., nutrient management, weed and pest management, species selection, etc.).

Merit and Scientific Peer Review Process

Updates

None.

Stakeholder Input

Actions to seek stakeholder input that encouraged their participation with a brief explanation

None.

Methods to identify individuals and groups and brief explanation

None.

Methods for collecting stakeholder input and brief explanation

UConn Extension conducted an online survey of 1,030 CT residents in mid-2023 designed to measure their perceptions of the effort which should be applied to various issues by UConn Extension. Results supported Extension's work supporting safe food systems and environmental quality, amongst others. A data dashboard was developed using Power BI and is available internally for Extension faculty and staff to use in program planning. A key feature of the dashboard is the ability to visualize the data geographically and by socio-economic data and REG data.

A statement of how the input will be considered and brief explanation of what you learned from your stakeholders

Stakeholder input is derived from our UConn partners at a state level as well as county based Extension Councils, and advisory boards. In addition our county and university based faculty and staff seek information at county, state, and regional events. Asking what issues and trends are most important helps UConn delineate what is necessary from an economic and social science perspective. The data dashboard visualizations revealed clear trends in how stakeholders viewed priority issues based on factors which increased their vulnerability. We plan to use that data to create more targeted efforts to serve the audiences experiencing the greatest needs. The data confirms some of the known disparities which exist in Connecticut. We will continue to engage in collecting stakeholder input in face to face and virtual meetings as well as surveys and program evaluations after meetings and seminars. The data gathered from stakeholders are used to plan programs aligned with CAHNR's Strategic Vision and our POW.

Highlighted Results by Project or Program

Critical Issue

Adaptation and resilience to a changing climate

There are no Projects or Programs with highlighted results for this Critical Issue or category.

Critical Issue

Enhancing health and well-being

There are no Projects or Programs with highlighted results for this Critical Issue or category.

Critical Issue

Sustainable agriculture and food supply

There are no Projects or Programs with highlighted results for this Critical Issue or category.

Critical Issue

Sustainable landscapes across urban-rural interfaces

There are no Projects or Programs with highlighted results for this Critical Issue or category.

Appendix

Research Projects

Extension Programs

Other Projects / Programs