FY 2020 Annual Report of Accomplishments and Results

New York
Cornell University Agricultural Experiment Station
New York State Agricultural Experiment Station
Cornell Cooperative Extension

I. Report Overview

The NIFA reviewer will refer to the executive summary submitted in your FY 2020 Plan of Work located in the Institutional Profile. Use this space to provide updates if needed.

1. Executive Summary (Optional) Several updates were made to the Executive Summary – for your ease, full content is here.

CORNELL UNIVERSITY EXECUTIVE SUMMARY

At Cornell University, Federal Capacity Funds are administered strategically to address a wide range of issues in New York State and beyond and foster the integration of applied research and extension programming.

Cornell University Agricultural Experiment Station (Cornell AES), New York State Agricultural Experiment Station (AgriTech at NYSAES), and Cornell Cooperative Extension (CCE) work collaboratively to determine planned programs that align with NIFA priority areas and direct funds to individual research and extension projects as well as projects that integrate these two domains. The approach used to integrate the work of the two experiment stations and CCE is designed to serve the citizens of New York State and improve the human condition through excellence in scholarship—linking research, non-formal teaching, and extension to "real life" challenges and opportunities. Director-level staff from Cornell AES, AgriTech at NYSAES, and CCE meet regularly throughout the year to discuss relevant issues, research and extension projects, and new opportunities.

Extension and research leaders communicate with stakeholders, who provide input and inform priority-setting for use of Federal Capacity Funds. Stakeholders review proposals submitted through an internal competitive process by which faculty may apply for Federal Capacity Funds for projects with research and extension components matching current priorities. In addition, we have 38 active Program Work Teams comprised of extension educators, faculty, and stakeholders from across New York State who work together to develop, implement, and evaluate priority programs.

University-wide strategic plans have reinforced the land grant research and extension mission. The Office of Engagement Initiatives (OEI) advances Cornell University's mission through community-engaged learning—preparing and inspiring students, faculty, staff and community partners to work together to solve the world's most difficult problems. OEI works closely with Cornell academic departments and Cornell Cooperative Extension to increase opportunities for community-engaged research, learning, and

service projects. In 2016, a liaison position was created to strengthen the collaboration among Cornell students, faculty and staff, and the CCE association offices across the state—thus supporting the development of new university links with association offices and facilitating opportunities for other extension units on campus to strengthen and diversify engagement in New York communities. In 2019, university-wide internships connected to Engaged Cornell were added to the annual CCE internship opportunities.

The College of Agriculture and Life Sciences (CALS) and the College of Human Ecology (CHE) continue to reinforce the bridges between science and practice, campus-community partnerships, and leadership and outreach. The CHE Bronfenbrenner Center for Translational Research is dedicated to expanding, strengthening, and accelerating the connections between research, policy, and practice to enhance human development and well-being. Both colleges along with the Industrial Labor Relations School of

Cornell University and the Cornell University College of Veterinary Medicine are committed to research, teaching and extension, and the need to translate knowledge for public purpose.

This report documents the intentionally planned program work that results from Federal Capacity Fund projects, programs, and initiatives and the results of funded projects. Planned Programs are addressed collectively by CCE, Cornell AES, and AgriTech at NYSAES. Further detail, outcome indicators, and success stories are included in the formal report.

Each organization is described below to better explain our unique system at Cornell University.

Cornell University Agricultural Experiment Station

The Cornell University Agricultural Experiment Station (Cornell AES) – an integral part of three colleges – advances research on food and agriculture systems, the environment, applied economics, and community and individual development. By doing so, Cornell AES improves people's lives and contributes towards Cornell's Land Grant mission of discovery, engagement, and advancement of learning.

Cornell AES links Cornell's world-class research facilities with one of the nation's most comprehensive statewide cooperative extension systems. Through this engaged, interactive system we address pressing issues that directly affect the health and welfare of the state and beyond. Many of today's most urgent societal concerns – from childhood obesity to invasive species to global climate change – are not bound by state or national boundaries. With more than 130 years of experience identifying, quantifying, and responding to emerging issues in an ever-changing world, Cornell AES directs some of the most important projects in the state.

The station directly manages over 5,600 acres of farms, orchards, vineyards, and forests, and includes the university compost facility, eight farm operations, and over 127,000 square feet of plant growth facility space—providing critical research services to scientists. Our student-run organic farm, Dilmun Hill, is a model of a student-run agricultural operation and engaged, experiential student leadership that has been emulated by other organizations and universities. Every aspect of our operation - from staff development to forest management to field practices - is viewed through the lens of sustainability.

The Cornell University Agricultural Experiment Station:

- Manages approximately $6 million in federal Hatch grants.

- Annually distributes approximately $1.5 million to new competitively reviewed projects. Federal Capacity Fund projects and initiatives are an essential element of Cornell's research portfolio, supporting a diverse portfolio of research that benefits residents of the state, region, and the nation.
- Employs over 50 full time staff—comprising, farm and plant growth facility managers, field staff, greenhouse workers, growth chamber workers, and administrative staff.
- Operates eight farms with agricultural production and forest acreage across the state, from Willsboro on Lake Champlain to Long Island on the Atlantic Seaboard.

AgriTech at New York State Agricultural Experiment Station

Agriculture and food are multi-billion dollar industries in New York, and to underscore the value that New York State Agricultural Experiment Station brings to improving the health of the people, environment and economy of the state and beyond. Established in 1880, AgriTech at NYSAES in Geneva, New York develops cutting-edge technologies essential to feeding the world and strengthening New York State economies.

From developing safe and nutritious foods to pioneering means to preserve the environment, AgriTech at NYSAES serves millions of New York consumers, agricultural producers, food businesses and farm families throughout the state. AgriTech at NYSAES helps New Yorkers capitalize on new food and agricultural opportunities and is uniquely positioned to translate state-of-the art research into industry innovation and economic growth.

AgriTech at NYSAES:

- Operates a budget of approximately $39 million—approximately one-third of which is funded through State University of New York's base budget.
- Employs nearly 300 staff and over three dozen tenure-track professors.
- Partners with Faculty and Extension Associates: on the range of ten visiting scientists, ten postdocs, and 25 research and extension associates.
- Extends research and knowledge through students. In recent years there have been 50 to 55 graduate students conducting masters and doctoral studies. Annually provides opportunities for 25-30 undergraduate students to experience research projects during a nine week summer internship program.
- Encourages cross departmental/Research Association operations: Our four departments—horticulture; plant pathology and plant-microbe biology; entomology, and food science—have faculty in Geneva and Ithaca. The main focus is on improving the genetics, cultivation, production, protection, handling and processing of fruit and vegetable crops.
- Partners with the Northeast Center for Food Entrepreneurship (NECFE), at the NY Food Venture Center at Geneva to provide assistance to over 200 food entrepreneurs annually, promoting sustainable economic development in rural communities.

The AgriTech at NYSAES campus includes:

- Center of Excellence for Food and Agriculture – launched in September 2019; its mission is to grow NY's food, beverage and agriculture economy by serving as a hub for NY businesses to connect with the expertise and resources they need to innovate, grow and thrive.
- The U.S. Department of Agriculture's Plant Genetic Resources Unit (PGRU), responsible for the collection of apple, sour cherry and cold-hardy grapes and selected seed-propagated crops, such as onion, garlic, broccoli, cabbage and winter squash; and the Grape Genetics Resources Unit (GGRU), responsible for the national program on grape genetics and genomics.

- A central Geneva campus made up of 20 major buildings, several smaller buildings for farm machinery storage and similar purposes, and two houses with rooms rented to graduate students, visiting scientists, and postdocs.
- Two pilot plants—the Fruit & Vegetable Processing Pilot Plant and the Vinification & Brewing Technology Laboratory—provide opportunities for entrepreneurs and processors to add value to the state's raw products.
- The New York State Integrated Pest Management Program
- Cornell Agriculture and Food Technology Park adjacent to the main AgriTech at NYSAES campus
- Research/extension laboratories: Hudson Valley at Highland, NY, and the Cornell Lake Erie Research and Extension Laboratory at Portland, NY.
- Eleven farms for experimental plot work close to the Geneva campus with a total of 870 acres. There is also one acre of greenhouse space on the campus.
- The High Pressure Processing Food Validation Center

Cornell Cooperative Extension

Cornell Cooperative Extension (CCE) extends Cornell University's land-grant programs to citizens all across New York State. With a presence in every county and New York City, CCE puts research into practice by providing high-value educational programs and university-backed resources that help solve real-life problems, transforming and improving New York families, farms, businesses, and communities.

County associations of Cornell Cooperative Extension work with their local boards, committees, and volunteers to influence decisions on program priorities and delivery. Our county extension associations and multi-county programs are separate 501(c) 3 organizations under the general supervision of Cornell University as agents for the state of New York. Extension efforts on and off-campus engages a program development process that relies heavily on community input to identify issues of local importance. Often research is informed by the two-way flow of information and experience. CCE is connected to 55 learning centers and 9 residential youth camps across New York State and is fully equipped to deliver events and instruction through various modes including webinars, online coursework, and on-demand videos to remote audiences.

Cornell Cooperative Extension summary information (2020):

- 2020 was an unprecedented year for everyone – families, communities, farms, and businesses suffered both socially and economically. During this time, many CCE programs were able to shift to distance education and reach over 800,000 directly through online events and on-demand learning.
- 72+ educational outreach programs were offered per month in each county across New York State.
- Over 257,000 youth gained life skills, experiences & networks of career and developmental support through 4-H Youth Development.
- Over 13,000 volunteers were active - advising, planning, teaching, and mentoring in all program areas extending the reach of staff in communities.
- Connected 36 student interns in 2020 to internship opportunities that bridge research connected to faculty in the College of Agriculture and Life Sciences, the College of Human Ecology, and throughout the University with the assistance of the Office of Engagement Initiatives.
- 990+ local and regional staff and educators organized around program initiatives and local needs.
- Over 130 specialists provide programming in integrated pest management, dairy, grape, fruit, vegetable, and field crop production and management.
- 400+ Cornell University faculty and staff connected with local needs as a result of formal Extension responsibilities - primarily in the College of Agriculture and Life Sciences and the College of Human Ecology.

Collective, planned program areas are described below.

AGRICULTURE AND FOOD SYSTEMS: Projects support a NY food and agriculture industry that is diverse, sustainable, and profitable, and that produces a safe, reliable, and healthy food supply.

CLIMATE CHANGE: Projects develop and/or implement practices to reduce impacts to agriculture from climate change and/or use agriculture and forestry practices to mitigate climate change. Special consideration is given to projects that will develop implementable strategies, linked to agriculture and forestry, for meeting New York's new law on reducing use of carbon-based fossil fuels and lowering greenhouse gas emissions.

ENVIRONMENT, NATURAL RESOURCES AND SUSTAINABLE ENERGY: Projects lead to improved use of the state's available land resources for agriculture and forestry industries, renewable energy production from agriculture or forest resources, and energy conservation and renewable energy that benefits agriculture and food systems.

NUTRITION, FOOD SAFETY AND SECURITY, AND OBESITY PREVENTION: Projects lead to childhood obesity prevention; improved youth, family and community nutrition; and food security and food safety.

4-H YOUTH DEVELOPMENT/CHILDREN, YOUTH, AND FAMILIES: Projects focus on life skill development, STEM opportunities for youth, human development, and the quality of home and work environments. For Hatch or McIntire-Stennis supported research there should be a connection with agriculture and food industries.

COMMUNITY AND ECONOMIC VITALITY: Projects empower entrepreneurship and workforce development, agriculture and food systems development, community and economic development, and community sustainability and resilience. For Hatch and McIntire-Stennis supported research these activities must have a connection to agriculture and food industries.

II. Merit and Scientific Peer Review Processes

The NIFA reviewer will refer to your 2020 Plan of Work. Use this space to provide updates as needed or activities that you would like to bring to NIFA's attention.

Process	**Updates ONLY** Several updates were made to the planned peer review process – for your ease, full content is here.
1. The <u>Merit Review Process</u>	**Merit Review Process:** Cornell AES, AgriTech at NYSAES and CCE work together on a process of merit review for applied research and extension projects, including review for integrated and multistate activities. Key elements of the process are described below, and include statistics from the most current (2020) proposal cycle. Director-level staff from Cornell AES, AgriTech at NYSAES, and CCE meet regularly throughout the year to discuss relevant issues, research and extension projects, and new opportunities. **Submission and Review Process (Research, Extension, and Integrated Projects with Federal Capacity Funds):** • Principal investigators (PI's) are asked to consult program priorities (established as outlined in the stakeholder involvement section) and develop pre-proposals for new or revised projects funded by Federal Capacity Funds. • PI's who meet eligibility requirements are generally allowed to submit one pre-proposal within each funding stream (e.g. Smith Lever, Hatch, Hatch Multistate), and do so through an online system, which tracks each proposal through its life cycle. • Pre-proposals are reviewed for purpose and relevancy by external stakeholders, the PI's department/unit chair, Extension Program Associate/Assistant Directors, and the agricultural experiment station directors (Cornell AES and AgriTech at NYSAES). Reviews are submitted via a secure website. **For research proposals:** • Agricultural experiment station directors make final determination of pre-proposals for development into full proposals. • Full proposals are reviewed by two or three peer reviewers suggested by the PI and the PI's Department Chair.

	• The final proposal is submitted to NIFA for approval. If approved by NIFA, Hatch funds are allocated to a unique account associated with their specific project. **For extension proposals:** • Extension Program Directors rank/recommend extension pre-proposals. • Extension Program Directors meet with agricultural experiment station (Ithaca and Geneva) staff to discuss potential research and extension linkages within extension pre-proposals. • Extension Assistant Director, Organizational Development & Accountability reviews for equal program opportunity and affirmative action considerations. • Extension Program Directors finalize Smith-Lever funding recommendations. **Cornell University Review Criteria:** • Alignment with NIFA priorities • Alignment with internal priorities • Anticipated significance of results relative to current priority needs or opportunities • Scientific merit of objectives • Clarity of objectives • Appropriate approach and methodology • Feasibility of attaining objectives • Accomplishment during previous projects • Research performance and competence of investigator(s) • Relevance of the proposed work to state, regional, or national goals • Impact on underserved audiences • Level of research-extension integration • Relevance to stakeholders • Strength of diversity statement For FY20 a total of 137 pre-proposals were submitted to Cornell AES, Agritech at NYSAES and CCE of which 76 were internally approved for funding.
2. The <u>Scientific Peer Review Process</u>	See above.

III. Stakeholder Input

The NIFA reviewer will refer to your 2020 Plan of Work. Use this space to provide updates as needed or activities that you would like to bring to NIFA's attention.

Stakeholder Input Aspects	**Updates ONLY**) Several updates were made to the stakeholder input section – for your ease, full content is here.
1. Actions taken to seek stakeholder input that encouraged their participation with a brief explanation	• Use of media to announce public meetings and listening sessions • Targeted invitation to traditional stakeholder groups • Targeted invitation to non-traditional stakeholder groups • Targeted invitation to selected individuals from general public • Survey of traditional stakeholder groups • Survey of traditional stakeholder individuals • Survey of the general public • Survey specifically with non-traditional groups • Survey specifically with non-traditional individuals • Survey of selected individuals from the general public Brief explanation. Gaining stakeholder input and encouraging stakeholder participation is a system-wide expectation of all levels and units. Across the system, all of the stakeholder participation methods listed are employed; no single unit uses them all. Cornell AES, NYSAES and CCE leadership work collaboratively to identify external stakeholders that provide guidance by reviewing funding support requests. In addition, we have 38 active Program Work Teams (PWTs). PWTs are made up of extension educators, faculty, and stakeholders who work together to determine, develop and implement priority programs within PWTs and to advise research and extension leadership as needed. PWTs are expected to nurture research-extension integration, to encourage campus-field interactions and collaborations, to take multi-disciplinary approaches, to evaluate their efforts, and to involve their external members in all aspects of their work. Notably, more than 1,400 individuals were involved in the work of these teams in 2020. Beyond this state-level stakeholder input structure/process, each of Cornell Cooperative Extension's county extension associations continue to work closely with local stakeholders via participation in their local governance structures, i.e. board of directors, and advisory committee structures. In 2020, more than 3,500

	board and committee volunteers from diverse backgrounds participated and assisted in the direction, priority setting programs throughout the state, and over 13,000 enrolled volunteers assisted with program delivery adding to stakeholder involvement. In local CCE offices, stakeholder input is sought from all audiences including under-represented or under-served audiences. One of the strategies used for gaining input and developing working relationships with new audiences is by networking and partnering with organizations that do have existing and strong relationships with target groups. Local boards of directors and advisory committees also recruit an intentionally diverse membership representative of the people and the needs in the community. Effective involvement of youth in program determination and implementation is a priority. Our local advisory committees are expected to include youth members as part of the needs assessment and decision making structure. In 2020, more than 2,900 youth reported serving in appropriate leadership, governance and program delivery roles statewide.
2. Methods to identify individuals and groups and brief explanation.	• Use Advisory Committees • Use Internal Focus Groups • Use External Focus Groups • Open Listening Sessions • Needs Assessments • Use Surveys Across all levels of the system, all of the techniques listed were used; the mix of methods varied from site to site and program to program. All of our units are expected to have active and diverse advisory processes and to intentionally consider audiences not currently served. The activities of extension and research leadership, stakeholders, and PWTs are described in other questions in this section. Needs assessments, focus groups, and user surveys are conducted at the individual level of program units as well as in our statewide plan of work process. As a method of tracking program needs and input received, CCE educators are expected to submit narrative reports of efforts including efforts intentionally planned to engage underserved populations. For the 2020 reporting year, over 22% of the 480+ impact statements were submitted exemplifying programming intended for underserved audiences: 4-H programs reaching new audiences through afterschool programming and working with other organizations, food and nutrition programs helping mothers, families and food pantry clients to cook well balanced, affordable meals, parenting programs focusing on families in

	high stress situations, resiliency and hope building strategies for families everywhere, and agricultural programs focused on working with farm workers to build skills, and ensure food safety practices.
3. Methods for collecting stakeholder input and brief explanation.	• Meeting with traditional Stakeholder groups • Survey of traditional Stakeholder groups • Meeting with the general public (open meeting advertised to all) • Meeting specifically with non-traditional groups • Survey specifically with non-traditional groups • Meeting with invited selected individuals from the general public • Survey of selected individuals from the general public All of the techniques listed were used in 2020 but methods varied site to site and program-to-program across the system. Structures and processes for aggregating data are addressed in this section. The most active data gathering occurred in three venues - local advisory bodies, PWTs, and the internal (e.g. Director-level) stakeholders. Web-based surveys; interactive webinars and response to social media also provide programmatic feedback. Examples of efforts to gather stakeholder input include: **CCE Niagara County Creating Healthy Schools and Communities worked with local stakeholders to review reports and census data to move forward with a mobile-farmer's market for both Niagara Falls and Lackawanna.** These cities were identified by NYSDOH to reduce the risk of obesity and chronic diseases by increasing access to healthy foods. According to the Community Health Needs Assessment - Core Health Indicator's Report, 71% of adult residents in both Niagara Falls and Lackawanna do not consume the recommended amount of fruits and vegetables. Access to grocery stores is well below both state and national rates, with 31% of census tracts in these municipalities designated as "food deserts." **CCE Tompkins worked with individuals, agencies, stakeholder groups to examine sectors of the food system and develop a collaborative vision.** More than 100 community members gathered to launch the planning process and share insights, thirty-five in-depth interviews were conducted, focus groups were held with more than a dozen stakeholders with more planned, 25 community members were surveyed in a canvassing event, and 30+ context experts were engaged in short-form interviews to inform the food system baseline assessment. A large-scale community survey on food insecurity was also launched, with more than 250 respondents. "Tompkins Food Future," was launched www.tompkinsfoodfuture.org to keep public and stakeholders informed with the input and progress.

	South Central NY Dairy & Field Crops Program - Business Planning & Financial Management focus groups point to programs related to data driven decisions making. Following a request for benchmarking from an organic dairy farmer, we established an Organic Dairy Discussion Group with 6 farms in July 2019. This discussion group was the first in New York State to receive a Dairy Advancement Program (DAP) Peer-to-Peer Strategic Focus Group grant, which provided $7,500 to support the program. Ten farms participated in our second Organic Dairy Discussion Group meeting in March 2020. As a result, our efforts to develop a discussion group program to meet the demands of producers in our 6-county region will end up benefiting organic dairies across the state by increasing enrollment in the DFBS, delivering greater benchmarking value to the farms that do participate, and offering a stronger incentive for new farms to participate going forward. **Eastern NY Commercial Horticulture Program pivots delivery to podcasts based on survey and interview results.** In response to grower feedback that the newsletter format made accessing extension outreach challenging, the Eastern New York Vegetable News Podcast was developed in the late fall of 2018 with support from the team's technicians. Early episodes, which were first published in February 2019, focused on the results of field trials conducted by regional specialists while in-season episodes highlighted current pest and disease issues being faced by growers in the region. All episodes are published on SoundCloud and distributed via an RSS feed to both podcast apps and the ENYCH website. Specialists developed a COVID-19 specific podcast series to address grower questions and concerns. The series included five episodes covering topics ranging from market impacts of COVID-19, pivoting to online sales platforms, employee management and H2A visa holder concerns, food safety considerations, and managing cash flow in a time of uncertainty. **CCE Tioga worked with the parent advisory committee to determine ways to support families virtually during throughout COVID-19 pandemic.** The Family Resource Center program of Cornell Cooperative Extension of Tioga County provides parenting education, parent-child activities, connections to community resources and opportunities for parents to engage in leadership activities. In order to remain relevant (for topics and logistics) and safe during COVID-19 participants were engaged in the process of program planning through the parent advisory committee. Staff quickly developed the skills necessary to continue their work with families utilizing Zoom, email and social media as well as telephone calls and text messaging. The FRC program increased circulation of educational content and information about community resources through the program Facebook Page. Virtual parent talk times, parent-child playgroups and parenting education series were held via zoom. **CCE Delaware worked with Youth Climate Summit advisory committee to shift to virtual environment.** Cornell Cooperative Extension of Delaware County completed a three year grant funded by NOAA and sponsored by The Wild Center by delivering its final Youth Summit in fall of 2020. The one day in-person

	event originally planned to take place on the SUNY Oneonta campus was changed to four shorter events featuring four workshops via Zoom in response to COVID safety concerns. Extension worked with a youth summit advisory committee, including students and teachers from local schools, to create an event schedule that would best serve participants in a virtual forum. Emphasis was placed on how to make the summit interactive and keep students interested, committed and connected. Preconference, a basic climate 101 youth workshop and a teacher training on climate action planning were held before the first virtual summit event. An online scavenger hunt challenge was developed with activities linked to climate awareness to be done in between workshop sessions. Students hosted short Zoom discussion groups with various climate topics such as renewable energy in the weeks in between workshops to facilitate continued engagement across school groups. Each workshop session was preceded by a welcome hosted by a Margaretville Central School student and included an ice breaker in smaller breakout groups. **In support of the objectives creating programs that meet the needs of all community stakeholders, Cornell Cooperative Extension requires local Associations to annually review and commit to the CCE Affirmative Action, Diversity and Inclusion Plan (AADIP).** AADIP is a comprehensive plan that sets a foundation for building a more diverse and inclusive organization and supports organizational development and sustained culture change. **Preparing staff to understand how to meet the needs of stakeholders is a priority.** In 2020 mandatory all-staff trainings on Title VI Civil Rights were available online. Additionally, diversity and inclusion topics were built into every larger staff training effort including: New staff orientation, the Program Development Leadership Cohort, Supervisory Development Training, Executive Director Boot Camp – and as the feature of the 4-H Youth Development Diversity and Inclusivity Cohort and Opening Doors Diversity training. These offerings, along with distance learning training in the program development process, help staff learn how to identify local needs and then meet the needs of audiences through programs.
4. A Statement of how the input will be considered and brief explanation of what you learned from your stakeholders.	• In the Budget Process • To Identify Emerging Issues • Redirect Extension Programs • Redirect Research Programs • In the Staff Hiring Process • In the Action Plans • To Set Priorities

	The stakeholder input process for statewide program development jointly utilized by Cornell AES, AgriTech at NYSAES and CCE was established in February 2001. Stakeholders and PWTs work to improve program focus, relevance, and planning activities. Stakeholder input informs Federal Capacity Fund priorities and provides project-specific input on the relevance and value of the proposed work. Stakeholders provide input that informs decisions around funding of current extension and research projects, contributing ratings of perceived relevance to New York State among other rating criteria. Statewide applied research and extension priorities are updated annually, communicated to faculty and staff, and used as a consideration in funding decisions. County associations of Cornell Cooperative Extension work with their local boards, committees and volunteers to influence decisions on program priorities and delivery. County extension associations and multi-county programs are separate 501(c) 3 organizations under the general supervision of Cornell University as agent for the state of New York. Their local plans of work are established under guidance of stakeholders in local advisory structures and governing boards and are in alignment with the statewide plan of work. Stakeholders help to frame and shape plans of work, funding proposals, programs, and educational activities. System-wide, the internal stakeholders and PWTs have affirmed a commitment to the NIFA priorities and have elevated needs and opportunities to make use of campus resources for educational programs. Feedback from stakeholders is sought in a variety of ways, welcomed and considered for planning.

IV. Critical Issues Table of Contents

No.	Critical Issues in order of appearance in Table V. Activities and Accomplishments
1.	Agriculture and Food Systems
2.	Climate Change
3.	Environment, Natural Resources, and Sustainable Energy
4.	Nutrition, Food Safety and Security, and Obesity Prevention
5.	4-H Youth Development/Children, Youth, and Families
6.	Community and Economic Vitality

V. Activities and Accomplishments

Please provide information for activities that represent the best work of your institution(s). In your outcome or impact statement, please include the following elements (in any order): 1) the issue and its significance (e.g. who cares and why); 2) a brief description of key activities undertaken to achieve the goals and objectives; 3) changes in knowledge, behavior, or condition resulting from the project or program's activities; 4) who benefited and how. Please weave supporting data into the narrative.

No.	Project or Program Title	Outcome/Impact Statement	Critical Issue Name or No.
1.	Agriculture and Food Systems	**Program participation in direct education events:** • Adult participants: 225,727 • Youth participants: 10,822 • Volunteers: 531 **Overall indications of program success:** • 4,079 producers, horticulture business persons, and/or natural resource managers modified existing practices and/or adopted new production practices or technologies to address current issues and improve yield efficiency, consistency and/or quality and/or conservation of resources. • 3,308 participants documented that they have applied knowledge and skills gained from extension programs to existing business operations.	Agriculture and Food Systems

		• 1,642 producers, horticulture professionals, and/or natural resource managers documented that they assessed potential environmental impacts of their operations and developed and acted on plans to eliminate or minimize those concerns. • 2,729 participants reported improved agricultural/horticultural business profitability attributed at least in part to program participation. • 2,660 producers, horticulture business persons, and/or natural resource managers reported improved ability to anticipate and respond to environmental and market variations through alternative production management strategies. • 542 participants documented that they adopted innovations in food enterprises including production, allied services, processing, and distribution. • 241 participants demonstrated knowledge gains related to needs of potential employees and/or availability of qualified employees. Hand Sanitizer, PPE distribution Personal Protective Equipment (PPE) was in short supply and high demand in early Spring 2020 with the onset of the COVID-19 Pandemic. Supply shortages led to increased costs, resulting in a risk that essential workers, including farm workers, would not have the PPE needed to continue to work safely. This concern was verified by farmers noting the need for sanitizers and face coverings to protect themselves and their employees against COVID-19 contagion. As part of collaboration with New York State Ag & Markets, Cornell Cooperative Extension Administration orchestrated two statewide sanitizer distribution campaigns in the late spring. Using six regional pick-up points as hubs for all 56 county extension offices and regional teams to further distribute locally, CCE distributed nearly 39,000 gallon-sized containers of hand sanitizer, over 34,000 two-ounce bottles of hand sanitizer, and over 141,000 face coverings to farm workers. Local Cooperative Extension Associations and Regional Ag Teams worked with their agricultural communities to get the word out about the PPE campaigns	

broadly by media and directly through individual contacts. Extension staff listened to local needs, coordinated orders, distributed supplies, and trained staff in efforts to continue to produce food safely. Farmers, green house owners, equine operations, local CSA providers, roadside stand owners, farmer's market managers, and others in the agricultural industry were invited and encouraged to pick up supplies at drive through events and curbside pick-up sites. Statewide, it is conservatively estimated that the PPE distribution resulted in over 75,000 agricultural employees receiving protective equipment and instructions. The farm community was very appreciative, noting that it had been very difficult, if not impossible, to get PPE during that period.

Success with PPE distribution to the agricultural community has helped lay the foundation for other initiatives as well. The development, distribution and virtual training for the resource: Best Management Practices for U-Pick Farms during the COVID-19 Pandemic: https://cals.cornell.edu/news/nys-sanitizer-cornells-u-pick-guide-boost-farm-success helped 500+ farms to consider protection strategies for their employees and the public. Additionally, mobile COVID-19 testing sites will be made available in 5 counties this fall (Orleans, Wayne, Genesee, Ulster & Clinton) to get ahead of the increased farm employees for fall harvest season.

Eastern New York Commercial Agriculture Tree Fruit Workshops Go Virtual in Response to COVID-19

When COVID-19 numbers started to increase in Eastern New York in March and April, tree fruit growers were getting into their 2020 orchard management season. Growers were in need of our usual in-person trainings, which we were no longer able to offer due to the statewide limits on in-person meetings. In March, fruit specialists offered a stone fruit pest management meeting, featuring specialists to highlight stone fruit insect, disease, and weed management best practices. Later that month, a bloom thinning how-to webinar was held. In May and June, the team held weekly online fruit thinning meetings with at the petal fall, 12mm, and 18mm fruit thinning stages, to allow growers to better manage their thinner applications. At the first meeting, participants also received critical pest management updates. In July a summer disease management webinar was

		held to speak on common summer apple diseases. In late July, we held a precision airblast spraying webinar. In August, we held a harvest plant growth regulator and fruit storage meeting where CCE Director Dr. Chris Watkins discussed his storage recommendations for our most commonly stored apple varieties. In addition to hosting these meetings live, meetings were recorded and uploaded to our team YouTube page. Between live views and YouTube hits, these recordings combined have well over 1000 views. While we hope we can return to in-person programming in the near future, we plan to continue to offer a wide array of online programming to allow our research-based information to be accessible to as many growers as possible. A Qualtrics Survey following 2021 Cornell Tree Fruit Conference indicated an overwhelming majority of survey recipients would prefer a hybrid format of educational approaches. Zoom/YouTube format provides on the spot training with no travel and live meetings provide Interaction/networking. ### Somali Bantu Women & Children Empowering Center's Farm|Market CCE Oneida County (CCEOC) has formed a strong working relationship with a local Somali Bantu refugee community. The community is made up of roughly 3,000 people and it is located in a part of the city of Utica in Oneida County, an area noted as a food desert. While CCEOC started by providing resources and information to the community about gardening, we learned of their needs, interests and desire to farm to support their community with fresh, local, affordable food. Over time, community connections were made, and eventually funding secured to begin the Somali Bantu Community Farm and the Women & Children Empowering Center's Market and Garden. The community farm is an inter-generational effort, where members are learning to grow, prepare, and sell food. The garden provides an opportunity for extension to support educational activities in growing and selling while encouraging interest in the potential of next-generational farmers. The market provides an avenue of income for the nonprofit organization, the Somali Bantu Women and Children Empowering Center. The market development also provided fresh produce to an area of much need.	

The Somali Bantu Community Farm and Market has thrived. As a community, the Somali Bantu families worked together, harvesting, washing, and preparing the products sold at each market. Over 500 pounds of product were sold during nine markets. All surplus produce was given to those who volunteered their hours at the farm and markets. With the outpour of community support from consumers, fellow farmer camaraderie, and the Oneida County Public Market, the Somali Bantu became a trial vendor at the public market in 2020 and names as a key vendor in their 2021 season.

During this time, the pandemic brought new challenges for CCE work with the Somali Bantu Community Farm, particularly when in-person meetings were not allowed. Extension and the Somali Bantu community worked together to find a communication strategy that would work for the community and staff and began using WhatsApp – which allowed for video and photo messages, as well as text. This worked well, WhatsApp allowed the Somali Bantu to share information beyond their community farm and with other farmers, other Somali Bantu community members in Oneida County, the surrounding region, and with family and friends in other states and in their home country of Africa. A video of the story of the Somali Bantu farmers in Oneida County can be found at https://vimeo.com/509892671 (password bantu).

Agricultural Research Internship Opportunities for Undergraduates: An Interdisciplinary Summer Research Scholars Program at Cornell University's New York State Agricultural Experiment Station

Principle Investigators: Kyle Wickings and Larry Smart

The Need

There is a critical need for more students to have access to undergraduate research opportunities in the food and agricultural sciences. These opportunities are integral to another high priority: increasing the number of students who pursue higher degrees in these underserved areas. This project was designed to bolster agricultural literacy, professionalism and research experience among the undergraduate student population — our future agricultural science leaders — through hands-on experience with research and outreach agricultural activities.

		The Approach Through an interdisciplinary nine-week summer research internship, this project gives cohorts of undergraduate students hands-on, experiential learning and professional development opportunities with campus-based faculty and regional extension educators. They also collaborate in research addressing pressing problems facing growers and producers in New York state. Located at Cornell AgriTech — the New York State Agricultural Experiment Station in Geneva, New York — this project was designed to support six undergraduate summer interns per year for three years (2017-2020), funding them to participate in an existing program that typically includes 20-30 interns per year, many funded from other sources. Focusing on both laboratory and field skills across multiple disciplines, students work with faculty mentors to address problems facing New York state agriculture and food production. Additionally, students have the opportunity to interact with growers and agricultural industry professionals, including crop consulting firms, seed companies, agrichemical companies and food processors. **The Impacts** Though the COVID-19 pandemic caused this programming to be put on hold in 2020, previous summer internships proved to be highly valuable for students. Experiences spanned aspects of digital agriculture — from enhancing drone image analysis of fire blight and apple scab in orchards, to understanding the effects of UV light as a control measure for spider mites. Each student developed laboratory and field research skills, and enhanced their verbal and written communication skills. The program also has a growing focus on recruiting students of many different backgrounds; In the summer of 2019, for example, 45% of participants were from underrepresented groups. Based on exit surveys completed by 110 of 160 program alumni, 45% have enrolled in or are planning to attend graduate school, while another 16 % have been employed in a field of plant or agricultural sciences. The long-term goal of this program is to build a foundation of research expertise that will contribute to development of a diverse workforce capable of extending innovative solutions that address the serious problems facing U.S. agriculture and food production.	

Conservation, Management, Enhancement and Utilization of Plant Genetic Resources

Principle Investigator: Michael Gore

The Need

In the United States, sweet corn is the third most consumed vegetable, following tomato and potato. In 2020, New York state sweet corn was harvested from 25,000 acres, with a production value of $36.9 million. Sweet corn varieties grown in New York need to have superior productivity and quality, but they also must be adapted to the state's climate and production systems. However, commercial seed companies are primarily focused on breeding for agroecosystems of the Midwest. This neglect for the Northeast's growing conditions has negative consequences for New York state growers in terms of market share. Notably, there is a premium price paid by the consumer for sweet corn that matures before the general sweet corn crop, due to less market competition.

The Approach

Seeking a solution for New York state growers, this project leveraged plant breeding and genetics methods to enhance the productivity of sweet corn. Through interactions with the National Plant Germplasm System, this work was positioned to genetically characterize the complete sweet corn germplasm collection maintained at the North Central Regional Plant Introduction Station (NCRPIS) in Ames, Iowa. The collection was evaluated using a combination of modern genomic and phenomic tools to help better understand the genetic basis of how sweet corn responds to a range of environments in Upstate New York. Until this work, this collection had been only minimally characterized at the genetic level. In total, the project evaluated more than 400 sweet corn inbred lines, and scored roughly 200,000 genetic markers, with a close look at leaf architecture and physiological variables.

The Impacts
The information generated from this research will contribute to the genetic improvement of sweet corn for the Northeastern United States, as well as support the conservation and utilization of the sweet corn collection. By employing high-throughput phenotyping — a method of screening that uses digital instruments to rapidly collect large amounts of data in a non-destructive manner — this project's results enhance our understanding of the genetic basis of leaf architecture in sweet corn and pave the way for the manipulation of leaf physiological attributes in breeding practices. By allowing for rapid adaptation of sweet corn varieties to succeed in different and changing growing environments, this work is intended to benefit seed companies, growers, food processors and consumers.

Developing a New Feed Protein Complex to Replace Fishmeal in Fish Farming

Principle Investigator: Xingen Lei

The Need
Fish prove to be a reliable source of high-quality protein and polyunsaturated fatty acids that may decrease risks of chronic diseases such as diabetes, hypertension and cancer. Although fish is an excellent dietary source of those nutrients, the average annual fish consumption is only 6.5 kilograms per person in the U.S., partially due to limited local production and high cost of imported seafood. Expansion of local and domestic aquaculture is also hindered by the high cost of fish feed, which relies on expensive, animal-based ingredients. Fish producers have looked to plant-based solutions for fish feed ingredients, but challenges persisted in finding the right recipe that both keeps costs down and keeps fish healthy and nutritious for consumption.

The Approach
This project sought alternative diets for fish, substituting expensive fish meal, fish oil and astaxathin — a bioactive antioxidant compound that occurs naturally in certain algae — with different combinations of microalgae, soybean meal and

		other plant-based ingredients to find the optimal mix. The research included two parallel experiments on more than 600 fish, across 16 weeks, examining 12 diet variables. Performed in well-equipped federal research facilities, the project team focused their fish diet study on rainbow trout, which is cultured in 69 countries and supports a $2.4 billion global industry. The U.S. alone produces over 20,000 metric tons of rainbow trout in freshwater systems annually, making it the eighth-largest producer worldwide. A staple for New York state hatcheries and farms, rainbow trout also has one of the highest protein requirements among fish and is a well-established model for aquaculture research, making it a prime candidate for this study. **The Impacts** This project addresses major real-world issues of food, feed, fuel and health. The project team developed laboratory and animal evaluation systems that allow for comparisons of how fish process essential nutrients from various ingredients. These systems help rank the effectiveness of different fish feed recipes that substitute fishmeal, fish oil and astaxanthin. These tools helped the project team demonstrate that well-formulated plant protein-based diet led to growth performance of rainbow trout similar to that of diets containing 15% fishmeal and that replacing 50% of fish oil with microalgae in both diets did not impair performance, health or nutritional value of fish. The intended technology will enable fish producers to use more sustainable and competitive feed ingredients than fishmeal and fish oil to enhance local fish production. Crop producers will be able to sell soybeans and microalgae as fish feed at a higher volume, earning higher profits. Feed and biofuel companies can develop new products to compete for the global markets. The general public and next generations can benefit from enhanced local production and supply of nutritious fish, as well as decreased use of land and fresh water for energy, food and feed production. Overall, it will help improve food security and public health — and make food and biofuel production in the U.S. more competitive and sustainable.	

Economic Impacts of Alternative Premium Structures by Cooperatives and Milk Handlers in New York State

Principle Investigator: Todd Schmit

The Need

With more than 80% of the nation's milk passing through them annually, dairy cooperatives play an ever more prominent role in the management of U.S. milk markets. But their management presents some unique challenges for cooperative members to navigate. For example, differing member interests become more prevalent and costly the longer a cooperative exists, and the cooperative's board of directors is tasked with increased responsibility in balancing the representation of these interests. Through a cooperative structure — where users of the business have ownership and, with it, democratic control — members' needs are prioritized over return on investment. The value that members see in belonging to and co-owning their cooperative has important implications for operational efficiencies and governance participation—factors that may allow cooperatives to form and succeed when other types of business models may not.

The Approach

The overall goal of this project was to assess what value dairy farmers assign to cooperative membership, as well as to the pricing and cost structures for levies on volume, quality and hauling provided by handlers. The project team conducted a year-long national survey that examined seldom researched preferences for milk pricing attributes and handler business structures. With insights from more than 200 participating dairy farmers, the project team evaluated the values and strategic tradeoffs between price components and handler business structure (cooperative or independent). By controlling for handler pricing factors, the team more accurately estimated the value of cooperative ownership to members.

The Impacts

This research provides new insights on the specific value that dairy farmers assign to their cooperative membership. Results suggest that dairy farmers, on aggregate, are willing to accept lower per-hundredweight (cwt) compensation to be cooperative members — 2.3% of the average milk price —versus selling to

		independent handlers. This indicates the average value of cooperative ownership to be $0.45/cwt. The inclusion of member demographic variables in the study highlighted preferences that are important for understanding diverging member interests, informing improved cooperative governance strategies and board decision-making to address them. The results suggest it's critical for seasoned cooperative members to communicate value of the cooperative to existing younger members, both for recruitment and long-term member retention.	
2.	Climate Change	**Program participation in direct education events:** • Adult participants: 100,361 • Youth participants: 7,799 • Volunteers: 617 **Overall indications of program success:** • 925 consumer, residents, agricultural/natural resource producers, organization and business representatives, and/or local government and community leaders documented that they modified existing practices or technologies and/or adopted new practices to protect/enhance natural resources and/or enhance biodiversity. • 692 consumers, residents, agricultural/natural resources producers, organization and business representatives, and/or local government and community leaders demonstrated knowledge gains about the causes and implications of climate change and adaptive or mitigation strategies. • 456 agricultural/natural resource producers, organization and business representatives documented that they adopted recommended adaptation strategies for production agricultural and natural resource management, including invasive species, pest management, pollutant loads, wetlands, emergency preparedness, etc. • 412 consumers, residents, agricultural/natural resources producers, organizations and business representatives, and/or local government and community leaders documented that they modified existing practices or technologies and/or adopted new practices to protect/enhance water resources.	Climate Change

		• 64 instances were documented where consumers, residents, agricultural/natural resource producers, organization and business representatives, and/or local government and community leaders improved and/or protected water resources. • 28 agencies/organizations/communities documented that they adopted recommended climate mitigation practices and policies. ### Climate Smart Farming Extension Team Cornell's Climate Smart Farming (CSF) Extension Team gives New York farmers access to extension specialists with commodity expertise necessary to help manage the risks posed by increasing extreme weather, climate variability and long-term change. The extension team works in partnership with Cornell Institute for Climate Smart Solutions (CICSS) staff and faculty (http://climateinstitute.cals.cornell.edu/whoweare/) and with other Cornell University faculty and CCE staff. The team has collaborated with NY Integrated Pest Management (IPM) staff, NYS Partnerships for Regional Invasive Species Management (PRISM) and industry groups like the NYS Berry Growers Association (NYSBGA). The primary effort is to help NYS farmers prepare for a changing climate by drawing on the latest science to answer questions about how to make changes to their management practices that will help increase resiliency and farm sustainability. Videos, resources and access to team members can be found here: http://climatesmartfarming.org/climate-smart-farming-extension-team/. ### Master Forest Owner and Woodland Education Programs The Master Forest Owner (MFO) program provides private forest owners of NYS with information and encouragement necessary to manage their forestlands. Over 150 experienced volunteer MFOs are available, ready to assist neighbor forest owners with the information needed to manage their forests. All MFOs are graduates of a four-day training program, where they learn about sawtimber and wildlife management, forest economics, and ecology. The program has the support of the Cornell Department of Natural Resources and the Environment and CCE staff. The impact of the volunteers and staff working in communities is broad.	

		Some programs were able to pivot and meet the needs of expanded audiences who turned to outdoor activities more than ever during 2020. In Columbia and Greene counties, the CCE program worked internally and with many partners to adapt the woodland education programs typically offered in-person. This required creativity, innovation and continued improvement over the course of 2020. Example initiatives include launching of an online publication "In These Woods". This publication exposed landowners to many woodland topics and tools to develop and achieve their stewardship goals, Trained Logger Certification courses converted to virtual platforms, field guide, "Wetlands in The Woods" created for loggers and forestry professionals to identify wet soils using common wetland species identification, new agroforestry resources developed and made available online. Staff created drone, video and photo libraries to convert popular courses to webinars, webinars hosted on many topics, including "Keeping Your Forest Healthy While Social Distancing", "Growing Woodland Mushrooms" and "Invasive Species", increased social media resources and virtual tools were provided through weekly programs like "Forestry Friday", which saw an estimated reach of 45,000.	
3.	Environment, Natural Resources, and Sustainable Energy	**Program participation in direct education events:** • Adult participants: 101,168 • Youth participants: 4,279 • Volunteers: 2,519 **Overall indications of program success:** • 4,099 consumers reported that they adopted appropriate energy cost control and/or conservation practices • 3,146 agricultural/natural resource producers, organizations and business representatives, community leaders, and/or residents documented that they modified existing practices or technologies that will assist with natural resources management and the environment	Environment, Natural Resources, and Sustainable Energy

		• 2,156 agricultural/natural resources producers, organization and business representatives, community leaders, and/or residents demonstrated knowledge gains about waste management and reduction • 1,356 consumers reported savings on energy costs attributed to adopting alternative energy sources • 1,193 consumers reported savings on energy costs attributable to adopting energy conservation measures • 906 agricultural/natural resources producers, organization and business representatives, community leaders, and/or residents documented that they reduced costs through improved waste management practices • 812 agricultural/natural resources producers, organization and business representatives, community leaders, and/or residents documented that they modified existing practices or technologies and/or adopted new practices to manage and reduce waste • 440 consumers reported that they adopted appropriate energy cost control and/or conservation practices Statewide Energy Innovations Project The goal of this project is to develop a Cornell Cooperative Extension statewide Energy Efficiency and Renewable Energy (EE/RE) Extension Program across NY. Project objectives are to: • increase the number of CCE county associations engaged in EE/RE extension programming, • expand the number of energy related partnerships with Cornell University faculty and programs and with key collaborators around the state, and • develop and test EE/RE extension approaches that are effective, appropriate and scalable for use across the state. In 2020 the **number of associations directly engaged in energy related programming more than doubled,** from 12 to 25+. In addition, at least 11 additional associations are actively planning and seeking funding to start EE/RE educational programming in their counties.	

		• The NYSERDA and New York State Electric and Gas utility-funded energy volunteer educator program, Energy Navigators, was expanded with NYSERDA funding to five counties. Also, the curriculum for Energy Navigators Volunteer training was revised. • A key metric for determining effectiveness of EE/RE extension approaches in helping households decide whether to implement significant actions related to EE/RE is the average cost/household/action of the approach in helping householders make the decision to take the action. The average cost in NY is over $600/household/action. Several approaches that have been tested and are now being implemented across 19 counties are averaging between $275 and $400/household/action, and one EE/RE extension approach that was tested in 2020 reduced the cost to less than $100/household/action. • Real Time Energy Monitoring project using an open source, Low Power/Wide Area Network-based Internet of Things (IoT) initiated. Cornell University students and faculty have helped 24 associations establish pilot networks in their respective counties, and are monitoring real time energy use in CCE association and/or county government buildings in those networks. • CU and CCE obtained an NSF Smart and Connected Communities Planning Grant to explore using LPWAN-based IoT networks in conjunction with NY State's Mesonet https://www2.nysmesonet.org/ , a network of 126 weather stations, to develop hyperlocal weather forecasts that will facilitate increased rural community resilience to storm events. Enhancing Forest Biodiversity, Regeneration, and Ecosystem Health in a Changing Climate Principle Investigators: Stephen Morreale and Kristi Sullivan **The Need** In northern forests, leftover treetops and branches from timber harvest are often used by industry for pellets, mulch and pulp, by small-scale commercial firewood operations and by wood-burning households. Collection of the leftover wood, usually after a harvest, is seen as an efficient use of labor and a value add to the	

		operation. However, woody material left in place can greatly influence forest floor environmental conditions and improve forest health. With predicted changes in climate, including extreme heat and droughts, excessive removal of wood from the forests could threaten future productivity, increase vulnerability to disease and result in a loss of vital ecosystem services. With forests claiming 63% of New York's landscape — the majority being small family forests of 100 acres or less — practical solutions that meet economic needs while preserving forest health could prove vital for the state and scale to serve forests all over the world. **The Approach** This project sought to develop a win for forest ecosystems and the timber industry by developing practical methods for timber harvesting that helped keep the forests healthy and thriving. Specifically, the project team tested a simple solution in five separate forest stands across Central New York: placement of loosely consolidated piles of treetops and branches — parts of the tree that aren't used in commercial lumber — on the forest floor. During a timber harvest, the decision of how much wood to remove and the best manner to retain it has long-term implications for sustained forest health, ecology and economics. After a canopy thinning, bare and exposed ground creates poor conditions for regeneration and is slow to recover. This project aimed to measure the impacts of constructed piles on forest regeneration and key environmental and biological factors across 10 years. Additionally, soil in the experimental forest stands was analyzed and compared to three un-managed forests, including two that were old growth. The goal of the work was to provide guidelines to forestland owners to encourage straightforward activities that promote regeneration and sustain healthy forests in a changing climate. **The Impacts** By leaving behind some of the timber harvest, this project demonstrated that woody materials on the ground can buffer temperature extremes, retain moisture during droughts and benefit many forest animals and plants in the process. Short-term impacts included more stable ground temperatures, more continuous moisture near the ground and in the soil, shielding from effects of harsh sun exposure and more cover for plants and animals. Findings from this program have been shared in presentations to more than 850 people across New	

		York state and Pennsylvania and integrated into educational and extension programming, including the popular NY Master Naturalist program, which has trained more than 450 volunteers about issues such as forest health and biodiversity. Applied at a larger scale, these straightforward methods can create an overall buffer effect, minimizing microclimate extremes and mediating the effects of an increasingly erratic climate — something that all northern forests can benefit from.	
4.	Nutrition, Food Safety and Security, and Obesity Prevention	**Program participation in direct education events:** • Adult participants: 187,955 • Youth participants: 228,118 • Volunteers: 10,361 **Overall indications of program success:** • 37,510 children and youth demonstrated knowledge or skill gains related to healthy eating and active living – 33,843 documented to have applied recommendations. • 25,113 program participants adopted food resource management practices. • 22,419 parents/caregivers and other adults demonstrated knowledge or skill gains related to healthy eating and active living – 27,610 documented to have applied recommendations. • 23,235 consumers demonstrated knowledge or skill gains related to reducing food safety and/or foodborne risks and illnesses including recommended purchasing, handling, storage, and preparation practices - 6,714 consumers documented increased application. • 2,622 program participants have acted to improve their food security status – 1,337 households documented status improved. • 332 producers/processors/food service providers documented that they implemented new and/or increased application of ongoing safe food production, processing, storage, handling, marketing, and preparation practices.	Nutrition, Food Safety and Security, and Obesity Prevention

		Strong Hearts for New York: Reducing Heart Disease Risk among Rural Women Principle Investigator: Rebecca Senguin **The Need** A leading cause of death in the U.S., cardiovascular disease (CVD) disproportionately affects rural communities. Rural women have higher CVD rates than their nonrural counterparts, partially because of their social and environmental settings. With CVD risk factors such as obesity, high cholesterol, hypertension and diabetes on the rise, identifying effective measures to intervene in these trends are critical to our nation's public health. Strong Hearts, Healthy Communities (SHHC), an NIH-funded heart disease prevention and intervention study targeting rural midlife and older women, provides a wealth of insight on the complex factors contributing to this problem. However, there is still a major knowledge gap — in both research and public health practice — that better defines the relationship between CVD and the physical activity, dietary behaviors and built environments of rural women. **The Approach** This project leveraged existing SHHC data, partnerships and an intervention study to collect additional insights on the physical activity, nutrition and environments that women in rural communities experience. Implemented in five New York state counties spanning 11 communities, the study focused on rural, overweight, sedentary women over the age of 40. Intervention participants directly engaged in a 24-week program that incorporated aerobic physical activity, strength training, nutrition and a civic engagement, whereas the control group did not. The project team also conducted comprehensive qualitative and quantitative built environment audits to the data collection at multiple time points across 48 weeks, allowing for data triangulation across study measures. The triangulation included physical activity measures using validated self-reported activity questionnaires, accelerometry, perceptions of the built environment, and built environment audits. It also accounted for dietary data collection, utilizing multiple validated fruit and vegetable self-reported questionnaires, 24-hour dietary recalls, a carotenoid skin scan measure, perceptions of the food	

		environment and food environment assessments. The environmental assessments also documented with audio narration and photos the physical activity and healthy eating resources available in each of the rural intervention communities. **The Impacts** Overall, the intervention study participants experienced positive changes across biometric, physical activity and diet, improving their body mass index, weight, waist circumference and body fat percentage, as compared to control participants. They also decreased their cardiovascular risk score and improved in various fitness test metrics. Beyond that, they reported making healthier dietary choices and observing more social support from family and friends for living more active lifestyle. Longer term impacts of this project include helping rural communities identify barriers and facilitators to physical activity, healthy eating and lifestyle choices for their residents — findings that can scale to improve national public health. ## Addressing Food Security Issues Food security issues for families across the state intensified throughout 2020 due to COVID-19. Some lost jobs, others lost housing, and still more lost hope. Across CCE program areas, staff, and volunteers came together to provide what we do, growing confidence through educational programs, and organizing efforts across non-profit organizations to raise awareness, distribute food, get resources to those in need. Master Gardener Volunteer programs extended food and the opportunities to garden from community gardens to families. Extension Associations helped to make connections so that locally grown food and shelf stable food was distributed by food trucks, through food pantries and through food lockers, and programs packed and distributed backpacks to youth. Our educators met with families through zoom to teach them to garden, cook meals on a budget, and provide instruction to help families to manage their finances. At a time of hardship, Extension programs collaborated, and connected people to resources.	

		As a result, evaluation indicates that over 2,600 program participants acted to improve their food security status, and 1,337 households documented status improved. 2,760 program participants reported that they are practicing improved money management skills such as comparison shopping, paying bills on time, paying more that minimum payment, checking credit report, and reviewing and understanding bills/statements as a means to meeting financial goals. ### Fruit and Vegetable Prescription Program (FVRx) Goes Virtual, Increases Fruit and Vegetable Consumption. The FVRx program focusses on increasing access to affordable and local produce as a solution to preventing and treating chronic diseases. In the Finger Lakes Region, only one in seven adults consumes the recommended number of fruits per day, and only one in ten consumes the recommended number of vegetables. Comparatively, rates of overweight or obese adults in Steuben and Yates Counties are 68.3% and 64.8%, respectively and many people struggle with food insecurity, making it difficult to have consistent access to healthy foods. Research indicates that having access to affordable fruits and vegetables – as well as strengthening a person's skills around healthy eating – can help reduce the likelihood of obesity and as a result, chronic disease. FVRx allows health care providers in the community to write prescriptions for fresh fruits and vegetables. Patients receive vouchers to spend at local farmers markets, farms stands, and other retail options–giving additional purchasing power to people who need it most. Participants receive support and education throughout the program, and can attend additional nutrition, cooking, gardening, and chronic disease self-management classes. In 2019 and 2020 Extension SNAP-Ed educators in the region worked collaboratively with the funders of the FVRx program to provide education and educational resources to participants. To meet the challenges presented by COVID-19, lessons were modified for virtual learning, including adapting presentation slides, handouts, and activities. Attendance records, voucher redemption forms, and waivers all went to electronic versions to accommodate	

		the distance-learning environment, and the in-person lessons shifted to a virtual platform. Three local produce vendors were recruited for voucher redemption. Vendors were trained on identifying FVRx vouchers from SNAP-Ed New York – Southern Finger Lakes Region and the process for redemption. At the completion of each week's class, participants were mailed handouts, along with vouchers ($20.00-worth) to spend on fresh fruits and vegetables at the participating FVRx vendors. Positive behavior change was measured through a retrospective questionnaire; survey responses indicate that 80% of participants eat more fruits and 60% of participants eat more vegetables now than they did before attending the nutrition classes. In addition, 60% of participants also reported being able to access more healthy foods following completion of the series than before.	
5.	4-H Youth Development/Children, Youth, and Families	**Program participation in direct education events:** • Adult participants: 86,224 • Youth participants: 184,449 • Volunteers: 8,345 **Overall indications of program success:** • 25,895 youth demonstrated a deeper understanding and appreciation of complex food systems and their impact in those systems. • 22,813 youth indicated development of environmental literacy. • 20,172 youth applied knowledge and skills in programs, projects and activities to foster an inclusive and diverse learning environment. • 19,366 youth demonstrated that they increased their ability to express their ideas confidently and competently. • 20,934 youth demonstrated they gained new STEM skills • 7,982 youth demonstrated improved college and career-readiness skills. • 12,926 parents/relative caregivers reported experiencing positive changes in parent-child relationships and parenting skills that they attribute to implementing new parenting behaviors and methods learned in parent education programs. • 10,368 youth lead community service projects in partnership with adults using skills learned in 4-H.	4-H Youth Development/Children, Youth, and Families

		• 2,760 program participants reported that they are practicing improved money management skills such as comparison shopping, paying bills on time, paying more that minimum payment, checking credit report, and reviewing and understanding bills/statements as a means to meeting financial goals. ### Growing the Next Generation of Conservationists CCE provides experiences for youth to engage with the outdoors, gain skills and knowledge to motivate good decisions for the environment and food, and build youth who are interested in sustainability. CCE Associations across the state run nine 4-H residential Camps, summer day camps, afterschool programs, children's gardens, nature centers, and school enrichment experiences – many of which support environmental education. In 2020 there were many examples of virtual experiences offered in a series of three or more zooms to grow young conservationists most of these were developed through the efforts of a campus/county team called the Youth, Nature, and the Outdoor Environment (YNOE) Program Work Team. In 2020, YNOE lead a Virtual Forestry Series. The series was a replacement for the canceled Forestry Weekend. This six-part series introduced forestry to youth across New York State. Each session focused on a different ecological concept and was taught by a different educator. Tree identification, map and compass, invasive species and pests, and forest ecology were the topics chosen. Over 110 unduplicated youth and adults from 23 counties participated. Participants who watched all six sessions and completed a survey were provided a tool they could use to continue their learning of and exploration into forestry. ### 4-H Program Reaches Families and Communities in Innovative and Nimble Ways in 2020 In the early phase of the COVID-19 pandemic, Extension-connected staff and faculty shifted learning strategies to meet the needs of families and communities. Most schools were fully or partially remote, so afterschool activities (if they were to continue) needed a plan B. Most Extension offices were not hosting in-person activities, so club and outreach experiences needed to shift, and traditional events, summer camps, and fairs were not able to happen in the usual way.	

		Spring of 2020 saw many learning opportunities offered for: using Zoom to engage audiences, creating video tutorials and showcases, and social media campaigns. Peer-to-peer meetings were hosted for staff to learn from each other about reaching diverse audiences in innovative, nimble, and agile ways. While participation in online experiences were often undocumented because of delivery, reach to new families grew exponentially. The FLX (Finger Lakes) Learning Launchpad offered 4-H live program delivery daily with recordings available. Jefferson County created "4-H Virtual Academy" immediately upon lockdown to provide a mechanism for families who connect through various program offerings to have a continuation of programs—Animal Science, Book Club, 3D Printing, Environmental Science, Coding, Chess, Nutrition/Mindfulness, Minecraft Education Gaming, American Sign Language and Spanish etc. County fairs, 4-H Public Presentations, and cooking demo contests offered virtual shows and exhibitions often allowing grandparents, family and friends to support and experience the youth experience in a way not normally possible. Hundreds of Facebook Live demonstrations and workshops were offered including Incubation and Embryology programs where 100K+ individuals and families watched the hatching of chicks. Virtual Market Auctions, Virtual Bluegrass Jam sessions, virtual dog tractor safety, garden growing challenges etc. offered nonformal education for families learning and working remotely. Additionally, teens worked online with staff and volunteers to produce content which included dialogues on Black Lives Matter from Buffalo teens, "Operation Camp from Home Day Camp" camp experiences content by teen counselors in Wayne County, and a series of Technology Tips workshops offered from the Orleans County Tech Changemakers. In addition, staff teams were formed to consider how to reach families where internet accessibility was an issue. In addition to online experiences, CCE Associations created opportunities where projects were mailed and delivered to families. Options like Delaware County's "Camp in a Box" which distributed project materials and "Urban 4-H Virtual STEM" programs where collaborations with libraries offered kit pickup reached families unable or unwilling to tune into online offerings.	

		Despite the pandemic, or maybe because of it, staff, volunteer, and teen leaders grew in skills and leadership. The indirect reach of all programs grew exponentially, and the spark for learning and aspirations developed. ### Building the Wave of Momentum for DEI Work Racist violence and killing led to civil unrest and an overall unease during 2020. While there is not a way to make sense of these acts of racism, Cornell Cooperative Extension (CCE) leadership and staff asked for time to dialogue, reflect, learn, grow, act and make changes for issues of diversity, equity, and inclusion (DEI). As one staff member reflected, it was time to "jump in the pool" - to get beyond feeling uneasy, and take action. By applying the principles social learning theory, activating action through dialogue-based experiences, many efforts have helped to support and to begin to transform our work this year. • **Visionary guidance of our director**, Dr. Chris Watkins, denouncing structural racism and white supremacy in a fervent statement shared swiftly and communicated to staff, boards and committees, noting "I invite all members of the extension community to join our collective efforts to transform ourselves, our relationships, and our systems through critical self-reflection, courageous conversations, and bold actions. Our intentional efforts in doing so will lead us to a more just, healed, and thriving community for all." • **Weekly web-series, "Remaining Whole, Human & Hopeful"** was held on Friday afternoons to reflect, learn, and dialogue in small groups. • **Anti-racism Reading Circles** were led by staff teams who guided discussions and human connections related to DEI for six separate titles during fall 2020. • **CCE DEI/Belonging Leadership and Consultative Teams** were created to build a system where everyone belongs, and confidently uses their sphere of influence to build a model anti-racism organization.	

6.	Community and Economic Vitality	**Program participation in direct education events:** • Adult participants: 110,836 • Youth participants: 10,608 • Volunteers: 4,266 **Overall indications of program success:** • 14,729 residents plan to initiate steps to support environmental stewardship and sustainable community - 13,330 residents have begun practicing management tactics in homes, lawns, gardens and landscapes. that support environmental stewardship and a sustainable community • 1,564 residents are enrolled as active Master Gardener volunteers. • 130 communities instituted new or enhanced participatory processes related to community and economic vitality. • 2,622 agriculture/horticulture/natural resource business professionals are better prepared to deal with disasters and emergencies. • 141 communities planned for and have implemented initiatives on community based agricultural economic development, land use, energy, workforce development, business and entrepreneurial development and assistance, non-profit sector development and/or other elements of sustainable growth. • 16 communities implemented projects that enhanced community sustainability and/or protect public health and community well-being through sound environmental management. Master Gardener Volunteer Program This year the focus was on online webinars and development of advanced sustainability Moodle courses for MGV to engage our volunteers and educators in overdue professional development on the latest topics and resources. We also made available more widely through virtual workshops the low-budget, beginning gardening resources to gardeners through Seed to Supper. As part of the Smith Lever funded "Food Forest Trial Garden" program and the PDLC, I identified core issues and needs with a small advisory group around ecological gardening education issues for advanced education of MGV and	Community and Economic Vitality

		engaged Donna Cooke in transferring these effectively to an online platform through Zoom and Moodle. Through analyzing past surveys and pilot studies, we identified key needs around: • Water Management: Rain barrels, grey water reuse, rain gardens • Soil Health: Soil diversity, monitoring and analysis • Climate Change: Plant selection and design with climate awareness • Food Security: Seed saving and succession planting; community food • system interest • Integrated Pest Management: Information on organic alternatives These topics became the foundation for a new "Advanced Session" Moodle course and Sustainable Landscape Lunch & Learn series, as well as bi-monthly Horticulture Updates. We promoted opportunities for the Cornell Garden-Based Learning Library advanced courses and Sustainable Landscapes Lunch & Learn through a listserv of all horticulture educators, our Horticulture Update newsletter, CGBL Facebook page and through Outlook invitations. This resulted in nine webinars and ten Moodle course Advanced Session modules, in addition to launching a fully guided course version of our static Cornell Garden-Based Learning Library for a virtual MGV core preparation. • 13 Counties became involved with Seed to Supper curriculum. • Many counties adopted the "Just Plant It, NY!" campaign slogan and beginning gardening open-source resources for quarantine gardeners new to CCE. • Statewide MGV Impacts: Over 7,000 lbs. of produce were donated to food banks from our various MGV Statewide Programs, over 50 demonstration gardens supported, and 352 garden education events provided to the public (virtual and outdoor), as well as 16,754 direct contacts through in-person and virtual opportunities by MGV. • Total MGV Service Hours Estimate: 1845 active volunteers (down from 2064 due to COVID complications) for a minimum estimate of 36,900 service hours. According to educators, there were 6,208 hours of	

		continuing education for MGV (utilizing CGBL resources). The most popular events were the Ag In-Service and Sustainable Landscape webinars. • 35+ Counties utilizing local or regional Moodle-based Cornell Garden-Based Learning Library Course for MGV prep. In 2021, with 60 new MGV trained in the Moodle in 2020, 150 planned for 2021 online, and 50+ educators and advanced MGV engaged in the pilot course. • 30+ Horticulture Update newsletters sent to 80 educators and ED's. • 9 Sustainable Landscape Lunch & Learn Webinars (20 Zoom meetings organized in total, including weekly Moodle course pilot meetings and tech support). Recordings included: • Biocontrol • Community Food Systems Best Practices • Safe, Sustainable Plant Sales Online! • Web Soil Survey 101 • Permaculture Design 101: Polycultures to Agroforestry Practices • Growing Unusual Fruits • Getting the Most out of your 'H' Soil Test Report • Healthy Soils, Healthy Communities: Resources and Best Practices for Healthy Gardening • SOI3L: Online Information, Investigation and Innovation Laboratory • We've planned five more sessions for 2021 focused on: • Rain Gardens & Green Infrastructure • Climate & Water Wise Plant Selection • Gardening in Our Warming World: Youth Grow! • Low-Carbon and Sustainable Lawn Alternatives • Food Forest Trial Gardens: Design Principles & Applied Skills	

OPTIONAL **Youth Development Expenditures (dollars)** SL based on FTEs	
State and/or Institution:	FY 2020 Expenditures ($)
1862 Smith-Lever	1,910,560

1890 Extension	