

2018 Cornell University Research and Extension and NY State Agricultural Experiment Station Research Combined Annual Report of Accomplishments and Results

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I. Report Overview

1. Executive Summary

Cornell University Executive Summary

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

Cornell University Agricultural Experiment Station (CUAES), 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 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 CUAES, AgriTech at NYSAES, and CCE meet regularly as an Integrated Program and Research Team (IPaRT) to discuss relevant issues, research and extension projects, and new opportunities.

IPaRT recruits and communicates with a group of richly diverse research and extension stakeholders, who provide input and inform priority-setting for use of Federal Capacity Funds. These 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 36 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. In 2014, a University-wide effort entitled Engaged Cornell was launched to enhance opportunities for students, the university, and communities toward the goal of strengthening opportunities for learning and engagement. Cornell Cooperative Extension has been involved in this effort to increase opportunities for community-engaged research, learning and service projects. In 2016, a liaison position was created to strengthen collaboration among Cornell students, faculty and staff, and the CCE association offices across the state--supporting 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.

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 intentional planned program work that results from Federal Capacity Fund projects, programs, and initiatives and the results of formerly funded projects. Planned Programs were addressed collectively by CCE, CUAES, 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 (CUAES) - 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, CUAES improves people's lives and contributes towards Cornell's Land Grant mission of discovery, engagement, and advancement of learning.

CUAES 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, CUAES directs some of the most important projects in the state.

The station directly manages over 5,600 acres of farms 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 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 more than \$5.6 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 applied research that benefits residents of the state, region, and the nation.
- Employs over 50 full time operations staff and eleven full-time directors 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 multibillion-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 NYSAES has changed its name to AgriTech at NYSAES. Established in 1880, AgriTech at NYSAES in Geneva develops cutting-edge technologies essential to feeding the world and strengthening New York 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

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innovation and economic growth.

AgriTech at NYSAES:

- Employs nearly 300 staff and over three dozen tenure-track professors.
- Operates a budget of approximately \$39 million--approximately one-third of which is funded through SUNY's base budget.
 - 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.
 - 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 2018; 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 NYS IPM 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 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

Cornell Cooperative Extension:

- Annually reaches over 1.6 million participants directly, and pushes information out thoroughly through print, social media, television, radio, and web pages - potentially reaching an indirect audience in 100 million ways.
- Employs 1191 local and regional staff and educators organized around program initiatives and local needs including 53 regional specialists from 10 regional area agriculture teams who focus on dairy and field crops, commercial horticulture, ag entrepreneurship, grapes/viticulture, fruit, and vegetables.
- Extends community work by partnering with over 26,000 volunteers who advise, plan, teach and mentor in all program areas.
- Partners with nearly 300 Cornell staff and faculty; primarily from the College of Agriculture and Life Sciences and the College of Human Ecology.
- 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.
- Includes 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.

Collective, planned program areas are described below.

AGRICULTURE AND FOOD SYSTEMS: Support, maintain and develop a NY agriculture industry that is diverse, sustainable, and profitable, which produces a safe, reliable, healthy and local food supply.

CLIMATE CHANGE: Engage with multidisciplinary researchers, educators and extension faculty to quantify the current climate trends and prepare for future impacts. This plan also includes related topics - biodiversity and water quality/erosion control.

ENVIRONMENT, NATURAL RESOURCES AND SUSTAINABLE ENERGY: Engage in research and extension that uses available resources - including land and organic waste streams for renewable solutions. This plan also supports research and extension strategies that promote energy and natural resource conservation.

NUTRITION, FOOD SAFETY AND SECURITY, AND OBESITY PREVENTION: Support families, youth, communities and the agricultural industry with research and extension connected to childhood obesity prevention; youth, family and community nutrition; food security and food safety.

4-H YOUTH DEVELOPMENT/CHILDREN, YOUTH, AND FAMILIES: Enrich the lives of youth and families with research and extension programs. 4-H youth programs focus on life skill development and STEM opportunities. Family programs emphasize human development and social well-being, parenting, economic well-being, and quality of home and work environments.

COMMUNITY AND ECONOMIC VITALITY: Empower individuals and communities to make sound decisions for the future through access to research, data and resources, best practices, university-based resources and community education. This plan also supports extension efforts related to entrepreneurship, workforce development, and community based food systems support through the Master Gardener Volunteer program.

Total Actual Amount of professional FTEs/SYs for this State

Year: 2018	Extension		Research	
	1862	1890	1862	1890
Plan	1058.0	0.0	40.0	0.0
Actual	808.0	0.0	31.0	0.0

II. Merit Review Process

1. The Merit Review Process that was Employed for this year

- Combined External and Internal University External Non-University Panel
- Expert Peer Review

2. Brief Explanation

CUAES, 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 (2018) proposal cycle. Director-level staff from CAUES, AgriTech at NYSAES, and CCE meet regularly as an Integrated Program and Research Team (IPaRT) 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 (CUAES 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 through REEPORT. Pending approval 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

For FY18, our most current data, a total of 137 pre-proposals were submitted to CUAES, Agritech at NYSAES and CCE of which 70 were funded.

III. Stakeholder Input

1. Actions taken to seek stakeholder input that encouraged their participation

- 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.

At the state level, IPaRT works with external stakeholders that provide guidance for CUAES, AgriTech at NYSAES and CCE by reviewing funding support requests. Involvement is intentionally monitored and updated to ensure involvement and ties to traditional and non-traditional constituents, and established and emerging partnerships.

In addition, we have 36 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 IPaRT 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. More than 1000 participants were involved in the work of these teams in 2018.

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 2018, more than 2,713 board and committee volunteers from diverse backgrounds participated and assisted in the direction, priority setting programs throughout the state, and over 25,000 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 2018, more than 11,700 youth reported serving in appropriate leadership, governance and program delivery roles statewide.

2(A). A brief statement of the process that was used by the recipient institution to identify individuals and groups stakeholders and to collect input from them

1. Method to identify individuals and groups

- Use Advisory Committees
- Use Internal Focus Groups
- Use External Focus Groups
- Open Listening Sessions
- Needs Assessments
- Use Surveys

Brief explanation.

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 IPaRT, 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 2018 reporting year, over 25% of the 430 + 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. Access to these examples can be found here:
<http://www2.cce.cornell.edu/plans/Pages/default.aspx>

2(B). A brief statement of the process that was used by the recipient institution to identify individuals and groups who are stakeholders and to collect input from them

1. Methods for collecting Stakeholder Input

- 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

Brief explanation.

All of the techniques listed were used in 2018 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 IPaRT stakeholders. Web-based surveys; interactive webinars and response to social media also provide programmatic feedback. Examples of efforts to gather stakeholder input include:

Charting the Course: CCE Jefferson County used surveys and a mappable database of agricultural producers within a 4-county region to help address logistical and food system needs and result in a broader and more profitable local food system;

HABs and Water Quality on Skaneateles Lake: CCE Onondaga County worked in partnership with the Town of Skaneateles and Skaneateles Lake Association to engage with a larger audience, plan and implement a forum on Harmful Algal Blooms (HABs) and the water quality of Skaneateles Lake.

Syracuse Refugee Agricultural Program: CCE Onondaga County worked with the refugee community to document the need for increased opportunities for food production in community gardens and market gardens in order to increase food security, create safe places for cultural exchange, and provide economic opportunities.

The Harvest NY program co-hosted the first state-wide malting barley conference in NY, attracting more than 125 key stakeholders from across the supply-chain and expand the dissemination of technical and educational updates from leading researchers, as well as networking critical to the success of the industry.

Towards Increased Diversity, a program of the CCE Dutchess County 4-H partnered with Grace Episcopal Church in Millbrook which offers youth services to a Latino audience to better understand the local needs and can help make educational connections to Latino youth in Northeast Dutchess County.

The 4-H Tech Wizards: Inspiring Tomorrow's Scientists and Engineers through Mentoring program - a part of CCE Broome worked through local school districts to better understand needs, and recruit and match youth with caring, trained mentors who work as teams on science, technology, engineering, art/agriculture, math (STEAM) and community improvement projects.

The Eastern NY Commercial Horticulture Program worked with their Advisory Committee to survey farmers and farm managers and found most respondents concerned about compliance with labor laws. The needs drove additional educational programming.

The Northwest NY Dairy Livestock and Field Crops Program met with various advisory and program committees to inform and affirm the direction of what team members hear from producers about the increasingly important topic of soil health. The meetings noted a need for producers to better understand soil health, as means for achieving economic, environmental, and resource objectives.

The Master Gardener Volunteer Program, Growline of CCE Tompkins, created a digital platform to gather helpline requests and better analyze trends for gardening needs. The former system of call recording limited the ability to utilize the data examine trends in garden issues over time. Creating a digital data collection platform will enable better

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 2018 mandatory all-staff training on Title VI Civil Rights were held. 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.

3. A statement of how the input will be considered

- 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

Brief explanation.

The stakeholder input process for statewide program development jointly utilized by CUAES, AgriTech at NYSAES and CCE was established in February 2001.

IPaRT 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. IPaRT stakeholders provide input that informs decisions around funding of current extension and research projects, contributing ratings of perceived relevance 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.

Brief Explanation of what you learned from your Stakeholders

Stakeholders help to frame and shape plans of work, funding proposals, programs, and educational activities. System-wide, the IPaRT 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. Communication between CUAES, AgriTech at NYSAES and CCE is open and regular at IPaRT meetings and through funding decisions.

IV. Expenditure Summary

1. Total Actual Formula dollars Allocated (prepopulated from C-REEMS)			
Extension		Research	
Smith-Lever 3b & 3c	1890 Extension	Hatch	Evans-Allen
{No Data Entered}	{No Data Entered}	{No Data Entered}	{No Data Entered}

Institution Name: Cornell University

2. Totalled Actual dollars from Planned Programs Inputs				
	Extension		Research	
	Smith-Lever 3b & 3c	1890 Extension	Hatch	Evans-Allen
Actual Formula	8500904	0	6068721	0
Actual Matching	8500904	0	11226222	0
Actual All Other	0	0	0	0
Total Actual Expended	17001808	0	17294943	0

Institution Name: NY State Agricultural Experiment Station

2. Totaled Actual dollars from Planned Programs Inputs				
	Extension		Research	
	Smith-Lever 3b & 3c	1890 Extension	Hatch	Evans-Allen
Actual Formula	0	0	1333535	0
Actual Matching	0	0	2039558	0
Actual All Other	0	0	0	0
Total Actual Expended	0	0	3373093	0

3. Amount of Above Actual Formula Dollars Expended which comes from Carryover funds from previous				
Carryover	0	0	3232075	0

V. Planned Program Table of Content

S. No.	PROGRAM NAME
1	Agriculture and Food Systems
2	Climate Change
3	Environment and 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(A). Planned Program (Summary)

Program # 1

1. Name of the Planned Program

Agriculture and Food Systems

Reporting on this Program

V(B). Program Knowledge Area(s)

1. Program Knowledge Areas and Percentage

KA Code	Knowledge Area	%1862 Extension	%1890 Extension	%1862 Research	%1890 Research
102	Soil, Plant, Water, Nutrient Relationships	5%		12%	
201	Plant Genome, Genetics, and Genetic Mechanisms	0%		10%	
202	Plant Genetic Resources	3%		16%	
203	Plant Biological Efficiency and Abiotic Stresses Affecting Plants	1%		1%	
204	Plant Product Quality and Utility (Preharvest)	15%		2%	
206	Basic Plant Biology	5%		1%	
211	Insects, Mites, and Other Arthropods Affecting Plants	5%		14%	
212	Pathogens and Nematodes Affecting Plants	5%		14%	
213	Weeds Affecting Plants	2%		2%	
215	Biological Control of Pests Affecting Plants	3%		9%	
216	Integrated Pest Management Systems	3%		1%	
301	Reproductive Performance of Animals	1%		2%	
302	Nutrient Utilization in Animals	6%		1%	
305	Animal Physiological Processes	2%		3%	
306	Environmental Stress in Animals	8%		1%	
307	Animal Management Systems	8%		2%	
501	New and Improved Food Processing Technologies	6%		2%	
503	Quality Maintenance in Storing and Marketing Food Products	10%		3%	
601	Economics of Agricultural Production and Farm Management	8%		3%	
604	Marketing and Distribution Practices	4%		1%	
	Total	100%		100%	

V(C). Planned Program (Inputs)

1. Actual amount of FTE/SYs expended this Program

Year: 2018	Extension		Research	
	1862	1890	1862	1890
Plan	274.0	0.0	18.0	0.0
Actual Paid	136.0	0.0	14.0	0.0
Actual Volunteer	1792.0	0.0	0.0	0.0

2. Institution Name: Cornell University

Actual dollars expended in this Program (includes Carryover Funds from previous years)

Extension		Research	
Smith-Lever 3b & 3c	1890 Extension	Hatch	Evans-Allen
1382723	0	2761283	0
1862 Matching	1890 Matching	1862 Matching	1890 Matching
1382723	0	5094042	0
1862 All Other	1890 All Other	1862 All Other	1890 All Other
0	0	0	0

2. Institution Name: NY State Agricultural Experiment Station

Actual dollars expended in this Program (includes Carryover Funds from previous years)

Extension		Research	
Smith-Lever 3b & 3c	1890 Extension	Hatch	Evans-Allen
0	0	1191425	0
1862 Matching	1890 Matching	1862 Matching	1890 Matching
0	0	1826167	0
1862 All Other	1890 All Other	1862 All Other	1890 All Other
0	0	0	0

V(D). Planned Program (Activity)

1. Brief description of the Activity

This is a comprehensive program entailing a wide range of applied research activities and multiple education methods depending on context and need. Campus-based faculty and extension associates, regional specialists and county-based educators all are involved in designing, implementing, and evaluating tailored educational efforts depending on the focus and scope of their role.

Sample Statewide/Regional Initiatives that fall within this Plan of Work

- Central NY Dairy & Field Crops Program
- Cornell Vegetable Program
- Eastern NY Commercial Horticulture Program
- Finger Lakes Grape Program
- Harvest NY
- Integrated Pest Management
- Lake Erie Regional Grape Program
- Lake Ontario Fruit Program
- Northern NY Regional Agriculture
- Northwest NY Dairy, Livestock & Field Crops Program
- Pesticide Management Education Program
- South Central NY Dairy and Field Crops Program

2. Brief description of the target audience

Key audiences served, directly and indirectly, in enhancing agribusiness viability include: established producers; new and young producers, consultants and service providers, input suppliers, cooperative directors and managers, marketing firms, governmental agencies, lenders, and local/state/federal governmental leaders.

3. How was eXtension used?

Cornell Cooperative Extension supports and promotes eXtension communities of practice, the eXtension public site and the professional development offered through eXtension.org. Staff across the state are encouraged to be involved in appropriate COPs, and the link to eXtension is promoted on the Cornell Cooperative Extension public and staff sites. Currently, 387 staff from Cornell and CCE are registered, 65 of which are faculty members. 145 staff were active in eXtension in the last year.

Examples of involvement include:

- **Sandra Cuellar**, a member of the Applied Economics and Management Unit at Cornell is director of the **Healthy Food Choices in Schools** Community of Practice. **Katie Kuhl, Cornell student**, helps to oversee 6 courses in the general topic of school lunchrooms
 - In the last year 53% of the **674 Ask an Expert** questions asked by in-state residents were answered by 10 in-state experts.
- **Steve Hadcock (CCE Albany - Ag Team Leader), Danielle Hauetami (CCE Administration - State Extension Specialist), Karin Bump (CCE Madison - Executive Director)** were trained as **Innovation Facilitators** as key partners to the Impact Collaborative, helping catalyze new ways of working innovatively with eXtension.
 - **Karin Bump assisted the Impact Collaborative** in leading the March 2019 Innovation Facilitator Training - introducing 18 new Innovation Facilitators representing 14 institutions to help catalyze innovation across Extension.
 - **Steve Hadcock assisted the Impact Collaborative** in leading a state Innovation Skill-Building experience for the University of New Hampshire in February 2018. He assisted in the delivery of the Impact Collaborative Innovation Kit to 21 Cooperative Extension professionals from the University of New Hampshire to help find more innovative ways to move institutional goals forward.
 - **Dan Wixted, Pesticide Safety Education Program Coordinator for Cornell University** received funding through the Pesticide Safety Education Funds Management Program (PSEFMP) to produce a presentation on pollinator protection in response to concerns from growers and beekeepers regarding

pesticide products for certification and recertification trainings held by Cornell. In 2019 funds will be used to produce a presentation on the Health Effects of Glyphosate developed in response to misinformation in the media and even within academic institutions regarding the health risks posed by glyphosate (Roundup) especially with respect to cancer and residues on food.

Staff have cited the usefulness of COPs - particularly where there are identified national projects - such as with Financial Security for All COP. Examples of participation in COPs that fall into this plan of work area include:

Ag and Food Systems:

- Agricultural and Food Law
- All About Blueberries
- Animal Welfare
- Apples
- Beef Cattle
- Big Data
- Communications and Marketing
- DAIRxNET
- Educational Technology Learning Network
- eOrganic
- Evaluation
- Farm Safety and Health
- Food Systems Impact Collaborative
- Goat Industry
- Grapes
- Internationalizing Extension
- Livestock and Poultry
- Local and Regional Food Systems
- Niche Meat Processor Assistance Network
- Plant Breeding and Genomics
- Precision Agriculture
- Sheep
- Small and Backyard Flocks
- Unmanned Aircraft Systems
- Women in Ag Learning Network

V(E). Planned Program (Outputs)

1. Standard output measures

2018	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Actual	383234	19349877	45769	2310924

2. Number of Patent Applications Submitted (Standard Research Output)
Patent Applications Submitted

Year: 2018

Actual: 4

Patents listed

15/896,517Fagopyritol Synthase Genes and Uses Thereof
15/731,949Strawberry (Previously tested as NY01-16) 'Archer'
15/732,410Apple Tree Named 'NY56'
15/932,641Apple - NY 97729-109-Apple Tree named "NY 109"

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

2018	Extension	Research	Total
Actual	161	109	270

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

- {No Data Entered}

V(G). State Defined Outcomes

V. State Defined Outcomes Table of Content

O. No.	OUTCOME NAME
1	(1.1a) Number participants documented to have applied knowledge or skills gained to strengthen existing business operations.
2	(1.1b) Number of participating family-owned agricultural/ horticultural/natural resources businesses that plan for succession, transfer, or sale of their business.
3	(1.1c) Number of participants reporting improved agricultural/ horticultural business profitability attributed at least in part to program participation.
4	(1.1d) Number of business owners successfully completing an intergenerational transfer or other desired dispensation of their business attributed at least in part to program participation.
5	(1.2a) Number of participants who demonstrate knowledge gains related to needs of potential employees and/or availability of qualified employees.
6	(1.2b) Number of participants documented to have made one or more changes in human resources practices to enhance labor availability or retention.
7	(1.2c) Number of producers/ horticultural businesses reporting improved labor availability, performance, and/or retention of higher skilled and more valuable human resource team members attributed at least in part to program participation.
8	(1.3a) Number of participants documented to have adopted innovations in food enterprises including production, allied services, processing, and distribution.
9	(1.3b) Number of participants or producer groups who adopt practices of value-added production through retaining control of their product further in the processing chain, starting their own value added business, or forming alliances.
10	(1.3c) Number of new food, horticultural, and agricultural businesses and/or new enterprises within existing businesses reported by program participants and attributed at least in part to program participation.
11	(1.4a) Number of producers, horticulture business persons, and/or natural resource managers modifying existing practices and/or adopted new production best practices or technologies to address current issues and improve yield efficiency, consistency and/or quality and/or conservation of resources.
12	(1.4b) Number of producers, horticulture business persons, and/or natural resource managers who report improved ability to anticipate and respond to environmental and market variations through alternative production management strategies.
13	(1.4c) Number of technical assistance providers documented to have incorporated current best management practices in their recommendations.
14	(1.4d) Number of producers or horticulture business persons, reporting increased dollar returns per acre or reduced costs per acre.
15	(1.5a) Number of producers, horticulture businesses, and/or natural resource managers documented to have assessed potential environmental impacts of their operations and developed and acted on plans to eliminate or minimize those concerns.
16	(1.5b) Number of producers, horticulture businesses, and/or natural resource managers documented to have developed and implemented nutrient management and/or waste management plans or modified existing plans to meet production and environmental goals or regulations.

17	(1.5c) Number of producers, horticulture businesses, and/or natural resource managers documented to meet or exceed current environmental protection standards as a result of participating in relevant educational programs.
18	(1.5d) Number of resource managers reporting reduced environmental concerns for participating enterprises.
19	Compost-biochar mixtures on New York farms: A new method for sustainable agriculture, waste management, and improved nitrogen use efficiency
20	Reproductive Programs and Novel Technologies to Maximize Dairy Herd Reproductive Performance and Profitability
21	Cornell Initiative for Digital Agriculture (CIDA)

Outcome #1

1. Outcome Measures

(1.1a) Number participants documented to have applied knowledge or skills gained to strengthen existing business operations.

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2018	3909

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done

Results

4. Associated Knowledge Areas

KA Code	Knowledge Area
503	Quality Maintenance in Storing and Marketing Food Products
604	Marketing and Distribution Practices

Outcome #2

1. Outcome Measures

(1.1b) Number of participating family-owned agricultural/ horticultural/natural resources businesses that plan for succession, transfer, or sale of their business.

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2018	240

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done

Results

4. Associated Knowledge Areas

KA Code	Knowledge Area
604	Marketing and Distribution Practices

Outcome #3

1. Outcome Measures

(1.1c) Number of participants reporting improved agricultural/ horticultural business profitability attributed at least in part to program participation.

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Actual
2018	3347

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done

Results

4. Associated Knowledge Areas

KA Code	Knowledge Area
503	Quality Maintenance in Storing and Marketing Food Products
604	Marketing and Distribution Practices

Outcome #4

1. Outcome Measures

(1.1d) Number of business owners successfully completing an intergenerational transfer or other desired dispensation of their business attributed at least in part to program participation.

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Actual
2018	96

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done

Results

4. Associated Knowledge Areas

KA Code	Knowledge Area
601	Economics of Agricultural Production and Farm Management
604	Marketing and Distribution Practices

Outcome #5

1. Outcome Measures

(1.2a) Number of participants who demonstrate knowledge gains related to needs of potential employees and/or availability of qualified employees.

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2018	108

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done

Results

4. Associated Knowledge Areas

KA Code	Knowledge Area
601	Economics of Agricultural Production and Farm Management
604	Marketing and Distribution Practices

Outcome #6

1. Outcome Measures

(1.2b) Number of participants documented to have made one or more changes in human resources practices to enhance labor availability or retention.

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2018	26

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done

Results

4. Associated Knowledge Areas

KA Code	Knowledge Area
601	Economics of Agricultural Production and Farm Management
604	Marketing and Distribution Practices

Outcome #7

1. Outcome Measures

(1.2c) Number of producers/ horticultural businesses reporting improved labor availability, performance, and/or retention of higher skilled and more valuable human resource team members attributed at least in part to program participation.

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Actual
2018	13

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done

Results

4. Associated Knowledge Areas

KA Code	Knowledge Area
601	Economics of Agricultural Production and Farm Management
604	Marketing and Distribution Practices

Outcome #8

1. Outcome Measures

(1.3a) Number of participants documented to have adopted innovations in food enterprises including production, allied services, processing, and distribution.

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2018	1029

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done

Results

4. Associated Knowledge Areas

KA Code	Knowledge Area
501	New and Improved Food Processing Technologies
503	Quality Maintenance in Storing and Marketing Food Products
604	Marketing and Distribution Practices

Outcome #9

1. Outcome Measures

(1.3b) Number of participants or producer groups who adopt practices of value-added production through retaining control of their product further in the processing chain, starting their own value added business, or forming alliances.

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2018	501

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done

Results

4. Associated Knowledge Areas

KA Code	Knowledge Area
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501	New and Improved Food Processing Technologies
503	Quality Maintenance in Storing and Marketing Food Products
604	Marketing and Distribution Practices

Outcome #10

1. Outcome Measures

(1.3c) Number of new food, horticultural, and agricultural businesses and/or new enterprises within existing businesses reported by program participants and attributed at least in part to program participation.

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Actual
2018	297

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done

Results

4. Associated Knowledge Areas

KA Code	Knowledge Area
501	New and Improved Food Processing Technologies
503	Quality Maintenance in Storing and Marketing Food Products
604	Marketing and Distribution Practices

Outcome #11

1. Outcome Measures

(1.4a) Number of producers, horticulture business persons, and/or natural resource managers modifying existing practices and/or adopted new production best practices or technologies to address current issues and improve yield efficiency, consistency and/or quality and/or conservation of resources.

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2018	4322

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done

Results

4. Associated Knowledge Areas

KA Code	Knowledge Area
102	Soil, Plant, Water, Nutrient Relationships
204	Plant Product Quality and Utility (Preharvest)
211	Insects, Mites, and Other Arthropods Affecting Plants
212	Pathogens and Nematodes Affecting Plants
213	Weeds Affecting Plants
215	Biological Control of Pests Affecting Plants
216	Integrated Pest Management Systems
503	Quality Maintenance in Storing and Marketing Food Products

Outcome #12

1. Outcome Measures

(1.4b) Number of producers, horticulture business persons, and/or natural resource managers who report improved ability to anticipate and respond to environmental and market variations through alternative production management strategies.

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2018	1351

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done

Results

4. Associated Knowledge Areas

KA Code	Knowledge Area
501	New and Improved Food Processing Technologies
503	Quality Maintenance in Storing and Marketing Food Products
604	Marketing and Distribution Practices

Outcome #13

1. Outcome Measures

(1.4c) Number of technical assistance providers documented to have incorporated current best management practices in their recommendations.

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2018	350

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done

Results

4. Associated Knowledge Areas

KA Code	Knowledge Area
216	Integrated Pest Management Systems
501	New and Improved Food Processing Technologies
503	Quality Maintenance in Storing and Marketing Food Products
604	Marketing and Distribution Practices

Outcome #14

1. Outcome Measures

(1.4d) Number of producers or horticulture business persons, reporting increased dollar returns per acre or reduced costs per acre.

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2018	1441

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done

Results

4. Associated Knowledge Areas

KA Code	Knowledge Area
501	New and Improved Food Processing Technologies
503	Quality Maintenance in Storing and Marketing Food Products
604	Marketing and Distribution Practices

Outcome #15

1. Outcome Measures

(1.5a) Number of producers, horticulture businesses, and/or natural resource managers documented to have assessed potential environmental impacts of their operations and developed and acted on plans to eliminate or minimize those concerns.

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2018	1119

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done

Results

4. Associated Knowledge Areas

KA Code	Knowledge Area
102	Soil, Plant, Water, Nutrient Relationships
206	Basic Plant Biology
215	Biological Control of Pests Affecting Plants
216	Integrated Pest Management Systems
307	Animal Management Systems

Outcome #16

1. Outcome Measures

(1.5b) Number of producers, horticulture businesses, and/or natural resource managers documented to have developed and implemented nutrient management and/or waste management plans or modified existing plans to meet production and environmental goals or regulations.

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2018	721

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done

Results

4. Associated Knowledge Areas

KA Code	Knowledge Area
307	Animal Management Systems

Outcome #17

1. Outcome Measures

(1.5c) Number of producers, horticulture businesses, and/or natural resource managers documented to meet or exceed current environmental protection standards as a result of participating in relevant educational programs.

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Actual
2018	631

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done

Results

4. Associated Knowledge Areas

KA Code	Knowledge Area
102	Soil, Plant, Water, Nutrient Relationships
216	Integrated Pest Management Systems
501	New and Improved Food Processing Technologies
604	Marketing and Distribution Practices

Outcome #18

1. Outcome Measures

(1.5d) Number of resource managers reporting reduced environmental concerns for participating enterprises.

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Actual
2018	28

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done

Results

4. Associated Knowledge Areas

KA Code	Knowledge Area
102	Soil, Plant, Water, Nutrient Relationships
216	Integrated Pest Management Systems

Outcome #19

1. Outcome Measures

Compost-biochar mixtures on New York farms: A new method for sustainable agriculture, waste management, and improved nitrogen use efficiency

2. Associated Institution Types

- 1862 Research

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2018	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Composting is a simple, cost-effective way to dispose of biomass waste and recycle nitrogen; however, more than half of nitrogen can be lost as ammonia gas during composting. These emissions are an economic loss, and they can damage ecosystems and cause odor pollution. This project explored the merits of adding biochar during composting to reduce ammonia emissions. We combined detailed laboratory observations with composting experiments to develop a technology that could both lower ammonia emissions and increase nitrogen availability to new plants. Such a technology helps reduce environmental impacts from composting, raise the quality of compost, reduce fertilizer costs for agricultural producers, and increase community acceptance of composting by reducing odor.

What has been done

We investigated the properties and mechanisms that enable biochar to retain ammonia, and evaluated biochar's ability to make retained ammonia available to new plants. Laboratory experiments demonstrated that acidity and electrostatic interactions are not the key to ammonia retention. Rather, cutting-edge spectroscopy techniques revealed that a variety of covalent bonds form between ammonia and biochar. We also conducted planting experiments using a homogenized potting mixture, and adding equal amounts of nitrogen from either conventional nitrogen fertilizer, or via biochar that had been exposed to ammonia gas. Preliminary results showed that nitrogen availability was comparable from both sources.

Results

Adding oxidized biochar to feedstock compost significantly reduces nitrogen loss in compost, resulting in lower air pollution and higher compost quality. We found that biochar is able to retain ammonia better than any unprocessed plant material and most animal manures, and that as biochar is oxidized, ammonia retention increases five-fold. Daily carbon dioxide emissions were significantly higher from compost with oxidized biochar, versus unoxidized biochar and compost feedstocks alone; this suggests that compost enriched with oxidized biochar enhances microbial activity and accelerates the compost rate. Results have been disseminated to the research community through submissions to peer-reviewed journals, formal presentations at conferences, and through informal conversations. The results have also been shared with the Innovation Center for US Dairy, and we are working with two private companies that are interested in commercializing our process.

Website: <https://pyrolysis.cals.cornell.edu/> and <http://www.css.cornell.edu/faculty/lehmann/index.html>

PI: Johannes Lehmann, Professor

4. Associated Knowledge Areas

KA Code	Knowledge Area
102	Soil, Plant, Water, Nutrient Relationships

Outcome #20

1. Outcome Measures

Reproductive Programs and Novel Technologies to Maximize Dairy Herd Reproductive Performance and Profitability

2. Associated Institution Types

- 1862 Research

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2018	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

This project helps dairy farmers by addressing two major challenges: reproductive management and business decision-making. Optimal timing of pregnancy in dairy cattle is crucial to ensure a farm's profitability and sustainability. To reduce the time until a cow becomes pregnant, many farms rely on fertility treatments; this method is labor-intensive and can cause overuse of reproductive hormones. This project also assists dairy industry stakeholders in improving their business decision-making by creating models to calculate the expected economic and environmental impacts of different management strategies and technologies.

What has been done

We created reproductive management programs to combine synchronization of ovulation and estrus detection. We also developed and tested an alternative method that delivers reproductive hormones intravaginally through programmable and reusable electronic devices. Finally, we developed the Cornell Dairy Farm Model (CDFM), which simulates interactions between multiple areas of management and drivers of herd performance, to give farmers better information to inform their business decision-making. The project involved working with dairy producers ranging in size from 25 to 10,000 cows, and conducting multiple experiments at the Cornell University Ruminant Center and Commercial dairy farms.

Results

The reproductive management program we developed decreased time to pregnancy ("days open") by 16 days and reduced the proportion of cows not pregnant at the end of lactation by 7 percentage points, a major improvement for dairy farms. The alternative hormone-delivery method we developed will help reduce dairy farm labor costs, improve cow welfare by eliminating injections, and may allow improved fertility treatments. The CDFM tool calculates expected economic and environmental impacts of different management strategies, including: health management programs; reproductive management strategies; multiple diets and feeding

strategies at different life stages; and management factors that affect lactation performance. The model simulates the lifetime of cows from birth to death. Data can be sorted by individual cow, group, and whole herd. These findings have been presented in at least 30 events nationally and internationally, reaching thousands of stakeholders. This includes meetings organized by Cornell Cooperative Extension, PRO-DAIRY, veterinary meetings, popular media articles, and scientific publications, including several in the Journal of Dairy Science.

PI: Julio Giordano, Assistant Professor

4. Associated Knowledge Areas

KA Code	Knowledge Area
301	Reproductive Performance of Animals

Outcome #21

1. Outcome Measures

Cornell Initiative for Digital Agriculture (CIDA)

2. Associated Institution Types

- 1862 Research

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2018	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Over the next few decades, a rising global population, increasing wealth, changing consumer demand and climate variation will put growing pressure on food systems. Globally, agriculture demands a radical transformation.

The world's future food systems must become more sustainable, productive, resilient and efficient. We must re-envision food production, processing and distribution, natural resource use, recycling and replenishment, and social and agricultural system interactions to support healthy individuals, communities and the environment. We also must unify biology, engineering and information sciences through an integrative approach that improves measurement and control of existing and emerging food systems. But first we must build the institutional capacity to be able to systematically and effectively work towards these goals.

What has been done

A core group of visionary multidisciplinary faculty teamed up in 2017 to advance digital agriculture. To engage a larger group of researchers and further foster collaborations across colleges, the Cornell University Agricultural Experiment Station provided Federal Capacity Funds (FCF) to selected multidisciplinary digital ag projects through a competitive grant opportunity. A series of workshops and events followed, building excitement, spurring ideas, and advancing the vision. An outside consultant provided guidance in solidifying the vision, identifying the best approach and establishing the necessary framework - the Cornell Initiative for Digital Agriculture (CIDA).

Through multidisciplinary work of Cornell's faculty, staff and students and diverse partners from the private sector, foundations, civil society organizations and government agencies, CIDA aims to develop integrated responses and innovative solutions to complex global food system challenges. Approximately 60 researchers are working diligently in one or more of the initiative's many working groups or project teams.

Following the FCF seed funding, in 2018 CIDA has been able to secure substantial additional funding from colleges, university, and private donors. Through the collaborative efforts with the private sector, funding agencies and foundations CIDA will be self-supporting in the future.

Results

With CIDA Cornell now has the organizational structure and institutional capacity in place to expedite the evolution of digital agriculture. CIDA marshals the university's multidisciplinary strengths and connects researchers with practitioners to tackle global food system challenges. Cornell's Provost Michael Kotlikoff named the initiative as one of Cornell's eight collaborative, university-wide efforts.

An inaugural DA Hackathon kicked off the 2019 CIDA events, drawing a crowd of 150 participants. Through enhanced curricula Cornell now offers new opportunities to students to join CIDA's efforts and engage in cross-college, digital agriculture research projects and partnerships with industry.

Website: <http://www.digitalagriculture.cornell.edu>

PI's: Multi-disciplinary initiative: College of Agriculture and Life Sciences; College of Computing and Information Sciences; College of Engineering; College of Veterinary Medicine; S.C. Johnson College of Business

4. Associated Knowledge Areas

KA Code	Knowledge Area
501	New and Improved Food Processing Technologies
604	Marketing and Distribution Practices

V(H). Planned Program (External Factors)

External factors which affected outcomes

- Natural Disasters (drought, weather extremes, etc.)
- Economy
- Appropriations changes
- Public Policy changes
- Government Regulations
- Competing Public priorities
- Populations changes (immigration, new cultural groupings, etc.)

Brief Explanation

Agricultural/horticultural/natural resources enterprises operate in a complex and volatile context involving susceptibility to weather extremes, changing governmental policies and regulations, competitive land uses and shifting development patterns, evolving consumer demands, and globally influenced markets. During the last decade highly damaging flood events damaged crop and forest resources in highly productive areas of New York. Recovery is slow for many areas. Fundamental change is occurring in the state and regional economies within which agricultural/horticultural/natural resources enterprises operate. The specific implications of these external factors vary greatly by locale and across commodities and business forms in some cases creating new market opportunities and in others erosion of traditional markets. Population and land use changes in farming communities has led in some places to producer/neighbor issues that influence choice of production practices. Economic stress exacerbates issues of food insecurity and hunger and many community organizations are over- burdened and unable to meet demands. There is a growing interest by consumers, communities and producers to market local foods locally. This interest continues to influence programs, research and funding availability. In the last couple of years state funded programs that couple local production and marketing have produced new opportunities for Cooperative Extension education and are beginning to influence research on value-added production. These trends are expected to continue.

V(I). Planned Program (Evaluation Studies)

Evaluation Results

Each of the plans addresses a broad combination of applied research and extension initiatives spanning multiple audiences, methods, and intended outcomes. A combination of routine program monitoring and documentation, near-term outcome assessment, and targeted follow-up activities are expected to provide a comprehensive assessment. We work towards this goal by doing two things - professional development to enhance evaluation capacity of our system and collecting quantitative and qualitative documentation of local, regional and statewide programs.

Evaluation Capacity Building: Cornell Cooperative Extension has worked with the Cornell Office of Research on Evaluation (CORE) to strengthen evaluation practice and build evaluation capacity. CORE developed The Systems Evaluation Protocol that takes programs from logic models (columnar) to pathway models (a visual model that shows relationship of short-term, mid-term and long-term outcomes) and helps to create an evaluation

strategy. CORE tested and refined The Systems Evaluation Protocol in partnership with CCE programs from 2006 - 2015. The Protocol has been integrated into professional development in CCE to promote consistent approaches to evaluation of county-based, regional, and statewide programs. Although the formal project connection with CORE ended in 2015, access to the Netway and online training continues to be available. Additionally, CCE program leaders are being trained in logic and pathway modelling through the CCE Program Development Leadership Cohort, an in-depth and comprehensive professional development experience targeting program leaders to become more proficient at program planning and evaluation.

Cornell University has a full license for Qualtrics surveys, resources and library. This tool is available to staff, faculty and the extension system for use with quantitative and qualitative surveys aiding in the development of evaluative surveys.

Regional/Statewide documentation examples. Many regional and statewide programs are receiving federal capacity funds. Documentation of outcomes is a requirement of funding. Results shape future program efforts and impact program design. **An example evaluation from a funded project can be found below.**

There is also a requirement for our local and regional programs to report on statewide outcomes/indicators: Program documentation results are aggregated in a statewide accountability database that includes both qualitative and quantitative data for reporting and helping us to better understand impacts. Quantitative system wide outcome data is reported in the outcome portion of this report.

Key Items of Evaluation

Example evaluation for the Agriculture and Food Systems Plan - Project: Small ruminant dairying (Michael Thonney) - use of a variety of evaluation methods have been used in this project, including surveys, interviews, pre-post tests, and formal discussion/feedback.

New York is one of the largest commercial dairy sheep producing states and ranks 7th for number of dairy goats in the nation. This existing background in goat and sheep dairying coupled with our abundance of forage land makes the state ripe for expansion. This project surveyed the nutritional, parasite, health, reproductive and milking practices of six diverse case study farms and engaged farmers, feed companies, veterinarians, extension educators and other groups in educational opportunities to share research and practices about balanced feeds/forages and health management recommendations.

Six diverse goat and sheep dairy farms were interviewed and feed/forage rations were analyzed to identify possible education needs. Per expressed need for consolidated resources, the Cornell Small Ruminant Dairying and the Cornell Small Ruminant Parasite Research websites were developed.

The Cornell Goat & Sheep Program also conducted a short, rapid response survey within the sheep farming community in the Northeast via the Cornell Sheep and Goat Management e-list (698 subscribers), the Cornell Sheep Program website, and the Cornell Sheep Program Facebook page (1,036 followers). A major goal of the survey was to identify research interests and needs of sheep farmers. Of the 72 sheep farmers who responded to the survey, 65 were currently keeping sheep and 4 planned to in the future, 64 were meat producers, and 14 were milking East Friesian and Lacaune dairy sheep and crossbreed ewes in flock sizes ranging between 30 and 1,100 in 1 annual lactation. Of the 14 sheep milk

producers, 56% were interested in year-round milk production as well as more milk from forage and 50% were interested in out of season breeding. Five responded that they were processing milk on farm, while only three shipped liquid milk to a processor. Of all respondents, 37 across the range of dairy and meat systems were interested in more nutritional value from forage, and 47 named nutrition as a research field that is important; 48 respondents believed that the number of sheep in the US will increase in the future, while 23 believed it will stay the same.

A small ruminant dairy summit was planned and implemented to provide experiential training. Pre and post tests were administered to participants at the four FAMACHA/IPM workshops during the last year of the project to track changes in knowledge. Pre-test scores were 51.7%, 40.6%, 58.4% and 41.8% while post test scores were 85%, 59.6%, 76.8% and 75%, respectively. Differing response rates was indicative of differing audiences.

Parasite workshops certified 81 people in FAMACHA and qualified three livestock educators as FAMACHA instructors. Changes planned by attendees generally focused on starting or improving FAMACHA screening. Other planned changes included starting or improving evasive grazing practices, starting or improving fecal egg count monitoring, establishing birdsfoot trefoil stands, trying out COWP, drylotting their animals instead of trying to graze them on the very limited pasture available, reducing barnyard effect, and determining Vitamin E levels in their feed ingredients to see if increases for better parasite resistance might be warranted.

Emails and comments from farmers and veterinarians indicate that both of these groups are more aware of the signs and current treatments for deer worm - audiences informally cited training and resources available on the web as cause for growth in awareness in signs and current treatments for deer worm.

More detail about this PI can be found at:

- <https://blogs.cornell.edu/smallruminantparasites/>
- <https://ansci.cals.cornell.edu/people/michael-thonney/>

V(A). Planned Program (Summary)

Program # 2

1. Name of the Planned Program

Climate Change

Reporting on this Program

V(B). Program Knowledge Area(s)

1. Program Knowledge Areas and Percentage

KA Code	Knowledge Area	%1862 Extension	%1890 Extension	%1862 Research	%1890 Research
101	Appraisal of Soil Resources	2%		7%	
104	Protect Soil from Harmful Effects of Natural Elements	7%		0%	
111	Conservation and Efficient Use of Water	15%		0%	
112	Watershed Protection and Management	12%		13%	
125	Agroforestry	5%		0%	
132	Weather and Climate	14%		22%	
133	Pollution Prevention and Mitigation	10%		25%	
135	Aquatic and Terrestrial Wildlife	8%		10%	
136	Conservation of Biological Diversity	15%		8%	
141	Air Resource Protection and Management	2%		1%	
203	Plant Biological Efficiency and Abiotic Stresses Affecting Plants	5%		0%	
405	Drainage and Irrigation Systems and Facilities	5%		0%	
902	Administration of Projects and Programs	0%		14%	
	Total	100%		100%	

V(C). Planned Program (Inputs)

1. Actual amount of FTE/SYs expended this Program

Year: 2018	Extension		Research	
	1862	1890	1862	1890
Plan	69.0	0.0	5.0	0.0
Actual Paid	9.0	0.0	5.0	0.0
Actual Volunteer	3670.0	0.0	0.0	0.0

2. Institution Name: Cornell University

Actual dollars expended in this Program (includes Carryover Funds from previous years)

Extension		Research	
Smith-Lever 3b & 3c	1890 Extension	Hatch	Evans-Allen
95277	0	893560	0
1862 Matching	1890 Matching	1862 Matching	1890 Matching
95277	0	1569488	0
1862 All Other	1890 All Other	1862 All Other	1890 All Other
0	0	0	0

2. Institution Name: NY State Agricultural Experiment Station

Actual dollars expended in this Program (includes Carryover Funds from previous years)

Extension		Research	
Smith-Lever 3b & 3c	1890 Extension	Hatch	Evans-Allen
0	0	3444	0
1862 Matching	1890 Matching	1862 Matching	1890 Matching
0	0	5729	0
1862 All Other	1890 All Other	1862 All Other	1890 All Other
0	0	0	0

V(D). Planned Program (Activity)

1. Brief description of the Activity

The initiative is guided by faculty and staff involved with several programs:

- **The Cornell Climate Change Program Work Team (PWT)** was formed in 2010 and currently has more than sixty five members comprised of Cornell faculty, staff, Cornell Cooperative Extension educators from around New York State, and external stakeholders who are working to advance climate change research and outreach programs. The PWT provides a mechanism through which faculty and extension educators connect with stakeholders to identify the needs surrounding climate change impacts and opportunities in New York State, create educational materials, and design learning experiences that address these needs. You can view the list of Climate Change PWT members at the Cornell Cooperative Extension website.

- **The Cornell Institute for Climate Smart Solutions (CICSS)** is focused on supporting farmers of New York and beyond with decision tools for strategic adaptation to climate change, so that they are better able to cope with potential negative effects of climate change, and are better able to take advantage of any opportunities that it might bring. A Climate Smart Farming Team (<http://climateinstitute.cals.cornell.edu/climate-smart-farming/climate-smart-farming-extension-team/>) has been established and is comprised of members of the CCE Area Agriculture Teams, representing

state. Adaptation and mitigation tools are being developed and made available on a new Web site (<http://climateinstitute.cals.cornell.edu/>).

- CCE educators from Dutchess, Putnam, Columbia/Greene, and Ulster have been working with the Hudson River Estuary Program (NYS Department of Environmental Conservation) and the NYS Water Resources Institute to develop and deliver storm resiliency programming, particularly in the wake of Hurricane Sandy and other recent high-impact storm events.

- CCE of Tompkins and other Associations are leading and contributing to development of local energy plans, adoption of renewable energy, and climate change education, including approaches to mitigation and adaptation.

- **The Atkinson Center for a Sustainable Future's (ACSF) Climate Change Focus Group** began in 2008 and currently has 17 interdisciplinary faculty members from across campus, representing disciplines such as: climate science, ecology, agriculture, engineering, economics, history, and social sciences, that guide research and teaching at the University.

- **NY EDEN** <http://emergencypreparedness.cce.cornell.edu/Pages/default.aspx> The New York Extension Disaster Education Network (NY EDEN) is a collaborative educational network based at Cornell University, dedicated to educating New York residents about preventing, preparing for and recovering from emergencies and disasters that could affect their families and communities. NY EDEN is affiliated with both the national USDA EDEN network and with Cornell University Cooperative Extension.

- **NYS Integrated Pest Management** <http://www.nysipm.cornell.edu/> Research, demonstrations, education, and outreach are part of a comprehensive plan to make IPM the safe, effective pest management solution for all New Yorkers. Solutions that help protect our health, our economic well-being, and our environment.

- **Invasive Species Education and Monitoring Efforts** The New York Invasive Species Clearinghouse at <http://www.nyis.info/> provides information on upcoming invasive species events and invasive species news of interest to New Yorkers, and has linkages with the New York Invasive Species Database (iMapInvasives). The New York Invasive Species Research Institute in the Department of Natural Resources at Cornell provides communication and coordination with researchers across NYS. The Hemlock Initiative, also based in the Department of Natural Resources, engages CCE educators and volunteers in an effort to investigate and manage hemlock wooly adelgid. CCE continues to be involved with with the State's eight PRISMs (Partnerships for Regional Invasive Species Management. CCE of Saratoga hosts the Capital/Mohawk PRISM. The AgroForestry Resource Center of CCE of Columbia/Greene is very involved in invasive species management, particularly with respect to forestry.

- **Master Watershed Stewards Program** <http://dnr.cornell.edu/outreach/watershedsteward/> The mission of the New York Master Watershed Steward Program is to strengthen local capacity for successful management and protection of watersheds by empowering volunteers.

- **Cornell Garden-Based Learning program** <http://gardening.cce.cornell.edu/> in partnership with CCE

educators, CCE Master Gardener Volunteers and Cornell Plantations is supporting climate science literacy and environmental stewardship through climate change and gardening initiatives. Educational outreach activities target children, youth, adults and families audiences engaged in managing lawns, gardens and landscapes in school, community and residential settings with a focus on the adoption of adaptation and mitigation strategies that reduce carbon footprint, conserve water resources, promote biodiversity, limit invasive species and protect natural resources.

- **Stormwater Management** <http://www.clrp.cornell.edu/workshops/stormwater.html> Stormwater management training is part of the Cornell Local Roads program which provides training and technical assistance to local highway and public works officials in New York State. CCE of Orange County also hosts stormwater management training for consultants, engineers, and planners.

- **New York State Water Resources Institute (WRI)** <http://wri.cals.cornell.edu/about/> works to improve the management of water resources in New York State and the nation. WRI works with water research and water management communities and collaborating with regional, state, and national partners to increase awareness of emerging water resources issues and to develop and assess new water management technologies and policies.

2. Brief description of the target audience

Key audiences served, directly and indirectly include: agricultural, horticultural and natural resource producers; consultants and service providers, resource managers, governmental agencies, and local/state/federal governmental leaders and policy makers, non-government organizations, individual consumers, and youth.

3. How was eXtension used?

Cornell Cooperative Extension supports and promotes eXtension communities of practice, the eXtension public site and the professional development offered through eXtension.org. Staff across the state are encouraged to be involved in appropriate COPs, and the link to eXtension is promoted on the Cornell Cooperative Extension public and staff sites. Currently, 387 staff from Cornell and CCE are registered, 65 of which are faculty members. 145 staff were active in eXtension in the last year.

Examples of involvement include:

- **Sandra Cuellar**, a member of the Applied Economics and Management Unit at Cornell is director of the **Healthy Food Choices in Schools** Community of Practice. **Katie Kuhl, Cornell student**, helps to oversee 6 courses in the general topic of school lunchrooms
 - In the last year 53% of the **674 Ask an Expert** questions asked by in-state residents were answered by 10 in-state experts.
 - **Steve Hadcock (CCE Albany - Ag Team Leader), Danielle Hauetami (CCE Administration - State Extension Specialist), Karin Bump (CCE Madison - Executive Director)** were trained as **Innovation Facilitators** as key partners to the Impact Collaborative, helping catalyze new ways of working innovatively with eXtension.
 - **Karin Bump assisted the Impact Collaborative** in leading the March 2019 Innovation Facilitator Training - introducing 18 new Innovation Facilitators representing 14 institutions to help catalyze innovation across Extension.
 - **Steve Hadcock assisted the Impact Collaborative** in leading a state Innovation Skill-Building experience for the University of New Hampshire in February 2018. He assisted in the delivery of the

Impact Collaborative Innovation Kit to 21 Cooperative Extension professionals from the University of New Hampshire to help find more innovative ways to move institutional goals forward.

- **Dan Wixted, Pesticide Safety Education Program Coordinator for Cornell University** received funding through the Pesticide Safety Education Funds Management Program (PSEFMP) to produce a presentation on pollinator protection in response to concerns from growers and beekeepers regarding pesticide products for certification and recertification trainings held by Cornell. In 2019 funds will be used to produce a presentation on the Health Effects of Glyphosate developed in response to misinformation in the media and even within academic institutions regarding the health risks posed by glyphosate (Roundup) especially with respect to cancer and residues on food.

Staff have cited the usefulness of COPs - particularly where there are identified national projects - such as with Financial Security for All COP. Examples of participation in COPs that fall into this plan of work area include:

Climate Change:

- Bee Health
- Climate
- Forests and Woodlands
- Impact of Climate Change on Agriculture
- Invasive Species
- Urban Integrated Pest Management
- Water Conservation for Lawn and Landscape
- Wildlife Damage Management

V(E). Planned Program (Outputs)

1. Standard output measures

2018	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Actual	56748	12542729	8109	1792292

2. Number of Patent Applications Submitted (Standard Research Output)

Patent Applications Submitted

Year: 2018
 Actual: 0

Patents listed

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

2018	Extension	Research	Total
Actual	1	2	3

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

- {No Data Entered}

V(G). State Defined Outcomes

V. State Defined Outcomes Table of Content

O. No.	OUTCOME NAME
1	(2.1a) Number of consumers, residents, agricultural/ natural resources producers, organization and business representatives, and/or local government and community leaders who demonstrate knowledge gains about on the causes and implications of climate change and adaptive or mitigating strategies.
2	(2.1b) Number of agricultural/ natural resources producers, organization and business representatives documented to have adopted recommended adaptation strategies for production agriculture and natural resources management, including invasive species, pest management, pollutant loads, wetlands, emergency preparedness etc.
3	(2.1c) Number of agencies/ organizations/ communities documented to have adopted recommended climate mitigation practices and policies.
4	(2.2a) Number of consumers, residents, agricultural/ natural resources producers, organization and business representatives, and/or local government and community leaders documented to have modified existing practices or technologies and/or adopted new practices to protect/enhance water resources.
5	(2.2b) Number of documented instances when consumers, residents, agricultural/ natural resources producers, organization and business representatives, and/or local government and community leaders have improved and/or protected water resources.
6	(2.3a) Number of consumers, residents, agricultural/ natural resources producers, organization and business representatives, and/or local government and community leaders documented to have modified existing practices or technologies and/or adopted new practices to protect/enhance natural resources and/or enhance biodiversity.
7	Adaptation of Urban Trees to Climate Change through Superior Genetics and Modified Soils

Outcome #1

1. Outcome Measures

(2.1a) Number of consumers, residents, agricultural/ natural resources producers, organization and business representatives, and/or local government and community leaders who demonstrate knowledge gains about on the causes and implications of climate change and adaptive or mitigating strategies.

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2018	10812

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done

Results

4. Associated Knowledge Areas

KA Code	Knowledge Area
111	Conservation and Efficient Use of Water
112	Watershed Protection and Management
125	Agroforestry
132	Weather and Climate
133	Pollution Prevention and Mitigation
135	Aquatic and Terrestrial Wildlife
136	Conservation of Biological Diversity
141	Air Resource Protection and Management
203	Plant Biological Efficiency and Abiotic Stresses Affecting Plants

Outcome #2

1. Outcome Measures

(2.1b) Number of agricultural/ natural resources producers, organization and business representatives documented to have adopted recommended adaptation strategies for production agriculture and natural resources management, including invasive species, pest management, pollutant loads, wetlands, emergency preparedness etc.

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2018	6729

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done

Results

4. Associated Knowledge Areas

KA Code	Knowledge Area
111	Conservation and Efficient Use of Water
132	Weather and Climate
133	Pollution Prevention and Mitigation
405	Drainage and Irrigation Systems and Facilities

Outcome #3

1. Outcome Measures

(2.1c) Number of agencies/ organizations/ communities documented to have adopted recommended climate mitigation practices and policies.

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Actual
2018	30

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done

Results

4. Associated Knowledge Areas

KA Code	Knowledge Area
111	Conservation and Efficient Use of Water
112	Watershed Protection and Management
132	Weather and Climate

Outcome #4

1. Outcome Measures

(2.2a) Number of consumers, residents, agricultural/ natural resources producers, organization and business representatives, and/or local government and community leaders documented to have modified existing practices or technologies and/or adopted new practices to protect/enhance water resources.

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2018	7685

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done

Results

4. Associated Knowledge Areas

KA Code	Knowledge Area
111	Conservation and Efficient Use of Water
112	Watershed Protection and Management

Outcome #5

1. Outcome Measures

(2.2b) Number of documented instances when consumers, residents, agricultural/ natural resources producers, organization and business representatives, and/or local government and community leaders have improved and/or protected water resources.

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Actual
-------------	---------------

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done

Results

4. Associated Knowledge Areas

KA Code	Knowledge Area
111	Conservation and Efficient Use of Water
112	Watershed Protection and Management

Outcome #6

1. Outcome Measures

(2.3a) Number of consumers, residents, agricultural/ natural resources producers, organization and business representatives, and/or local government and community leaders documented to have modified existing practices or technologies and/or adopted new practices to protect/enhance natural resources and/or enhance biodiversity.

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2018	8423

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done

Results

4. Associated Knowledge Areas

KA Code	Knowledge Area
111	Conservation and Efficient Use of Water
203	Plant Biological Efficiency and Abiotic Stresses Affecting Plants

Outcome #7

1. Outcome Measures

Adaptation of Urban Trees to Climate Change through Superior Genetics and Modified Soils

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2018	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Almost 80 percent of the U.S. population lives in urban areas and depends on the essential ecological, economic, and social benefits provided by urban trees and forests. In the U.S. alone, urban trees store over 708 million tons of carbon, and they can help further reduce emissions by lowering electricity demand for summer air conditioning and winter heating. However, urban soils are often unproductive due to high bulk density, low organic matter, poor structure, and low water-holding capacity. These characteristics diminish soil health and create an environment inhospitable to plant growth. Moreover, as climate change worsens, increased summer heat stress is predicted, and new strategies for urban tree selection and management are needed now if we are to prepare for these challenges.

What has been done

We sought strategies to strengthen the health of urban trees and forests in two ways: selecting tree species that are better able to grow under extreme weather events, and mitigating disturbed urban soils to reduce stress on plants. We continued development of an improved method for determining a tree's drought tolerance, as well as researched the ability of trees to adapt to drought conditions, by simulating limited water availability under controlled conditions. We also continued to research the Scoop & Dump (S&D) process of soil remediation, which consists of digging-out compacted urban soils and incorporating large amounts (33% by volume) of compost, as well as topping soils with mulch once a year.

Results

We found that fifteen hybrid oak species have increased insect and disease resistance, drought tolerance, good form, and tolerance to alkaline soils. These species were able to cope after drought events, while other trees dropped their leaves to reduce water losses. We have provided 230 trees to communities in New York State for further, long-term evaluation. The Scoop & Dump soil remediation technique has shown to increase the volume of soil usable for trees, while increasing soil quality both in landscape beds and along streets. We also developed a Soil Health Manual for Urban Landscapes, to assist municipalities in assessing and protecting their urban trees and forests; this work is crucial for storm water management, pollution relief, urban heat island mitigation, and human well-being. Over the past two years, we have disseminated our research findings via 25 presentations and workshops, with attendees including Cornell Cooperative Extension educators, urban foresters, nursery professionals, and arborists.

Website: <http://woodyplants.cals.cornell.edu/home>

PI: Nina Bassuk, Professor

4. Associated Knowledge Areas

KA Code	Knowledge Area
104	Protect Soil from Harmful Effects of Natural Elements
203	Plant Biological Efficiency and Abiotic Stresses Affecting Plants

V(H). Planned Program (External Factors)

External factors which affected outcomes

- Natural Disasters (drought, weather extremes, etc.)
- Economy
- Appropriations changes
- Public Policy changes
- Government Regulations
- Competing Public priorities
- Populations changes (immigration, new cultural groupings, etc.)

Brief Explanation

Climate change issues play out in a complex and volatile context involving weather extremes, changing governmental policies and regulations, competitive land uses and shifting development patterns, evolving consumer demands, and globally influenced markets. The specific implications of these external factors vary greatly by locale and across commodities and business forms. Technical knowledge of climate change issues and mitigation strategies is evolving rapidly. Flooding events during recent years continue to elevate consumer and community interest in disaster preparedness and water quality protection for families, communities and farms. Recent trends in this program area include research/education around mitigation practices, biodiversity, pollinator health, and water quality protection. The shift in interest, program offerings and campus and research support is evident. These trends are expected to continue.

V(I). Planned Program (Evaluation Studies)

Evaluation Results

Each of the plans addresses a broad combination of applied research and extension initiatives spanning multiple audiences, methods, and intended outcomes. A combination of routine program monitoring and documentation, near-term outcome assessment, and targeted follow-up activities are expected to provide a comprehensive assessment. We work towards this goal by doing two things - professional development to enhance evaluation capacity of our system and collecting quantitative and qualitative documentation of local, regional and statewide programs.

Evaluation Capacity Building: Cornell Cooperative Extension has worked with the Cornell Office of Research on Evaluation (CORE) to strengthen evaluation practice and build evaluation capacity. CORE developed The Systems Evaluation Protocol that takes programs from logic models (columnar) to pathway models (a visual model that shows relationship of short-term, mid-term and long-term outcomes) and helps to create an evaluation strategy. CORE tested and refined The Systems Evaluation Protocol in partnership with CCE programs from 2006 - 2015. The Protocol has been integrated into professional development in CCE to promote consistent approaches to evaluation of county-based, regional, and statewide programs. Although the formal project connection with CORE ended in 2015, access to the Netway and online training continues to be available. Additionally, CCE program leaders are being trained in logic and pathway modelling through the CCE Program Development Leadership Cohort, an in-depth and comprehensive professional development experience targeting program leaders to become more proficient at program planning and evaluation.

Cornell University has a full license for Qualtrics surveys, resources and library. This tool is available to staff, faculty and the extension system for use with quantitative and qualitative surveys aiding in the development of evaluative surveys.

Regional/Statewide documentation examples. Many regional and statewide programs are receiving federal capacity funds. Documentation of outcomes is a requirement of funding. Results shape future program efforts and impact program design. **An example evaluation from a funded project can be found below.**

There is also a requirement for our local and regional programs to report on statewide outcomes/indicators: Program documentation results are aggregated in a statewide accountability database that includes both qualitative and quantitative data for reporting and helping us to better understand impacts. Quantitative system-wide outcome data is reported in the outcome portion of this report.

Key Items of Evaluation

Example evaluation Climate Change Plan- Project: Climate Change Education (Marianne Krasny) - use of pre-post tests, formal discussion/feedback, informal observation of participants via social media

Extension associates and volunteers from the Northeastern states as well as participants from around the US and the world participated in online and regional face-to-face training on climate change science, communication, and action. The course was offered as a 6 week, 4 week and 3 week asynchronous course - with readings, discussion boards via social media, recordings from experts, live web-meetings, and a closing assignment about a self-selected relevant topic for participants. A total of 1143 participants enrolled in the course in 2018, with 25% receiving a Certificate of Professional Development. Of those receiving certificates, 29 were educators for Cooperative Extension coming from 10 states across the

US. Participants receiving certificates hailed from 65 different countries internationally. The US, Nigeria, and China are the highest represented countries.

Expected outcomes included increased climate actions based on understanding of the efficacy of climate change mitigation and adaptation actions. Participants report having increased their knowledge in climate change science, communication, and action and describe ways in which they are directly applying course content to climate change action.

Pre and post surveys were deployed before and after each course to assess course outcomes. In the post-survey, 75% of participants in the Winter Session and 73% of participants in the Fall Session reported already having used the course materials in their work or home life. 95% of Winter Session and 90% of Fall Session participants reported gaining ideas from the course.

The majority of participants who took the course communicated that they interacted personally with at least one other participant during the course, using email, Facebook, Skype, or the Discussion Board, many communicated with at least 10 people during the course. In qualitative responses, participants asked that in the next iteration of the course include additional content on a variety of climate-related topics, from renewable energy to climate justice.

More detail about this PI can be found at:

- <https://civicecology.org/course-cc/>
- <https://dnr.cals.cornell.edu/people/marianne-krasny/>

V(A). Planned Program (Summary)

Program # 3

1. Name of the Planned Program

Environment and Natural Resources and Sustainable Energy

Reporting on this Program

V(B). Program Knowledge Area(s)

1. Program Knowledge Areas and Percentage

KA Code	Knowledge Area	%1862 Extension	%1890 Extension	%1862 Research	%1890 Research
123	Management and Sustainability of Forest Resources	18%		1%	
124	Urban Forestry	10%		11%	
205	Plant Management Systems	0%		57%	
401	Structures, Facilities, and General Purpose Farm Supplies	14%		0%	
402	Engineering Systems and Equipment	8%		14%	
403	Waste Disposal, Recycling, and Reuse	17%		9%	
404	Instrumentation and Control Systems	5%		0%	
511	New and Improved Non-Food Products and Processes	5%		5%	
605	Natural Resource and Environmental Economics	20%		0%	
609	Economic Theory and Methods	3%		3%	
	Total	100%		100%	

V(C). Planned Program (Inputs)

1. Actual amount of FTE/SYs expended this Program

Year: 2018	Extension		Research	
	1862	1890	1862	1890
Plan	64.0	0.0	3.0	0.0
Actual Paid	107.0	0.0	3.0	0.0
Actual Volunteer	3489.0	0.0	0.0	0.0

2. Institution Name: Cornell University

Actual dollars expended in this Program (includes Carryover Funds from previous years)

Extension		Research	
Smith-Lever 3b & 3c	1890 Extension	Hatch	Evans-Allen
1083417	0	603856	0
1862 Matching	1890 Matching	1862 Matching	1890 Matching
1083417	0	1180043	0
1862 All Other	1890 All Other	1862 All Other	1890 All Other
0	0	0	0

2. Institution Name: NY State Agricultural Experiment Station

Actual dollars expended in this Program (includes Carryover Funds from previous years)

Extension		Research	
Smith-Lever 3b & 3c	1890 Extension	Hatch	Evans-Allen
0	0	75297	0
1862 Matching	1890 Matching	1862 Matching	1890 Matching
0	0	106476	0
1862 All Other	1890 All Other	1862 All Other	1890 All Other
0	0	0	0

V(D). Planned Program (Activity)

1. Brief description of the Activity

This is a program entailing a wide range of applied research activities and multiple education methods depending on local context and need. Campus-based faculty and extension associates, regional specialists and county-based educators all are involved in designing, implementing, and evaluating tailored applied research and educational efforts depending on the focus and scope of their role.

Topics include: Home and school composting, residential landscapes, waste management, wildlife management and forestry, renewable energy resources, energy conservation and efficiency, heating with wood, forestry etc.

Sample Statewide/Regional Initiatives that fall within this Plan of Work

- Consumer Education Program for Residential Energy Efficiency
- Energy Education in Camp
- Farm Energy Audits
- Farm Waste Management
- Green Building Seminar Series
- Maple Program
- Master Composters

- Master Forest Owners
- Master Naturalist
- Master Gardener Volunteer Program
- Private Forest Stewardship Program
- Recycling Ag Plastics
- Save Energy, Save Dollars
- Urban Forestry

2. Brief description of the target audience

Key audiences served, directly and indirectly include: agricultural and natural resource producers; consumers and property owners, home/school/community gardeners businesses and organizations, local/state/federal governmental leaders.

Businesses, organizations, and producers are targeted with information about improved management practices and alternative land uses, such as agroforestry. Environmental planners and managers and technical assistance providers, such as foresters, are targeted with in-depth information related to their audiences/constituents. Teachers, youth professionals and volunteers are targeted with in-depth knowledge for youth enrichment.

Agricultural/horticulture/natural resource and supporting businesses are targeted both regarding bioenergy production opportunities and information regarding alternative energy sources and conservation. Consumers are targeted for information regarding energy supply alternatives and energy conservation options for residential, facilities, and transportation needs.

Residents and property owners are targeted with stewardship and waste reduction and management in their homes and on their properties including lawns and gardens. Businesses, organizations, and producers are targeted with information about reducing impacts of their operations. Teachers and youth professionals and volunteers are provided with curriculum and training. Youth are targeted with age-appropriate education.

3. How was eXtension used?

Cornell Cooperative Extension supports and promotes eXtension communities of practice, the eXtension public site and the professional development offered through eXtension.org. Staff across the state are encouraged to be involved in appropriate COPs, and the link to eXtension is promoted on the Cornell Cooperative Extension public and staff sites. Currently, 387 staff from Cornell and CCE are registered, 65 of which are faculty members. 145 staff were active in eXtension in the last year.

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Staff have cited the usefulness of COPs - particularly where there are identified national projects - such as with Financial Security for All COP. Examples of participation in COPs that fall into this plan of work area include:

- Forest Farming
- Freshwater Aquaculture
- Home Energy
- Sustainability Education
- Sustainable Ag Energy
- Sustainable Marine Fisheries
- Wood Energy

V(E). Planned Program (Outputs)

1. Standard output measures

2018	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Actual	85626	14157612	27560	4556838

2. Number of Patent Applications Submitted (Standard Research Output)

Patent Applications Submitted

Year: 2018
 Actual: 0

Patents listed

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

2018	Extension	Research	Total
Actual	6	1	7

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

- {No Data Entered}

V(G). State Defined Outcomes

V. State Defined Outcomes Table of Content

O. No.	OUTCOME NAME
1	(3.1a) Number of producers, economic development organizations and other groups who collaborate to establish bioenergy as a viable alternative crop.
2	(3.1b) Number of existing or new producers documented to have modified existing practices or technologies and/or adopted best management practices for bioenergy production, harvesting, and/or storage systems.
3	(3.1c) Number of producers, horticulture businesses and/or natural resource managers reporting that cropping for and/or use of bioenergy leads to increased economic returns to their enterprises.
4	(3.2a) Number of agricultural/horticultural/ natural resource businesses documented to have adopted appropriate alternative energy sources and/or energy conservation practices.
5	(3.2b) Number of producers/horticulture businesses/natural resource managers documented to have improved economic returns to agricultural/ horticultural business profitability and vitality resulting from adopting alternative energy sources and/or energy conservation.
6	(3.3a) Number of consumers documented to have adopted appropriate alternative energy sources.
7	(3.3b) Number of consumers who report savings on energy costs attributable to adopting alternative energy sources.
8	(3.4a) Number of consumers reporting to have adopted appropriate energy cost control and/or conservation practices.
9	(3.4b) Number of property managers, and/or housing officials documented to have taken measures to improve energy cost control or efficiency of existing and new buildings.
10	(3.4c) Number of consumers who report savings on energy costs attributable to adopting energy conservation measures.
11	(3.5a) Number of communities documented to have assessed local energy development proposals and/or the relationships between current policies and regulations and energy conservation.
12	(3.5b) Number of community agencies/ organizations documented to have adopted appropriate alternative energy sources.
13	(3.5c) Number of communities that adapt or revise policies in response to large scale energy development (e.g., Marcellus shale development) and/or include energy as a component of their comprehensive plans.
14	(3.5d) Number of communities documented to have established or modified land use and development policies to promote energy conservation.
15	(3.5e) Number of community agencies/organizations reporting savings on energy costs attributable to adopting alternative energy sources.
16	(3.6a) Number of agricultural/natural resources producers, organization and business representatives, community leaders, and/or residents who demonstrate knowledge gains about waste management and reduction.
17	(3.6b) Number of agricultural/natural resources producers, organization and business representatives, community leaders, and/or residents documented to have modified existing

	practices or technologies and/or adopted new practices to manage and reduce waste.
18	(3.6c) Number of agricultural/natural resources producers, organization and business representatives, community leaders, and/or residents documented to have reduced costs through improved waste management practices.
19	(3.7a) Number of agricultural/natural resources producers, organization and business representatives, community leaders, and/or residents documented to have modified existing practices or technologies that will assist with natural resources management and the environment.
20	Engineering Denitrification Hotspots in Agricultural Landscapes

Outcome #1

1. Outcome Measures

(3.1a) Number of producers, economic development organizations and other groups who collaborate to establish bioenergy as a viable alternative crop.

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2018	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done

Results

4. Associated Knowledge Areas

KA Code	Knowledge Area
123	Management and Sustainability of Forest Resources
402	Engineering Systems and Equipment
403	Waste Disposal, Recycling, and Reuse

404	Instrumentation and Control Systems
605	Natural Resource and Environmental Economics

Outcome #2

1. Outcome Measures

(3.1b) Number of existing or new producers documented to have modified existing practices or technologies and/or adopted best management practices for bioenergy production, harvesting, and/or storage systems.

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2018	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done

Results

4. Associated Knowledge Areas

KA Code	Knowledge Area
402	Engineering Systems and Equipment
403	Waste Disposal, Recycling, and Reuse
404	Instrumentation and Control Systems
605	Natural Resource and Environmental Economics

Outcome #3

1. Outcome Measures

(3.1c) Number of producers, horticulture businesses and/or natural resource managers reporting that cropping for and/or use of bioenergy leads to increased economic returns to their enterprises.

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Actual
2018	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done

Results

4. Associated Knowledge Areas

KA Code	Knowledge Area
123	Management and Sustainability of Forest Resources
402	Engineering Systems and Equipment
403	Waste Disposal, Recycling, and Reuse
404	Instrumentation and Control Systems
605	Natural Resource and Environmental Economics

Outcome #4

1. Outcome Measures

(3.2a) Number of agricultural/horticultural/ natural resource businesses documented to have adopted appropriate alternative energy sources and/or energy conservation practices.

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2018	46

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done

Results

4. Associated Knowledge Areas

KA Code	Knowledge Area
402	Engineering Systems and Equipment
403	Waste Disposal, Recycling, and Reuse
404	Instrumentation and Control Systems
605	Natural Resource and Environmental Economics

Outcome #5

1. Outcome Measures

(3.2b) Number of producers/horticulture businesses/natural resource managers documented to have improved economic returns to agricultural/ horticultural business profitability and vitality resulting from adopting alternative energy sources and/or energy conservation.

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Actual
2018	42

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done

Results

4. Associated Knowledge Areas

KA Code	Knowledge Area
402	Engineering Systems and Equipment
403	Waste Disposal, Recycling, and Reuse
404	Instrumentation and Control Systems
605	Natural Resource and Environmental Economics

Outcome #6

1. Outcome Measures

(3.3a) Number of consumers documented to have adopted appropriate alternative energy sources.

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2018	141

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done

Results

4. Associated Knowledge Areas

KA Code	Knowledge Area
605	Natural Resource and Environmental Economics

Outcome #7

1. Outcome Measures

(3.3b) Number of consumers who report savings on energy costs attributable to adopting alternative energy sources.

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Actual
2018	117

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done

Results

4. Associated Knowledge Areas

KA Code	Knowledge Area
605	Natural Resource and Environmental Economics

Outcome #8

1. Outcome Measures

(3.4a) Number of consumers reporting to have adopted appropriate energy cost control and/or conservation practices.

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2018	1522

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done

Results

4. Associated Knowledge Areas

KA Code	Knowledge Area
124	Urban Forestry
403	Waste Disposal, Recycling, and Reuse
605	Natural Resource and Environmental Economics

Outcome #9

1. Outcome Measures

(3.4b) Number of property managers, and/or housing officials documented to have taken measures to improve energy cost control or efficiency of existing and new buildings.

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2018	46

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done

Results

4. Associated Knowledge Areas

KA Code	Knowledge Area
403	Waste Disposal, Recycling, and Reuse
404	Instrumentation and Control Systems
605	Natural Resource and Environmental Economics

Outcome #10

1. Outcome Measures

(3.4c) Number of consumers who report savings on energy costs attributable to adopting energy conservation measures.

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Actual
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3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done

Results

4. Associated Knowledge Areas

KA Code	Knowledge Area
124	Urban Forestry
403	Waste Disposal, Recycling, and Reuse
605	Natural Resource and Environmental Economics

Outcome #11

1. Outcome Measures

(3.5a) Number of communities documented to have assessed local energy development proposals and/or the relationships between current policies and regulations and energy conservation.

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2018	33

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done

Results

4. Associated Knowledge Areas

KA Code	Knowledge Area
124	Urban Forestry
403	Waste Disposal, Recycling, and Reuse

Outcome #12

1. Outcome Measures

(3.5b) Number of community agencies/ organizations documented to have adopted appropriate alternative energy sources.

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2018	17

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done

Results

4. Associated Knowledge Areas

KA Code	Knowledge Area
605	Natural Resource and Environmental Economics

Outcome #13

1. Outcome Measures

(3.5c) Number of communities that adapt or revise policies in response to large scale energy development (e.g., Marcellus shale development) and/or include energy as a component of their comprehensive plans.

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Actual
2018	20

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done

Results

4. Associated Knowledge Areas

KA Code	Knowledge Area
124	Urban Forestry

Outcome #14

1. Outcome Measures

(3.5d) Number of communities documented to have established or modified land use and development policies to promote energy conservation.

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Actual
2018	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done

Results

4. Associated Knowledge Areas

KA Code	Knowledge Area
123	Management and Sustainability of Forest Resources
401	Structures, Facilities, and General Purpose Farm Supplies
402	Engineering Systems and Equipment
403	Waste Disposal, Recycling, and Reuse

Outcome #15

1. Outcome Measures

(3.5e) Number of community agencies/organizations reporting savings on energy costs attributable to adopting alternative energy sources.

2. Associated Institution Types

- 1862 Research

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2018	3

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done

Results

4. Associated Knowledge Areas

KA Code	Knowledge Area
605	Natural Resource and Environmental Economics

Outcome #16

1. Outcome Measures

(3.6a) Number of agricultural/natural resources producers, organization and business representatives, community leaders, and/or residents who demonstrate knowledge gains about waste management and reduction.

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2018	3357

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done

Results

4. Associated Knowledge Areas

KA Code	Knowledge Area
401	Structures, Facilities, and General Purpose Farm Supplies
402	Engineering Systems and Equipment
403	Waste Disposal, Recycling, and Reuse
404	Instrumentation and Control Systems

Outcome #17

1. Outcome Measures

(3.6b) Number of agricultural/natural resources producers, organization and business representatives, community leaders, and/or residents documented to have modified existing practices or technologies and/or adopted new practices to manage and reduce waste.

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2018	1877

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done

Results

4. Associated Knowledge Areas

KA Code	Knowledge Area
401	Structures, Facilities, and General Purpose Farm Supplies
402	Engineering Systems and Equipment
403	Waste Disposal, Recycling, and Reuse
404	Instrumentation and Control Systems

Outcome #18

1. Outcome Measures

(3.6c) Number of agricultural/natural resources producers, organization and business representatives, community leaders, and/or residents documented to have reduced costs through improved waste management practices.

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2018	1836

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done

Results

4. Associated Knowledge Areas

KA Code	Knowledge Area
401	Structures, Facilities, and General Purpose Farm Supplies
402	Engineering Systems and Equipment
403	Waste Disposal, Recycling, and Reuse
404	Instrumentation and Control Systems

Outcome #19

1. Outcome Measures

(3.7a) Number of agricultural/natural resources producers, organization and business representatives, community leaders, and/or residents documented to have modified existing practices or technologies that will assist with natural resources management and the environment.

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2018	3769

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done

Results

4. Associated Knowledge Areas

KA Code	Knowledge Area
605	Natural Resource and Environmental Economics

Outcome #20

1. Outcome Measures

Engineering Denitrification Hotspots in Agricultural Landscapes

2. Associated Institution Types

- 1862 Research

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2018	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Nitrogen is a crucial nutrient in agricultural production, but excess nitrogen runoff creates chronic pollution in coastal ecosystems by feeding the excessive growth of algae, which chokes out other life. Extreme examples of this problem include the recurring "dead zones" in the Gulf of Mexico and the Chesapeake Bay. Although many human activities contribute excess nitrogen to waterways, runoff from nitrogen fertilizer used in agriculture is a primary source. This project sought to reduce nitrogen pollution by engineering field-based bioreactors that can convert dissolved nitrogen into nitrogen gasses, a process referred to as denitrification.

What has been done

Some parts of landscapes are naturally well-suited to high denitrification rates. The overarching purpose of this project was to reveal the underpinning environmental and microbial genetic conditions that promote full denitrification, i.e., conversion of nitrate to inert di-nitrogen gas. One step in the sequence of nitrogen transformations produces nitrous oxide, which is an aggressive

greenhouse gas; therefore, we sought to create a process that minimizes nitrous oxide and maximizes di-nitrogen. We used state-of-the-art microbial DNA analyses to understand how microbial functions necessary for denitrification are distributed over landscapes, and how these patterns change over time.

Results

Our initial efforts to engineer artificial denitrification hotspots have been inconsistent in their nitrogen removal, and nitrous oxide emissions. However, we have answered several fundamental questions about how denitrification, and the genes necessary to produce it, varies over landscapes and among bioreactors. For example, denitrification genes are strongly correlated to patterns of average soil moisture across a landscape; however, other factors like nitrate supply and pH can also play important roles in determining which genes are present at any particular point in the landscape. We also learned that patterns of gene distributions across a watershed remain very stable over time, even with environmental changes, such as drought. Denitrification genes are good indicators of long-term denitrification process; however, disruptions to the soil environment appear to take years to make a difference. Findings from this project have been disseminated through peer-reviewed journals, conference presentations, and invited seminars.

PI: Michael Walter, Emeritus Professor

4. Associated Knowledge Areas

KA Code	Knowledge Area
404	Instrumentation and Control Systems

V(H). Planned Program (External Factors)

External factors which affected outcomes

- Natural Disasters (drought, weather extremes, etc.)
- Economy
- Appropriations changes
- Public Policy changes
- Government Regulations
- Competing Public priorities
- Populations changes (immigration, new cultural groupings, etc.)

Brief Explanation

The interaction between natural disasters, the economy, energy and waste management costs is well documented. Weather in particular has interrupted supplies and dramatically influences heating and cooling costs. Appropriations, public policy, and regulations directly affect the ability to pursue energy source alternatives, including bioenergy development, and to implement energy conservation alternatives, particularly for low-income households. While funding around energy options is growing, previous cuts in state funding for consumer energy education continues to influence available education capacity through Extension across the state. Recent policy changes around agricultural waste management also are influencing interest in research and extension. These trends are expected to continue.

V(I). Planned Program (Evaluation Studies)

Evaluation Results

Each of the plans addresses a broad combination of applied research and extension initiatives spanning multiple audiences, methods, and intended outcomes. A combination of routine program monitoring and documentation, near-term outcome assessment, and targeted follow-up activities are expected to provide a comprehensive assessment. We work towards this goal by doing two things - professional development to enhance evaluation capacity of our system and collecting quantitative and qualitative documentation of local, regional and statewide programs.

Evaluation Capacity Building: Cornell Cooperative Extension has worked with the Cornell Office of Research on Evaluation (CORE) to strengthen evaluation practice and build evaluation capacity. CORE developed The Systems Evaluation Protocol that takes programs from logic models (columnar) to pathway models (a visual model that shows relationship of short-term, mid-term and long-term outcomes) and helps to create an evaluation strategy. CORE tested and refined The Systems Evaluation Protocol in partnership with CCE programs from 2006 - 2015. The Protocol has been integrated into professional development in CCE to promote consistent approaches to evaluation of county-based, regional, and statewide programs. Although the formal project connection with CORE ended in 2015, access to the Netway and online training continues to be available. Additionally, CCE program leaders are being trained in logic and pathway modelling through the CCE Program Development Leadership Cohort, an in-depth and comprehensive professional development experience targeting program leaders to become more proficient at program planning and evaluation.

Cornell University has a full license for Qualtrics surveys, resources and library. This tool is available to staff, faculty and the extension system for use with quantitative and qualitative surveys aiding in the development of evaluative surveys.

Regional/Statewide documentation examples. Many regional and statewide programs are receiving federal capacity funds. Documentation of outcomes is a requirement of funding. Results shape future program efforts and impact program design. **An example evaluation from a funded project can be found below.**

There is also a requirement for our local and regional programs to report on statewide outcomes/indicators: Program documentation results are aggregated in a statewide accountability database that includes both qualitative and quantitative data for reporting and helping us to better understand impacts. Quantitative system wide outcome data is reported in the outcome portion of this report.

Key Items of Evaluation

Example evaluation for Environment, Natural Resources, & Sustainable Energy Plan- Project: Changing Sustainability Norms (Janis Dickinson)- use of linear mixed models to analyze data and social contagion data.

The Cornell Lab of Ornithology has been an initiator of the Citizen Science movement. A goal of Citizen Science is to promote learning through engagement and collect important data. This project helped create a social and ecological mapping application to crowd source sustainable practices in backyards, schoolyards, corporate campuses, parks, and

other public spaces. The online app, Yard Map, also provided an integrated social networking and mapping environment for citizen scientists' bird monitoring efforts, gardening practices, and residential conservation efforts, allowing people to draw and share what is on their property, including bird observations. The project intent is to build positive peer pressure for changing sustainability norms.

This project engaged with 38 households who agreed to modify residential yards and compared social contagion and bee visit rates with control yards.

This project used generalized linear mixed models to collect and analyze the data and social contagion data. Results indicate that when neighbors promote/communicate sustainable practices that increase the bird friendliness of their yards and parks and reduce energy consumption (through signs, crowd sourcing maps and data, social media promotion), there is a positive peer pressure on neighbors, peer-to-peer dialogue about sustainability increases, and social norms about planting practices for sustainability change.

More detail about this project can be found at:

- <http://www2.dnr.cornell.edu/citizenscience/>
- <http://www.birds.cornell.edu/citscikit/projects/clo/yardmap>

V(A). Planned Program (Summary)

Program # 4

1. Name of the Planned Program

Nutrition, Food Safety and Security, and Obesity Prevention

Reporting on this Program

V(B). Program Knowledge Area(s)

1. Program Knowledge Areas and Percentage

KA Code	Knowledge Area	%1862 Extension	%1890 Extension	%1862 Research	%1890 Research
303	Genetic Improvement of Animals	0%		3%	
311	Animal Diseases	2%		9%	
313	Internal Parasites in Animals	2%		0%	
315	Animal Welfare/Well-Being and Protection	2%		2%	
405	Drainage and Irrigation Systems and Facilities	1%		1%	
502	New and Improved Food Products	4%		4%	
603	Market Economics	2%		2%	
607	Consumer Economics	2%		2%	
701	Nutrient Composition of Food	3%		0%	
702	Requirements and Function of Nutrients and Other Food Components	6%		6%	
703	Nutrition Education and Behavior	27%		9%	
711	Ensure Food Products Free of Harmful Chemicals, Including Residues from Agricultural and Other Sources	9%		9%	
712	Protect Food from Contamination by Pathogenic Microorganisms, Parasites, and Naturally Occurring Toxins	13%		24%	
721	Insects and Other Pests Affecting Humans	2%		2%	
722	Zoonotic Diseases and Parasites Affecting Humans	2%		2%	
723	Hazards to Human Health and Safety	9%		12%	
724	Healthy Lifestyle	6%		5%	
903	Communication, Education, and Information Delivery	8%		8%	
	Total	100%		100%	

V(C). Planned Program (Inputs)

1. Actual amount of FTE/SYs expended this Program

Year: 2018	Extension		Research	
	1862	1890	1862	1890
Plan	190.0	0.0	8.0	0.0
Actual Paid	217.0	0.0	8.0	0.0
Actual Volunteer	14976.0	0.0	0.0	0.0

2. Institution Name: Cornell University

Actual dollars expended in this Program (includes Carryover Funds from previous years)

Extension		Research	
Smith-Lever 3b & 3c	1890 Extension	Hatch	Evans-Allen
2200080	0	1265764	0
1862 Matching	1890 Matching	1862 Matching	1890 Matching
2200080	0	2330300	0
1862 All Other	1890 All Other	1862 All Other	1890 All Other
0	0	0	0

2. Institution Name: NY State Agricultural Experiment Station

Actual dollars expended in this Program (includes Carryover Funds from previous years)

Extension		Research	
Smith-Lever 3b & 3c	1890 Extension	Hatch	Evans-Allen
0	0	63369	0
1862 Matching	1890 Matching	1862 Matching	1890 Matching
0	0	101186	0
1862 All Other	1890 All Other	1862 All Other	1890 All Other
0	0	0	0

V(D). Planned Program (Activity)

1. Brief description of the Activity

Programs for children and youth are delivered through a variety of settings: after school programs, in-school student enrichment, 4-H clubs, summer camps, and fairs, as well as through cooking or other educational programs involving both children and their parent or caregiver. Family-focused programs promote a positive parent/caregiver-child feeding relationship and an understanding of age appropriate nutrition and physical activity. Extension staff also collaborate with community leaders to improve the local policies, systems, and environments for healthy eating and active living. Activities include sequential

learning events, community workshops, and engagement with community and civic leaders to improve the environment for nutrition and wellness and support of the local food system. Professional development is provided to county and regional staff through in-person and online trainings.

Food safety activities provide educational programs in collaboration with regulatory agencies involved with assuring the safety and wholesomeness of food grown, processed, prepared, sold and handled and consumed by the public in New York State. They are delivered via courses, presentations and educational materials, support transfer of new research-based information for appropriate applications in the agricultural production, manufacturing, retailing and food service industries.

Food security activities may be aimed at both/either nutrition and garden-based efforts which address culturally acceptable, nutritionally adequate, safely grown diets and sustainable growing projects through a variety of means, including school and community gardens and youth-led food systems activities.

Sample Statewide/Regional Initiatives that fall within this Plan of Work

- Adopting Healthy Habits (AHH)
- Choose Health Action Teens (CHAT)
- Choose Health: Fun, Food & Fitness (CHFFF)
- Choose Health Officers (CHO)
- Cooking Up Fun!: Vary Your Veggies
- Cornell Healthy After School Self-Assessment (CHASE)
- Cornell Farm to School Research and Extension Program
- Cornell NutritionWorks Online Professional Development Program
- Discovering Our Food System
- Expanded Food and Nutrition Education Program (EFNEP)
- Farmers Market Nutrition Program
- Master Gardener Volunteer Program
- National GAPs Program Online Produce Safety Course
- Northeast Regional Nutrition Education and Obesity Prevention Center of Excellence (NE-RNECE)
- Produce Safety Alliance Grower and Train-the-Trainer Programs
- Seed to Supper
- Supplemental Nutrition Assistance Program - Education (SNAP-Ed)
- Youth Grow
- Youth Healthy Eating and Active Living Program Work Team (YHEAL PWT)

2. Brief description of the target audience

Childhood obesity prevention program audiences reached include: low-income families; 4-H youth; children in and out of school; nutrition and health professionals; school food service staff; community leaders; and government and agency leaders at the local, state, and national levels. Food security program audiences reached include: low-income individuals and families; and child caregivers, community leaders, human service providers and food policy makers at the local, state, and national levels.

Food safety program audiences reached include: produce growers, dairy farmers, food processors, producers and consumers with targeted programs for low- and moderate- income families; 4-H youth; nutrition and health professionals; food service and food production staff and their managers and directors; and government and agency leaders at the local, state, and national levels.

3. How was eXtension used?

Cornell Cooperative Extension supports and promotes eXtension communities of practice, the eXtension public site and the professional development offered through eXtension.org. Staff across the state are encouraged to be involved in appropriate COPs, and the link to eXtension is promoted on the Cornell Cooperative Extension public and staff sites. Currently, 387 staff from Cornell and CCE are registered, 65 of which are faculty members. 145 staff were active in eXtension in the last year.

Examples of involvement include:

- **Sandra Cuellar**, a member of the Applied Economics and Management Unit at Cornell is director of the **Healthy Food Choices in Schools** Community of Practice. **Katie Kuhl, Cornell student**, helps to oversee 6 courses in the general topic of school lunchrooms
 - In the last year 53% of the **674 Ask an Expert** questions asked by in-state residents were answered by 10 in-state experts.
 - **Steve Hadcock (CCE Albany - Ag Team Leader), Danielle Hauetami (CCE Administration - State Extension Specialist), Karin Bump (CCE Madison - Executive Director)** were trained as **Innovation Facilitators** as key partners to the Impact Collaborative, helping catalyze new ways of working innovatively with eXtension.
 - **Karin Bump assisted the Impact Collaborative** in leading the March 2019 Innovation Facilitator Training - introducing 18 new Innovation Facilitators representing 14 institutions to help catalyze innovation across Extension.
 - **Steve Hadcock assisted the Impact Collaborative** in leading a state Innovation Skill-Building experience for the University of New Hampshire in February 2018. He assisted in the delivery of the Impact Collaborative Innovation Kit to 21 Cooperative Extension professionals from the University of New Hampshire to help find more innovative ways to move institutional goals forward.
 - **Dan Wixted, Pesticide Safety Education Program Coordinator for Cornell University** received funding through the Pesticide Safety Education Funds Management Program (PSEFMP) to produce a presentation on pollinator protection in response to concerns from growers and beekeepers regarding pesticide products for certification and recertification trainings held by Cornell. In 2019 funds will be used to produce a presentation on the Health Effects of Glyphosate developed in response to misinformation in the media and even within academic institutions regarding the health risks posed by glyphosate (Roundup) especially with respect to cancer and residues on food.

Staff have cited the usefulness of COPs - particularly where there are identified national projects - such as with Financial Security for All COP. Examples of participation in COPs that fall into this plan of work area include:

- Community Nutrition Education
- Creating Healthy Communities
- Drinking Water and Human Health
- Electric Pressure Cooker
- Food and Fitness
- Food Safety
- Foodshed
- Healthy Food Choices in Schools

V(E). Planned Program (Outputs)

1. Standard output measures

2018	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Actual	318035	14343639	488591	22035854

2. Number of Patent Applications Submitted (Standard Research Output)

Patent Applications Submitted

Year: 2018

Actual: 1

Patents listed

62/686,318 Systems and Methods for Halamine-Dopamine Copolymers for High-Performance, Low-Cost, and Easy-to Apply Antimicrobial Coatings

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

2018	Extension	Research	Total
Actual	10	14	24

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

- {No Data Entered}

V(G). State Defined Outcomes

V. State Defined Outcomes Table of Content

O. No.	OUTCOME NAME
1	(4.1a) Number of children and youth who demonstrate knowledge or skill gains related to healthy eating and active living
2	(4.1b) Number parents/ caregivers and other adults who demonstrate knowledge or skill gains related to healthy eating and active living.
3	(4.1c) Number of youth program participants documented to have applied healthy eating and/or active living, recommendations
4	(4.1d) Number of adult program participants documented to have applied healthy eating and/or active living, recommendations
5	(4.2a) Number of program participants who adopt food resource management and/or food security practices
6	(4.3a) Number of program participants documented to have increased involvement in public/community childhood obesity prevention actions
7	(4.3b) Number of participating schools and/or communities documented to have made practice and/or policy changes to promote healthy eating and active living
8	(4.4a) Number of program participants who have acted to improve their food security status.
9	(4.4b) Number of community action plans implemented as a result of community based assessment.
10	(4.5a) Number of consumers who demonstrate knowledge or skill gains related to reducing food safety and/or foodborne risks and illnesses including recommended purchasing, handling, storage, and preparation practices.
11	(4.5b) Number of consumers documented to have implemented new and/or increased application of ongoing safe food purchasing, handling, storage, and preparation practices.
12	(4.6a) Number of producers/ processors/food service providers documented to have implemented new and/or increased application of ongoing safe food production, processing, storage, handling, marketing, and preparation practices.
13	(4.7a) Number of communities/ firms/or organizations documented to have assessed practices or food safety policies as a result of participating in relevant educational programs.
14	(4.7b) Number of communities/ firms/or organizations documented to have implemented improved practices or food safety policies as a result of participating in relevant educational programs.
15	(4.4c) Number of program participants who have acted to improve their food security status by growing food.
16	(4.4d) Number of program participants who have assisted another/others in improving their food security status through growing food.
17	(4.4e) Number of individuals or households documented to have improved food security status

18	Food Insecurity and Food Decision-Making: Uses of Behavioral Nudges in a Food Pantry Setting
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Outcome #1

1. Outcome Measures

(4.1a) Number of children and youth who demonstrate knowledge or skill gains related to healthy eating and active living

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2018	157333

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done

Results

4. Associated Knowledge Areas

KA Code	Knowledge Area
701	Nutrient Composition of Food
702	Requirements and Function of Nutrients and Other Food Components
703	Nutrition Education and Behavior
724	Healthy Lifestyle

Outcome #2

1. Outcome Measures

(4.1b) Number parents/ caregivers and other adults who demonstrate knowledge or skill gains related to healthy eating and active living.

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2018	32348

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done

Results

4. Associated Knowledge Areas

KA Code	Knowledge Area
701	Nutrient Composition of Food
703	Nutrition Education and Behavior
724	Healthy Lifestyle

Outcome #3

1. Outcome Measures

(4.1c) Number of youth program participants documented to have applied healthy eating and/or active living, recommendations

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2018	88451

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done

Results

4. Associated Knowledge Areas

KA Code	Knowledge Area
701	Nutrient Composition of Food
703	Nutrition Education and Behavior
724	Healthy Lifestyle

Outcome #4

1. Outcome Measures

(4.1d) Number of adult program participants documented to have applied healthy eating and/or active living, recommendations

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
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3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done

Results

4. Associated Knowledge Areas

KA Code	Knowledge Area
701	Nutrient Composition of Food
703	Nutrition Education and Behavior

Outcome #5

1. Outcome Measures

(4.2a) Number of program participants who adopt food resource management and/or food security practices

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Actual
2018	71656

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done

Results

4. Associated Knowledge Areas

KA Code	Knowledge Area
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701	Nutrient Composition of Food
703	Nutrition Education and Behavior

Outcome #6

1. Outcome Measures

(4.3a) Number of program participants documented to have increased involvement in public/community childhood obesity prevention actions

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2018	580

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done

Results

4. Associated Knowledge Areas

KA Code	Knowledge Area
701	Nutrient Composition of Food
703	Nutrition Education and Behavior
724	Healthy Lifestyle

Outcome #7

1. Outcome Measures

(4.3b) Number of participating schools and/or communities documented to have made practice and/or policy changes to promote healthy eating and active living

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2018	116

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done

Results

4. Associated Knowledge Areas

KA Code	Knowledge Area
701	Nutrient Composition of Food
702	Requirements and Function of Nutrients and Other Food Components
703	Nutrition Education and Behavior
724	Healthy Lifestyle

Outcome #8

1. Outcome Measures

(4.4a) Number of program participants who have acted to improve their food security status.

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
-------------	---------------

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done

Results

4. Associated Knowledge Areas

KA Code	Knowledge Area
702	Requirements and Function of Nutrients and Other Food Components

Outcome #9

1. Outcome Measures

(4.4b) Number of community action plans implemented as a result of community based assessment.

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2018	16

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done

Results

4. Associated Knowledge Areas

KA Code	Knowledge Area
702	Requirements and Function of Nutrients and Other Food Components

Outcome #10

1. Outcome Measures

(4.5a) Number of consumers who demonstrate knowledge or skill gains related to reducing food safety and/or foodborne risks and illnesses including recommended purchasing, handling, storage, and preparation practices.

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2018	86146

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done

Results

4. Associated Knowledge Areas

KA Code	Knowledge Area
703	Nutrition Education and Behavior
724	Healthy Lifestyle

Outcome #11

1. Outcome Measures

(4.5b) Number of consumers documented to have implemented new and/or increased application of ongoing safe food purchasing, handling, storage, and preparation practices.

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2018	6971

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done

Results

4. Associated Knowledge Areas

KA Code	Knowledge Area
502	New and Improved Food Products
703	Nutrition Education and Behavior
724	Healthy Lifestyle

Outcome #12

1. Outcome Measures

(4.6a) Number of producers/ processors/food service providers documented to have implemented new and/or increased application of ongoing safe food production, processing, storage, handling, marketing, and preparation practices.

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2018	450

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done

Results

4. Associated Knowledge Areas

KA Code	Knowledge Area
502	New and Improved Food Products
703	Nutrition Education and Behavior
724	Healthy Lifestyle

Outcome #13

1. Outcome Measures

(4.7a) Number of communities/ firms/or organizations documented to have assessed practices or food safety policies as a result of participating in relevant educational programs.

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2018	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done

Results

4. Associated Knowledge Areas

KA Code	Knowledge Area
702	Requirements and Function of Nutrients and Other Food Components
703	Nutrition Education and Behavior

Outcome #14

1. Outcome Measures

(4.7b) Number of communities/ firms/or organizations documented to have implemented improved practices or food safety policies as a result of participating in relevant educational programs.

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2018	267

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done

Results

4. Associated Knowledge Areas

KA Code	Knowledge Area
702	Requirements and Function of Nutrients and Other Food Components
703	Nutrition Education and Behavior
724	Healthy Lifestyle

Outcome #15

1. Outcome Measures

(4.4c) Number of program participants who have acted to improve their food security status by growing food.

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2018	733

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done

Results

4. Associated Knowledge Areas

KA Code	Knowledge Area
703	Nutrition Education and Behavior
724	Healthy Lifestyle
903	Communication, Education, and Information Delivery

Outcome #16

1. Outcome Measures

(4.4d) Number of program participants who have assisted another/others in improving their food security status through growing food.

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2018	95

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done

Results

4. Associated Knowledge Areas

KA Code	Knowledge Area
703	Nutrition Education and Behavior
903	Communication, Education, and Information Delivery

Outcome #17

1. Outcome Measures

(4.4e) Number of individuals or households documented to have improved food security status

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2018	103

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done

Results

4. Associated Knowledge Areas

KA Code	Knowledge Area
{No Data}	null

Outcome #18

1. Outcome Measures

Food Insecurity and Food Decision-Making: Uses of Behavioral Nudges in a Food Pantry Setting

2. Associated Institution Types

- 1862 Research

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2018	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Roughly 14 percent of the U.S. population struggles with food insecurity, including 19.5 percent of households with children. Many of these food-insecure households face significant diet-related health challenges, especially with obesity, which has been closely linked to food insecurity and poverty. There is also evidence to suggest that living with the constant threat of food scarcity induces poorer decision-making in general. Some efforts to improve nutrition choices among food-insecure households restrict or patronize consumers. We developed 10 inexpensive behavioral interventions, or nudges, which can lead food pantry consumers to choose foods that are more nutritious.

What has been done

Behavioral economists use the term "nudges" to describe a host of strategies that influence human decision-making - in this case, encouraging food pantry consumers to choose healthier foods, such as fruits and vegetables, low-fat dairy, and whole grains. We partnered with Feeding

America's network of hunger relief agencies to develop and field-test nudges using one or more key behavioral principles: convenience, visibility, setting taste expectations, social norms, smart choice structure, and priming. We ran a series of field experiments over 12 weeks across four states in a variety of food pantry settings. We discovered that subtle changes can in fact encourage food pantry consumers to make healthier choices.

Results

In collaboration with Feeding America, we distilled our key findings on successful nudges into a Practitioner's Guide to Nudging Nutrition. This guide is being disseminated throughout the Feeding America network of 60,000 member agencies. The guide is also publicly available at the link below. Some of the successful nudges include: ensuring that produce is presented at waist level rather than at ground level; using signage to highlight the flavor or other appealing characteristics of foods, rather than nutritional information; displaying fewer unhealthy foods, and storing the rest out of sight; displaying whole grain items in multiple locations; displaying produce in attractive bins; placing healthier foods in the front of the line; and retaining commercial-quality packaging, when possible. Our research team made presentations and led trainings in the use of behavioral techniques to encourage healthy food consumption for pantry managers in New York, Oklahoma, Colorado, New Jersey, and Texas. We've also disseminated our findings through academic conferences and peer-reviewed journals.

Website: <https://hungerandhealth.feedingamerica.org/resource/the-power-of-nudges-making-the-healthy-choice-the-easy-choice-in-food-pantries/>

PI: David Just, Professor

4. Associated Knowledge Areas

KA Code	Knowledge Area
703	Nutrition Education and Behavior
724	Healthy Lifestyle

V(H). Planned Program (External Factors)

External factors which affected outcomes

- Economy
- Appropriations changes
- Public Policy changes
- Government Regulations
- Competing Public priorities
- Populations changes (immigration, new cultural groupings, etc.)

Brief Explanation

The scope and scale of outcomes in this program areas is greatly enhanced by external sources of support. In the last five years funding administration has changed for the Eat Smart New York program, changing capacity for education, audience, staffing patterns and staff requirements. The reformed Eat Smart New York program <http://eatsmartnewyork.org/> is now out of a reframing phase and experiencing greater outputs and impact. The impact of specific programmatic funds focused on audience needs and not program capacity are still being experienced. These trends are expected to continue.

V(I). Planned Program (Evaluation Studies)

Evaluation Results

Each of the plans addresses a broad combination of applied research and extension initiatives spanning multiple audiences, methods, and intended outcomes. A combination of routine program monitoring and documentation, near-term outcome assessment, and targeted follow-up activities are expected to provide a comprehensive assessment. We work towards this goal by doing two things - professional development to enhance evaluation capacity of our system and collecting quantitative and qualitative documentation of local, regional and statewide programs.

Evaluation Capacity Building: Cornell Cooperative Extension has worked with the Cornell Office of Research on Evaluation (CORE) to strengthen evaluation practice and build evaluation capacity. CORE developed The Systems Evaluation Protocol that takes programs from logic models (columnar) to pathway models (a visual model that shows relationship of short-term, mid-term and long-term outcomes) and helps to create an evaluation strategy. CORE tested and refined The Systems Evaluation Protocol in partnership with CCE programs from 2006 - 2015. The Protocol has been integrated into professional development in CCE to promote consistent approaches to evaluation of county-based, regional, and statewide programs. Although the formal project connection with CORE ended in 2015, access to the Netway and online training continues to be available. Additionally, CCE program leaders are being trained in logic and pathway modelling through the CCE Program Development Leadership Cohort, an in-depth and comprehensive professional development experience targeting program leaders to become more proficient at program planning and evaluation.

Cornell University has a full license for Qualtrics surveys, resources and library. This tool is available to staff, faculty and the extension system for use with quantitative and qualitative surveys aiding in the development of evaluative surveys.

Regional/Statewide documentation examples. Many regional and statewide programs are receiving federal capacity funds. Documentation of outcomes is a requirement of funding. Results shape future program efforts and impact program design. **An example evaluation from a funded project can be found below.**

There is also a requirement for our local and regional programs to report on statewide outcomes/indicators: Program documentation results are aggregated in a statewide accountability database that includes both qualitative and quantitative data for reporting and helping us to better understand impacts. Quantitative system wide outcome data is reported in the outcome portion of this report.

Key Items of Evaluation

Example evaluation for the Human Nutrition, Food Safety & Security, and Obesity Prevention Plan - Project: CHAT - Teens as Teachers (Jacqueline Ann Davis-Manigaulte) - use of 4-H Common Measures evaluation system (surveys administered in final group sessions)

CUCE-NYC is working with teen leaders to promote healthy eating habits for elementary school aged youth in predominantly low-income communities in New York City in an effort to reduce obesity rates. Teen leaders were trained in the Choose Health Food, Fun and

Fitness (CHFFF) curriculum to teach middle school youth. Teen educators engaged youth in eating and physical activity workshops such as how to shop for and prepare healthy dishes for the youth and their families. Funding from 4-H Food Smart Families allowed youth two recipes with all ingredients provided to make healthy foods for their families. Educating youth about the affordability of healthy living can increase resources for other living expenses. A total of 37 teen leaders were involved with the CHAT project and reached nearly 360 youth participants.

After the completion of the program, youth participants were surveyed about their healthy eating habits. 63% of youth responded "yes" or "usually" when asked if they paid attention to fruit consumption while 59% said "yes" or "usually" when asked if they paid attention to vegetable consumption. 81% of participants indicated that they "do" or "usually" pay attention to daily water consumption. 63% report eating meals with their families "every" or "most" days and 66% eat fast foods "some" days. Because of the 4-H and Choose Health project, 82% of youth indicated that they learned about healthy food choices and 76% have given their family ideas about healthy meals and snacks.

More detail about this PI and project can be found at:

- <https://www.human.cornell.edu/people/jad23>
- <https://fnec.cornell.edu/for-partners/programs/chat/>

V(A). Planned Program (Summary)

Program # 5

1. Name of the Planned Program

4-H Youth Development/Children, Youth and Families

Reporting on this Program

V(B). Program Knowledge Area(s)

1. Program Knowledge Areas and Percentage

KA Code	Knowledge Area	%1862 Extension	%1890 Extension	%1862 Research	%1890 Research
134	Outdoor Recreation	1%		3%	
607	Consumer Economics	7%		0%	
608	Community Resource Planning and Development	9%		0%	
610	Domestic Policy Analysis	2%		0%	
801	Individual and Family Resource Management	5%		0%	
802	Human Development and Family Well-Being	28%		42%	
803	Sociological and Technological Change Affecting Individuals, Families, and Communities	7%		0%	
804	Human Environmental Issues Concerning Apparel, Textiles, and Residential and Commercial Structures	4%		20%	
806	Youth Development	35%		33%	
901	Program and Project Design, and Statistics	2%		2%	
	Total	100%		100%	

V(C). Planned Program (Inputs)

1. Actual amount of FTE/SYs expended this Program

Year: 2018	Extension		Research	
	1862	1890	1862	1890
Plan	308.0	0.0	4.0	0.0
Actual Paid	281.0	0.0	1.0	0.0
Actual Volunteer	17805.0	0.0	0.0	0.0

2. Institution Name: Cornell University

Actual dollars expended in this Program (includes Carryover Funds from previous years)

Extension		Research	
Smith-Lever 3b & 3c	1890 Extension	Hatch	Evans-Allen
2849482	0	407012	0
1862 Matching	1890 Matching	1862 Matching	1890 Matching
2849482	0	779095	0
1862 All Other	1890 All Other	1862 All Other	1890 All Other
0	0	0	0

2. Institution Name: NY State Agricultural Experiment Station

Actual dollars expended in this Program (includes Carryover Funds from previous years)

Extension		Research	
Smith-Lever 3b & 3c	1890 Extension	Hatch	Evans-Allen
0	0	0	0
1862 Matching	1890 Matching	1862 Matching	1890 Matching
0	0	0	0
1862 All Other	1890 All Other	1862 All Other	1890 All Other
0	0	0	0

V(D). Planned Program (Activity)

1. Brief description of the Activity

Youth: 4-H Youth Development is a comprehensive, statewide positive youth development program. 4-H entails a wide variety of applied research and educational methods based on need and local context. Campus-based faculty and Extension Associates, Program Work Teams (PWTs), State Office staff, the New York State Association of CCE 4-H Educators (NYSACCE4-HE), county-based educators, volunteers, and youth leaders are all involved in designing, implementing, and evaluating program efforts.

NYS 4-H's first priority is to create a safe, inclusive space for learning, sharing, and collaboration welcoming to people from diverse backgrounds, cultures and perspectives. A 4-H Learning Experience is an active, reflective learning and growing process where young people, connected in transformative relationships with educators and each other, engage in progressive learning pathways in the dynamic ecology of positive youth development. Young people participate in a variety of 4-H Learning Experiences through 4-H projects. A project is a planned series of experiential learning opportunities that focuses on a particular topic area and learning goals over a period of time. 4-H Learning Experiences includes a wide array of delivery modes, ways of learning, project and topic areas, and local adaptations. All young people who participate in a 4-H Learning Experience are considered members. Members may participate in one or several 4-H Learning Experiences, through one or many delivery modes and in one or many project areas. They may join for a short-term experience or remain involved for several years.

Through their 4-H Learning Experiences, youth develop understanding, practical skills, life skills, contribute to their community, and explore their sparks. A spark is a special quality, skill, or interest that a young person is passionate about and is a source of meaning and purpose. 4-H Learning Experiences, projects, and programs aim to support young people as they develop the 6 Cs: caring, character, confidence, competence, connection, and contribution.

A variety of educational strategies are also used to support county educators and volunteers. Professional development goals include assisting colleagues in gaining the knowledge and skills necessary to assess the ranges of possibilities that exist within and among program areas. Trained 4-H educators and staff, volunteers, youth, schoolteachers, community agency staff and others lead youth in 4-H projects.

Family: This is a comprehensive, statewide educational program entailing multiple education methods depending on local context and need. Campus-based faculty and Extension Associates and county-based educators are involved in designing, implementing, and evaluating tailored (as well as state-wide) educational efforts depending on the focus and scope of their role.

Sample Statewide Program Initiatives that fall within this Plan of Work:

- 4-H Youth Development Program (clubs, events, camps, afterschool, school enrichment)
- 4-H and NYS Library Partnership
- 4-H National Mentoring Program
- ACT (Assets Coming Together) for Youth
- 4-H Public Presentations
- Children, Youth, and Families at Risk Program (CYFAR)
- Cornell Early Childhood Program
- Cornell Research Program on Self-Injurious Behavior
- Design & Environmental Analysis: knowledge, ideas, and designs that contribute to improving the places in which we work, live, learn, heal, and play
 - Events: 4-H Career Explorations Conference, State Teen Action Representative Retreat (STARR), National 4-H Conference, Dairy Discovery Days, Animal Crackers, Public Presentations, State Fair, etc.
 - Family Economics and Resource Management
 - Operation Military Kids
 - Parenting in Context Initiative
 - Role of Grandparents in the Lives of Adolescent Grandchildren
 - Volunteer development opportunities and events

2. Brief description of the target audience

Youth

- Young people ages 5-19: Cloverbuds (5-8), pre-teens (9-12), and teens (13-19)
- Youth development educators, staff, and volunteers
- Families, parents, and guardians
- Youth-serving organizations
- Teachers and schools (elementary, middle, high school)
- Community leaders
- Underserved communities (Black, Latino, Native American, Asian youth).

Family

- Parents, grandparents and other caregivers
- Child care providers
- Community stakeholders such as employers, leaders and policy makers at local/state levels

- Low and moderate-income households who are especially vulnerable to financial setbacks and have less disposable income to commit to savings
- Low-income households living in poor-quality housing

3. How was eXtension used?

Cornell Cooperative Extension supports and promotes eXtension communities of practice, the eXtension public site and the professional development offered through eXtension.org. Staff across the state are encouraged to be involved in appropriate COPs, and the link to eXtension is promoted on the Cornell Cooperative Extension public and staff sites. Currently, 387 staff from Cornell and CCE are registered, 65 of which are faculty members. 145 staff were active in eXtension in the last year.

Examples of involvement include:

- **Sandra Cuellar**, a member of the Applied Economics and Management Unit at Cornell is director of the **Healthy Food Choices in Schools** Community of Practice. **Katie Kuhl, Cornell student**, helps to oversee 6 courses in the general topic of school lunchrooms
 - In the last year 53% of the **674 Ask an Expert** questions asked by in-state residents were answered by 10 in-state experts.
 - **Steve Hadcock (CCE Albany - Ag Team Leader), Danielle Hauetami (CCE Administration - State Extension Specialist), Karin Bump (CCE Madison - Executive Director)** were trained as **Innovation Facilitators** as key partners to the Impact Collaborative, helping catalyze new ways of working innovatively with eXtension.
 - **Karin Bump assisted the Impact Collaborative** in leading the March 2019 Innovation Facilitator Training - introducing 18 new Innovation Facilitators representing 14 institutions to help catalyze innovation across Extension.
 - **Steve Hadcock assisted the Impact Collaborative** in leading a state Innovation Skill-Building experience for the University of New Hampshire in February 2018. He assisted in the delivery of the Impact Collaborative Innovation Kit to 21 Cooperative Extension professionals from the University of New Hampshire to help find more innovative ways to move institutional goals forward.
 - **Dan Wixted, Pesticide Safety Education Program Coordinator for Cornell University** received funding through the Pesticide Safety Education Funds Management Program (PSEFMP) to produce a presentation on pollinator protection in response to concerns from growers and beekeepers regarding pesticide products for certification and recertification trainings held by Cornell. In 2019 funds will be used to produce a presentation on the Health Effects of Glyphosate developed in response to misinformation in the media and even within academic institutions regarding the health risks posed by glyphosate (Roundup) especially with respect to cancer and residues on food.

Staff have cited the usefulness of COPs - particularly where there are identified national projects - such as with Financial Security for All COP. Examples of participation in COPs that fall into this plan of work area include:

- 4-H Computer Science Community
- 4-H Curriculum Development
- 4-H Learning Network
- 4-H Online Learning Environments
- Agriscience/Ag-STEM
- Citizen Science
- CYFAR
- Extension alliance for better child care
- Families
- Families and Child Well-Being Learning Network
- Family Caregiving

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- Financial Security for All
- Just in Time Parenting
- Map@Syst
- Military Families
- Military families Concentration Leaders
- Teen Leadership
- Youth Agriculture
- Youth Geospatial Technology

V(E). Planned Program (Outputs)

1. Standard output measures

2018	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Actual	240083	8652666	320903	11565445

2. Number of Patent Applications Submitted (Standard Research Output)

Patent Applications Submitted

Year: 2018
 Actual: 0

Patents listed

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

2018	Extension	Research	Total
Actual	15	1	16

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

- {No Data Entered}

V(G). State Defined Outcomes

V. State Defined Outcomes Table of Content

O. No.	OUTCOME NAME
1	(5.1a) Number of youth who demonstrate ability to express their ideas confidently and competently.
2	(5.1b) Number of youth who demonstrate intercultural competence and cultural humility.
3	(5.1c) Number of youth who demonstrate improved college and career-readiness skills.
4	(5.1d) Number of youth who demonstrate Science and Engineering Practices.
5	(5.1e) Number of youth who demonstrate increased knowledge and skills in Animal Science fields.
6	(5.1f) Number of youth who develop environmental literacy.
7	(5.1g) Number of youth who demonstrate a deeper understanding and appreciation of complex food systems and their impact in those systems.
8	(5.2a) Number of youth who applied knowledge and skills in programs, projects, and activities to foster an inclusive and diverse learning environment.
9	(5.2b) Number of youth who lead community service projects in partnership with adults using skills learned in 4-H.
10	(5.2c) Number of youth programs and organizations documented to incorporate youth voice in programming to reflect youth needs, interests, and excitement for learning.
11	(5.3a) Number of 4-H Volunteer Leaders who lead learning experiences in partnership with youth.
12	(5.3b) Number of 4-H Teen Leaders who lead learning experiences in partnership with youth.
13	(5.4a) Number of parents and other adults providing parental care who adopt developmentally appropriate and effective parenting behaviors and methods.
14	(5.4b) Number of parents/ relative caregivers who report 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.
15	(5.5a) Number of participating infant and child caregivers reporting to have applied positive care-giving practices.
16	(5.5b) Number of participating persons with care-requiring dependents reporting to have used childcare quality characteristics in their care selection.
17	(5.5c) Number of participating persons with care-requiring dependents reporting positive change in childcare as a result of participating in educational programs.

18	(5.6a) Number of program participants reporting to have been involved in community level assessments of family care needs.
19	(5.6b) Number of communities documented to have taken action to address family needs that can be related to educational programs and/or critical community collaborations provided.
20	(5.7a) Number of program participants reporting they are practicing improved money management skills such as comparison shopping, paying bills on time, paying more than minimum payment, checking credit report, and reviewing and understanding bills/statements as a means to meeting financial goals.
21	(5.7b) Number of program participants reporting to have met day-to-day financial obligations while also progressing on future goals for home ownership, savings, retirement accounts, etc.
22	(5.7c) Number of program participants reporting to have reduced debts and/or increased savings.
23	(5.8a) Number of program participants documented to have taken measures to prevent or remediate indoor air quality issues.
24	Parents, Teens, and Online Safety: Improving Parenting Practices in a Digital Age

Outcome #1

1. Outcome Measures

(5.1a) Number of youth who demonstrate ability to express their ideas confidently and competently.

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2018	38345

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done

Results

4. Associated Knowledge Areas

KA Code	Knowledge Area
806	Youth Development

Outcome #2

1. Outcome Measures

(5.1b) Number of youth who demonstrate intercultural competence and cultural humility.

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2018	26390

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done

Results

4. Associated Knowledge Areas

KA Code	Knowledge Area
806	Youth Development

Outcome #3

1. Outcome Measures

(5.1c) Number of youth who demonstrate improved college and career-readiness skills.

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2018	20092

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done

Results

4. Associated Knowledge Areas

KA Code	Knowledge Area
806	Youth Development

Outcome #4

1. Outcome Measures

(5.1d) Number of youth who demonstrate Science and Engineering Practices.

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Actual
2018	42415

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done

Results

4. Associated Knowledge Areas

KA Code	Knowledge Area
806	Youth Development

Outcome #5

1. Outcome Measures

(5.1e) Number of youth who demonstrate increased knowledge and skills in Animal Science fields.

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2018	28677

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done

Results

4. Associated Knowledge Areas

KA Code	Knowledge Area
806	Youth Development

Outcome #6

1. Outcome Measures

(5.1f) Number of youth who develop environmental literacy.

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2018	43120

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done

Results

4. Associated Knowledge Areas

KA Code	Knowledge Area
806	Youth Development

Outcome #7

1. Outcome Measures

(5.1g) Number of youth who demonstrate a deeper understanding and appreciation of complex food systems and their impact in those systems.

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2018	49805

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done

Results

4. Associated Knowledge Areas

KA Code	Knowledge Area
806	Youth Development

Outcome #8

1. Outcome Measures

(5.2a) Number of youth who applied knowledge and skills in programs, projects, and activities to foster an inclusive and diverse learning environment.

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2018	34871

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done

Results

4. Associated Knowledge Areas

KA Code	Knowledge Area
806	Youth Development

Outcome #9

1. Outcome Measures

(5.2b) Number of youth who lead community service projects in partnership with adults using skills learned in 4-H.

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2018	11759

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done

Results

4. Associated Knowledge Areas

KA Code	Knowledge Area
806	Youth Development

Outcome #10

1. Outcome Measures

(5.2c) Number of youth programs and organizations documented to incorporate youth voice in programming to reflect youth needs, interests, and excitement for learning.

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2018	11531

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done

Results

4. Associated Knowledge Areas

KA Code	Knowledge Area
802	Human Development and Family Well-Being
806	Youth Development

Outcome #11

1. Outcome Measures

(5.3a) Number of 4-H Volunteer Leaders who lead learning experiences in partnership with youth.

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2018	3484

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done

Results

4. Associated Knowledge Areas

KA Code	Knowledge Area
802	Human Development and Family Well-Being
806	Youth Development

Outcome #12

1. Outcome Measures

(5.3b) Number of 4-H Teen Leaders who lead learning experiences in partnership with youth.

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Actual
2018	1600

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done

Results

4. Associated Knowledge Areas

KA Code	Knowledge Area
802	Human Development and Family Well-Being
806	Youth Development

Outcome #13

1. Outcome Measures

(5.4a) Number of parents and other adults providing parental care who adopt developmentally appropriate and effective parenting behaviors and methods.

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2018	8644

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done

Results

4. Associated Knowledge Areas

KA Code	Knowledge Area
802	Human Development and Family Well-Being
806	Youth Development

Outcome #14

1. Outcome Measures

(5.4b) Number of parents/ relative caregivers who report 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.

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Actual
2018	9122

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done

Results

4. Associated Knowledge Areas

KA Code	Knowledge Area
802	Human Development and Family Well-Being
806	Youth Development

Outcome #15

1. Outcome Measures

(5.5a) Number of participating infant and child caregivers reporting to have applied positive caregiving practices.

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2018	6637

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done

Results

4. Associated Knowledge Areas

KA Code	Knowledge Area
607	Consumer Economics
801	Individual and Family Resource Management

Outcome #16

1. Outcome Measures

(5.5b) Number of participating persons with care-requiring dependents reporting to have used childcare quality characteristics in their care selection.

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Actual
2018	5027

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done

Results

4. Associated Knowledge Areas

KA Code	Knowledge Area
607	Consumer Economics
801	Individual and Family Resource Management

Outcome #17

1. Outcome Measures

(5.5c) Number of participating persons with care-requiring dependents reporting positive change in childcare as a result of participating in educational programs.

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Actual
2018	5703

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done

Results

4. Associated Knowledge Areas

KA Code	Knowledge Area
607	Consumer Economics
801	Individual and Family Resource Management

Outcome #18

1. Outcome Measures

(5.6a) Number of program participants reporting to have been involved in community level assessments of family care needs.

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2018	5739

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done

Results

4. Associated Knowledge Areas

KA Code	Knowledge Area
607	Consumer Economics
803	Sociological and Technological Change Affecting Individuals, Families, and Communities
804	Human Environmental Issues Concerning Apparel, Textiles, and Residential and Commercial Structures

Outcome #19

1. Outcome Measures

(5.6b) Number of communities documented to have taken action to address family needs that can be related to educational programs and/or critical community collaborations provided.

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2018	27

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done

Results

4. Associated Knowledge Areas

KA Code	Knowledge Area
608	Community Resource Planning and Development
806	Youth Development

Outcome #20

1. Outcome Measures

(5.7a) Number of program participants reporting they are practicing improved money management skills such as comparison shopping, paying bills on time, paying more than minimum payment, checking credit report, and reviewing and understanding bills/statements as a means to meeting financial goals.

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2018	10673

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done

Results

4. Associated Knowledge Areas

KA Code	Knowledge Area
608	Community Resource Planning and Development
806	Youth Development

Outcome #21

1. Outcome Measures

(5.7b) Number of program participants reporting to have met day-to-day financial obligations while also progressing on future goals for home ownership, savings, retirement accounts, etc.

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Actual
2018	10112

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done

Results

4. Associated Knowledge Areas

KA Code	Knowledge Area
608	Community Resource Planning and Development
806	Youth Development

Outcome #22

1. Outcome Measures

(5.7c) Number of program participants reporting to have reduced debts and/or increased savings.

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2018	10137

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done

Results

4. Associated Knowledge Areas

KA Code	Knowledge Area
806	Youth Development

Outcome #23

1. Outcome Measures

(5.8a) Number of program participants documented to have taken measures to prevent or remediate indoor air quality issues.

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2018	291

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done

Results

4. Associated Knowledge Areas

KA Code	Knowledge Area
806	Youth Development

Outcome #24

1. Outcome Measures

Parents, Teens, and Online Safety: Improving Parenting Practices in a Digital Age

2. Associated Institution Types

- 1862 Research

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2018	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Children's exposure to online risks such as cyberbullying, being contacted by strangers online, and searching for sexual content is a primary parental concern, but there are few evidence-based resources to guide parents and teens on strategies to reduce these risks. A growing number of parents are becoming social media users themselves, but rapid changes in media technologies make it difficult for parents to stay up to date with their children's Internet use. We sought to understand the types of social media use that increase chances of risky online behaviors and reduce family bonding. And we have provided insights into how parents can help their children successfully navigate a diverse media environment.

What has been done

To research the factors that influence social media use, we conducted in-depth interviews with 44 participants: 22 teens, ages 12-17 years old, and 22 parents. Parents and teens were interviewed separately and asked about family rules governing social media use, and whether they felt those rules were effective. We found that parenting strategies frequently have limited efficacy, perhaps because parents and teens have different understandings of online risks. While parents focused on longer-term risks, teens cared more about immediate, relationship-based concerns. Younger teens, 12-13 years old, showed the highest discrepancies in understanding. Discrepancies markedly reduce as teens get older and move from relying on family rules to self-regulating social media behavior.

Results

We developed a social media simulator, Social Media TestDrive, which provides interactive lessons that teach children and caregivers social media literacy in a safe, realistic environment. One of the lessons teaches how to choose a username and a safe password. Another helps teens understand the importance of self-presentation to multiple audiences at once, and how to make smart self-disclosures. A lesson on cyberbullying helps students learn to detect the signs of cyberbullying and practice "upstanding" behaviors to interrupt it. A lesson on information literacy helps teens learn how to evaluate the quality and veracity of facts they encounter online, and how to help others detect fake news. Results of this study have been disseminated through academic conferences, via two Psychology Today blog posts, and through various workshops and webinars, some in partnership with Cooperative Extension and 4-H programming. We have also partnered with Common Sense Media to develop and disseminate the Social Media TestDrive modules as supplements to the Common Sense Digital Citizenship curriculum.

Website: <https://socialmediatestdrive.org/>

PI: Natalya Bazarova, Associate Professor

4. Associated Knowledge Areas

KA Code	Knowledge Area
803	Sociological and Technological Change Affecting Individuals, Families, and Communities

V(H). Planned Program (External Factors)

External factors which affected outcomes

- Economy
- Public Policy changes
- Government Regulations
- Competing Public priorities
- Populations changes (immigration, new cultural groupings, etc.)

Brief Explanation

Youth Fiscal pressures internal to Extension and among community organizations influence the scope of programming available to youth. The increasing diversity of our populations creates the need for an array of program materials, strategies, and a dedication to multicultural competencies. Changing educational standards influence the acceptability or credibility of existing curricula. Regional and community demographic differences influence both program strategies and professional development needs. Social and emotional health and well-being are also on the radar for youth educators, families, and researchers. These trends are expected to continue.

Family The economic, political and governmental sectors affect the quality, availability and accessibility of childcare. The growth of aging and minority populations in the US means cultures that are more diverse and diverse values related to parenting, childcare, and family care giving. Natural disasters and the economy affect household financial status and impact energy issues. They also affect the quality of the indoor air environment. Government regulation and policies driven by public priorities can change the circumstances of personal finances, the energy market and the quality of the indoor household environment. Public and private funding agents and CCE may have fewer fiscal resources and other resources to devote to the quality of life in financial, energy and indoor air quality matters. These trends are expected to continue.

V(I). Planned Program (Evaluation Studies)

Evaluation Results

Each of the plans addresses a broad combination of applied research and extension initiatives spanning multiple audiences, methods, and intended outcomes. A combination of routine program monitoring and documentation, near-term outcome assessment, and targeted follow-up activities are expected to provide a comprehensive assessment. We work towards this goal by doing two things - professional development to enhance evaluation capacity of our system and collecting quantitative and qualitative documentation of local, regional and statewide programs.

Evaluation Capacity Building: Cornell Cooperative Extension has worked with the Cornell Office of Research on Evaluation (CORE) to strengthen evaluation practice and build evaluation capacity. CORE developed The Systems Evaluation Protocol that takes programs from logic models (columnar) to pathway models (a visual model that shows relationship of short-term, mid-term and long-term outcomes) and helps to create an evaluation strategy. CORE tested and refined The Systems Evaluation Protocol in partnership with CCE

programs from 2006 - 2015. The Protocol has been integrated into professional development in CCE to promote consistent approaches to evaluation of county-based, regional, and statewide programs. Although the formal project connection with CORE ended in 2015, access to the Netway and online training continues to be available. Additionally, CCE program leaders are being trained in logic and pathway modelling through the CCE Program Development Leadership Cohort, an in-depth and comprehensive professional development experience targeting program leaders to become more proficient at program planning and evaluation.

Cornell University has a full license for Qualtrics surveys, resources and library. This tool is available to staff, faculty and the extension system for use with quantitative and qualitative surveys aiding in the development of evaluative surveys.

Regional/Statewide documentation examples. Many regional and statewide programs are receiving federal capacity funds. Documentation of outcomes is a requirement of funding. Results shape future program efforts and impact program design. **An example evaluation from a funded project can be found below.**

There is also a requirement for our local and regional programs to report on statewide outcomes/indicators: Program documentation results are aggregated in a statewide accountability database that includes both qualitative and quantitative data for reporting and helping us to better understand impacts. Quantitative system wide outcome data is reported in the outcome portion of this report.

Key Items of Evaluation

Example evaluation for the 4-H Youth Development, Children, Youth & Families Program Area - Cornell Garden Based learning Takes Root project (Marcia Eames-Sheavley) - use of post-participation documentation (3+ month) written in impact statement format.

The intent of this project was to encourage new educators to seek professional development, recognize program strategies and models; and dissolve cooperative extension audience delimitation (the content was appropriate for youth and other educators, 4-H leaders, and master gardener volunteers). The deliverables were created as digital content - webinar/Moodle courses, hands-on workshops, and one on one supports.

Educators were involved in workshops and content through a variety of means, with promotion about programs being shared widely via e-lists and social media. In addition to broad efforts, a focus of this project was a committed cohort based team where there was an expectation of moving through content, growing new strategies for program development and delivery, relationship building, and reporting back. Mini-grants were provided to the counties partaking in the cohort teams to help implement local efforts and a certificate was provided at the conclusion of participation. Cohort members were expected to complete an impact statement (template provided in advance) and collected four to five months after the close of the program.

More detail about this PI and project can be found at:

- <https://hort.cals.cornell.edu/people/marcia-eames-sheavly/>
- <http://blogs.cornell.edu/garden/for-cce-staff/> and <http://gardening.cals.cornell.edu/program-tools/>

V(A). Planned Program (Summary)

Program # 6

1. Name of the Planned Program

Community and Economic Vitality

Reporting on this Program

V(B). Program Knowledge Area(s)

1. Program Knowledge Areas and Percentage

KA Code	Knowledge Area	%1862 Extension	%1890 Extension	%1862 Research	%1890 Research
131	Alternative Uses of Land	22%		21%	
134	Outdoor Recreation	5%		0%	
602	Business Management, Finance, and Taxation	8%		7%	
608	Community Resource Planning and Development	34%		7%	
803	Sociological and Technological Change Affecting Individuals, Families, and Communities	21%		55%	
805	Community Institutions, Health, and Social Services	10%		10%	
Total		100%		100%	

V(C). Planned Program (Inputs)

1. Actual amount of FTE/SYs expended this Program

Year: 2018	Extension		Research	
	1862	1890	1862	1890
Plan	121.0	0.0	3.0	0.0
Actual Paid	88.0	0.0	1.0	0.0
Actual Volunteer	6850.0	0.0	0.0	0.0

2. Institution Name: Cornell University

Actual dollars expended in this Program (includes Carryover Funds from previous years)

Extension		Research	
Smith-Lever 3b & 3c	1890 Extension	Hatch	Evans-Allen
889925	0	137246	0
1862 Matching	1890 Matching	1862 Matching	1890 Matching
889925	0	273254	0
1862 All Other	1890 All Other	1862 All Other	1890 All Other
0	0	0	0

2. Institution Name: NY State Agricultural Experiment Station

Actual dollars expended in this Program (includes Carryover Funds from previous years)

Extension		Research	
Smith-Lever 3b & 3c	1890 Extension	Hatch	Evans-Allen
0	0	0	0
1862 Matching	1890 Matching	1862 Matching	1890 Matching
0	0	0	0
1862 All Other	1890 All Other	1862 All Other	1890 All Other
0	0	0	0

V(D). Planned Program (Activity)

1. Brief description of the Activity

CCE, CUAES and AgriTech at NYSAES have a commitment to the people of New York to build self-capacity among citizens, leaders, and local officials so they are better positioned to address challenges and opportunities, improve quality of life, and build strong and vibrant communities. Through integrated research and extension agendas, we can help develop effective and collaborative agriculture, energy, emergency management, and land use/natural resource management approaches and policies that enhance economic, environmental and social connections. Educators work with a variety of state and local groups to tackle projects that vary in nature from applied research to pilot projects or case studies. These activities, which are demand driven (locally or regionally initiated usually with sponsored or self-financing), provide valuable insights, resources and materials for extension education.

Sample Statewide/Regional Initiatives that fall within this Plan of Work

·Agriculture and Food Systems Development: Community and Economy

- Community and Energy
- Community Capacity Building
- Entrepreneurship
- Land Use Education
- Leadership Development

- Master Gardener Volunteer Program
- New York Extension Disaster Education Network (NY EDEN)
- Regional Economic Development
- Sustainable and Resilient Communities
- Training for Local Officials
- Workforce Development

2. Brief description of the target audience

- Elected officials, community leaders, business and economic leaders, not-for-profit agencies, schools, environmental groups, agribusiness leaders, etc.
- Retirees and other elders who have time to engage in community stewardship
- Engaged community citizens
- Communities as a whole: youth and adults organizations, businesses, schools, and other institutions
- Agriculture/horticulture/natural resource enterprise managers, community residents and visitors, youth, local media, local officials, and local planning and economic development staff
- Workforce development specialists

3. How was eXtension used?

Cornell Cooperative Extension supports and promotes eXtension communities of practice, the eXtension public site and the professional development offered through eXtension.org. Staff across the state are encouraged to be involved in appropriate COPs, and the link to eXtension is promoted on the Cornell Cooperative Extension public and staff sites. Currently, 387 staff from Cornell and CCE are registered, 65 of which are faculty members. 145 staff were active in eXtension in the last year.

Examples of involvement include:

- **Sandra Cuellar**, a member of the Applied Economics and Management Unit at Cornell is director of the **Healthy Food Choices in Schools** Community of Practice. **Katie Kuhl, Cornell student**, helps to oversee 6 courses in the general topic of school lunchrooms
 - In the last year 53% of the **674 Ask an Expert** questions asked by in-state residents were answered by 10 in-state experts.
 - **Steve Hadcock (CCE Albany - Ag Team Leader), Danielle Hauetami (CCE Administration - State Extension Specialist), Karin Bump (CCE Madison - Executive Director)** were trained as **Innovation Facilitators** as key partners to the Impact Collaborative, helping catalyze new ways of working innovatively with eXtension.
 - **Karin Bump assisted the Impact Collaborative** in leading the March 2019 Innovation Facilitator Training - introducing 18 new Innovation Facilitators representing 14 institutions to help catalyze innovation across Extension.
 - **Steve Hadcock assisted the Impact Collaborative** in leading a state Innovation Skill-Building experience for the University of New Hampshire in February 2018. He assisted in the delivery of the Impact Collaborative Innovation Kit to 21 Cooperative Extension professionals from the University of New Hampshire to help find more innovative ways to move institutional goals forward.
 - **Dan Wixted, Pesticide Safety Education Program Coordinator for Cornell University** received funding through the Pesticide Safety Education Funds Management Program (PSEFMP) to produce a presentation on pollinator protection in response to concerns from growers and beekeepers regarding pesticide products for certification and recertification trainings held by Cornell. In 2019 funds will be used to produce a presentation on the Health Effects of Glyphosate developed in response to misinformation in the media and even within academic institutions regarding the health risks posed by glyphosate (Roundup) especially with respect to cancer and residues on food.

Staff have cited the usefulness of COPs - particularly where there are identified national projects - such as

with Financial Security for All COP. Examples of participation in COPs that fall into this plan of work area include:

- Community
- Consumer Horticulture
- Diversity and Inclusion Issue Corps Enhancing Rural Capacity
- Entrepreneurs and their communities
- eXtension Community Issue Corps
- Extension Disaster Education Network
- Extension Master Gardener
- Extension Master Gardener Coordinators
- Fostering Civil Discourse
- Garden Professors CoP
- Land Use Planning
- Leadership development for Organizations and Communities
- Managing in Tough Times Community

V(E). Planned Program (Outputs)

1. Standard output measures

2018	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Actual	206669	18227566	64477	5686672

2. Number of Patent Applications Submitted (Standard Research Output)

Patent Applications Submitted

Year: 2018
 Actual: 0

Patents listed

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

2018	Extension	Research	Total
Actual	12	2	14

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

- {No Data Entered}

V(G). State Defined Outcomes

V. State Defined Outcomes Table of Content

O. No.	OUTCOME NAME
1	(6.1a) Number of communities who plan for and implement 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.
2	(6.1b) Number of residents and/or community leaders, who plan for and initiate steps to enhance facilities, and/or other community resources or services
3	(6.1c) Number of municipalities that were part of an intentional process re: intergovernmental cooperation.
4	(6.1d) Number of communities establishing an infrastructure and climate to support entrepreneurs, local farms and agribusinesses attributable at least in part to initiatives of the program.
5	(6.1e) Number of communities documenting improvements in facilities and/or other community resources or services.
6	(6.2a) Number of communities instituting new or enhanced participatory processes related to community and economic vitality.
7	(6.2b) Number of local officials who cite LGU research and data as having influenced a decision.
8	(6.2c) Number of documented instances in which a community effectively resolves a need or strengthens community assets attributable at least in part to participation in the program.
9	(6.3a) Number of communities and municipalities that address the connection between their land base and possible energy scenarios.
10	(6.3b) Number of sustainability initiatives adopted.
11	(6.3c) Number of communities that address climate change and energy issues in an integrated manner.
12	(6.3d) Number of communities that incorporate energy use and development in their comprehensive plans.
13	(6.4a) Number of communities utilizing information of NY-EDEN.
14	(6.4b) Number of community leaders documented to apply community economic development and quality of life indicators to support decision-making.
15	(6.4c) Number of communities who were better prepared to deal with emergencies and disasters.
16	(6.4d) Number of communities implementing projects that enhance community sustainability and/or protect public health and community well-being through sound environmental management.
17	(6.5a) Number of municipalities adopting land use planning tools that incorporate environmental dimensions and/or develop new institutional arrangements to support land use

	planning and environmental management.
18	(6.5b) Number of communities adopting or updating farmland preservation and/or agricultural economic development plans.
19	(6.6a) Number of residents and/or community leaders, who plan for and initiate steps to enhance public spaces.
20	(6.6b) Number of new or enhanced community organizations or networks linking diverse sub-groups and focused on enhancing community sustainability.
21	(6.6c) Number of communities documenting improvements in public spaces.
22	(6.7a) Number of instances in which producers/ horticulture businesses/ natural resource enterprises, residents and community leaders work together to address issues.
23	(6.7b) Number of agriculture/horticulture/natural resource business persons who are better prepared to deal with disasters and emergencies.
24	(6.7c) Number of communities that assess how current policies and infrastructures sustain or impede agriculture/ horticulture/natural resource enterprises (such as farmland protection or including such enterprises in economic development planning) and how the enterprises are affected by public policy.
25	(6.7d) Number of communities that initiate specific plans to address agriculture/ horticulture/ natural resource enterprise related issues or capitalize on new opportunities including community agriculture initiatives.
26	(6.7e) Number of documented instances in which agriculture/community conflicts are resolved locally.
27	(6.7f) Number of communities documented to adopt, maintain, or expand policies supportive of appropriate agriculture/horticulture/ natural resource enterprise development and/or community agriculture.
28	(6.8a) Number of residents practicing management tactics in homes, lawns, gardens and landscapes that support environmental stewardship and a sustainable community.
29	(6.8b) Number of residents who plan for and initiate steps to enhance homes, lawns, gardens and landscapes that support environmental stewardship and a sustainable community.
30	(6.1f) Number of new shared services among municipalities.
31	Enhancing Rural Economic Opportunities, Community Resilience, and Entrepreneurship: Building Community Resilience through Civic Ecology Practices

Outcome #1

1. Outcome Measures

(6.1a) Number of communities who plan for and implement 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.

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2018	44

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done

Results

4. Associated Knowledge Areas

KA Code	Knowledge Area
602	Business Management, Finance, and Taxation
608	Community Resource Planning and Development
803	Sociological and Technological Change Affecting Individuals, Families, and Communities
805	Community Institutions, Health, and Social Services

Outcome #2

1. Outcome Measures

(6.1b) Number of residents and/or community leaders, who plan for and initiate steps to enhance facilities, and/or other community resources or services

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2018	417

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done

Results

4. Associated Knowledge Areas

KA Code	Knowledge Area
608	Community Resource Planning and Development
805	Community Institutions, Health, and Social Services

Outcome #3

1. Outcome Measures

(6.1c) Number of municipalities that were part of an intentional process re: intergovernmental cooperation.

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2018	30

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done

Results

4. Associated Knowledge Areas

KA Code	Knowledge Area
602	Business Management, Finance, and Taxation
608	Community Resource Planning and Development
803	Sociological and Technological Change Affecting Individuals, Families, and Communities
805	Community Institutions, Health, and Social Services

Outcome #4

1. Outcome Measures

(6.1d) Number of communities establishing an infrastructure and climate to support entrepreneurs, local farms and agribusinesses attributable at least in part to initiatives of the program.

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2018	19

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done

Results

4. Associated Knowledge Areas

KA Code	Knowledge Area
608	Community Resource Planning and Development
805	Community Institutions, Health, and Social Services

Outcome #5

1. Outcome Measures

(6.1e) Number of communities documenting improvements in facilities and/or other community resources or services.

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2018	39

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done

Results

4. Associated Knowledge Areas

KA Code	Knowledge Area
608	Community Resource Planning and Development
805	Community Institutions, Health, and Social Services

Outcome #6

1. Outcome Measures

(6.2a) Number of communities instituting new or enhanced participatory processes related to community and economic vitality.

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Actual
2018	28

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done

Results

4. Associated Knowledge Areas

KA Code	Knowledge Area
608	Community Resource Planning and Development
805	Community Institutions, Health, and Social Services

Outcome #7

1. Outcome Measures

(6.2b) Number of local officials who cite LGU research and data as having influenced a decision.

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2018	6

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done

Results

4. Associated Knowledge Areas

KA Code	Knowledge Area
131	Alternative Uses of Land
608	Community Resource Planning and Development

Outcome #8

1. Outcome Measures

(6.2c) Number of documented instances in which a community effectively resolves a need or strengthens community assets attributable at least in part to participation in the program.

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2018	143

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done

Results

4. Associated Knowledge Areas

KA Code	Knowledge Area
131	Alternative Uses of Land
134	Outdoor Recreation

608 Community Resource Planning and Development
805 Community Institutions, Health, and Social Services

Outcome #9

1. Outcome Measures

(6.3a) Number of communities and municipalities that address the connection between their land base and possible energy scenarios.

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2018	116

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done

Results

4. Associated Knowledge Areas

KA Code	Knowledge Area
608	Community Resource Planning and Development
805	Community Institutions, Health, and Social Services

Outcome #10

1. Outcome Measures

(6.3b) Number of sustainability initiatives adopted.

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2018	23

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done

Results

4. Associated Knowledge Areas

KA Code	Knowledge Area
608	Community Resource Planning and Development
803	Sociological and Technological Change Affecting Individuals, Families, and Communities
805	Community Institutions, Health, and Social Services

Outcome #11

1. Outcome Measures

(6.3c) Number of communities that address climate change and energy issues in an integrated manner.

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
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3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done

Results

4. Associated Knowledge Areas

KA Code	Knowledge Area
608	Community Resource Planning and Development
803	Sociological and Technological Change Affecting Individuals, Families, and Communities
805	Community Institutions, Health, and Social Services

Outcome #12

1. Outcome Measures

(6.3d) Number of communities that incorporate energy use and development in their comprehensive plans.

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2018	20

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done

Results

4. Associated Knowledge Areas

KA Code	Knowledge Area
131	Alternative Uses of Land
608	Community Resource Planning and Development
803	Sociological and Technological Change Affecting Individuals, Families, and Communities
805	Community Institutions, Health, and Social Services

Outcome #13

1. Outcome Measures

(6.4a) Number of communities utilizing information of NY-EDEN.

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2018	21

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done

Results

4. Associated Knowledge Areas

KA Code	Knowledge Area
131	Alternative Uses of Land
608	Community Resource Planning and Development

Outcome #14

1. Outcome Measures

(6.4b) Number of community leaders documented to apply community economic development and quality of life indicators to support decision-making.

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2018	24

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done

Results

4. Associated Knowledge Areas

KA Code	Knowledge Area
131	Alternative Uses of Land
134	Outdoor Recreation
608	Community Resource Planning and Development

Outcome #15

1. Outcome Measures

(6.4c) Number of communities who were better prepared to deal with emergencies and disasters.

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2018	20

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done

Results

4. Associated Knowledge Areas

KA Code	Knowledge Area
131	Alternative Uses of Land
134	Outdoor Recreation
608	Community Resource Planning and Development
805	Community Institutions, Health, and Social Services

Outcome #16

1. Outcome Measures

(6.4d) Number of communities implementing projects that enhance community sustainability and/or protect public health and community well-being through sound environmental management.

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2018	13

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done

Results

4. Associated Knowledge Areas

KA Code	Knowledge Area
131	Alternative Uses of Land
134	Outdoor Recreation
608	Community Resource Planning and Development
805	Community Institutions, Health, and Social Services

Outcome #17

1. Outcome Measures

(6.5a) Number of municipalities adopting land use planning tools that incorporate environmental dimensions and/or develop new institutional arrangements to support land use planning and environmental management.

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2018	13

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done

Results

4. Associated Knowledge Areas

KA Code	Knowledge Area
131	Alternative Uses of Land
602	Business Management, Finance, and Taxation
608	Community Resource Planning and Development
803	Sociological and Technological Change Affecting Individuals, Families, and Communities
805	Community Institutions, Health, and Social Services

Outcome #18

1. Outcome Measures

(6.5b) Number of communities adopting or updating farmland preservation and/or agricultural economic development plans.

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2018	15

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done

Results

4. Associated Knowledge Areas

KA Code	Knowledge Area
608	Community Resource Planning and Development

- 803 Sociological and Technological Change Affecting Individuals, Families, and Communities
- 805 Community Institutions, Health, and Social Services

Outcome #19

1. Outcome Measures

(6.6a) Number of residents and/or community leaders, who plan for and initiate steps to enhance public spaces.

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2018	90

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done

Results

4. Associated Knowledge Areas

KA Code	Knowledge Area
608	Community Resource Planning and Development
803	Sociological and Technological Change Affecting Individuals, Families, and Communities
805	Community Institutions, Health, and Social Services

Outcome #20

1. Outcome Measures

(6.6b) Number of new or enhanced community organizations or networks linking diverse sub-groups and focused on enhancing community sustainability.

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2018	13

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done

Results

4. Associated Knowledge Areas

KA Code	Knowledge Area
602	Business Management, Finance, and Taxation
608	Community Resource Planning and Development
805	Community Institutions, Health, and Social Services

Outcome #21

1. Outcome Measures

(6.6c) Number of communities documenting improvements in public spaces.

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2018	10

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done

Results

4. Associated Knowledge Areas

KA Code	Knowledge Area
602	Business Management, Finance, and Taxation
608	Community Resource Planning and Development
803	Sociological and Technological Change Affecting Individuals, Families, and Communities
805	Community Institutions, Health, and Social Services

Outcome #22

1. Outcome Measures

(6.7a) Number of instances in which producers/ horticulture businesses/ natural resource enterprises, residents and community leaders work together to address issues.

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2018	225

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done

Results

4. Associated Knowledge Areas

KA Code	Knowledge Area
131	Alternative Uses of Land
134	Outdoor Recreation
608	Community Resource Planning and Development
803	Sociological and Technological Change Affecting Individuals, Families, and Communities
805	Community Institutions, Health, and Social Services

Outcome #23

1. Outcome Measures

(6.7b) Number of agriculture/horticulture/natural resource business persons who are better prepared to deal with disasters and emergencies.

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Actual
2018	205

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done

Results

4. Associated Knowledge Areas

KA Code	Knowledge Area
134	Outdoor Recreation
803	Sociological and Technological Change Affecting Individuals, Families, and Communities
805	Community Institutions, Health, and Social Services

Outcome #24

1. Outcome Measures

(6.7c) Number of communities that assess how current policies and infrastructures sustain or impede agriculture/ horticulture/natural resource enterprises (such as farmland protection or including such enterprises in economic development planning) and how the enterprises are affected by public policy.

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Actual
2018	65

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done

Results

4. Associated Knowledge Areas

KA Code	Knowledge Area
131	Alternative Uses of Land

134	Outdoor Recreation
608	Community Resource Planning and Development
803	Sociological and Technological Change Affecting Individuals, Families, and Communities
805	Community Institutions, Health, and Social Services

Outcome #25

1. Outcome Measures

(6.7d) Number of communities that initiate specific plans to address agriculture/ horticulture/ natural resource enterprise related issues or capitalize on new opportunities including community agriculture initiatives.

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2018	31

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done

Results

4. Associated Knowledge Areas

KA Code	Knowledge Area
131	Alternative Uses of Land
608	Community Resource Planning and Development

Outcome #26

1. Outcome Measures

(6.7e) Number of documented instances in which agriculture/community conflicts are resolved locally.

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2018	60

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done

Results

4. Associated Knowledge Areas

KA Code	Knowledge Area
608	Community Resource Planning and Development
803	Sociological and Technological Change Affecting Individuals, Families, and Communities
805	Community Institutions, Health, and Social Services

Outcome #27

1. Outcome Measures

(6.7f) Number of communities documented to adopt, maintain, or expand policies supportive of appropriate agriculture/horticulture/ natural resource enterprise development and/or community agriculture.

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2018	30

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done

Results

4. Associated Knowledge Areas

KA Code	Knowledge Area
608	Community Resource Planning and Development
803	Sociological and Technological Change Affecting Individuals, Families, and Communities
805	Community Institutions, Health, and Social Services

Outcome #28

1. Outcome Measures

(6.8a) Number of residents practicing management tactics in homes, lawns, gardens and landscapes that support environmental stewardship and a sustainable community.

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
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2018 14179

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done

Results

4. Associated Knowledge Areas

KA Code	Knowledge Area
131	Alternative Uses of Land
608	Community Resource Planning and Development
803	Sociological and Technological Change Affecting Individuals, Families, and Communities
805	Community Institutions, Health, and Social Services

Outcome #29

1. Outcome Measures

(6.8b) Number of residents who plan for and initiate steps to enhance homes, lawns, gardens and landscapes that support environmental stewardship and a sustainable community.

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2018	13090

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done

Results

4. Associated Knowledge Areas

KA Code	Knowledge Area
608	Community Resource Planning and Development
803	Sociological and Technological Change Affecting Individuals, Families, and Communities

Outcome #30

1. Outcome Measures

(6.1f) Number of new shared services among municipalities.

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2018	11

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done

Results

4. Associated Knowledge Areas

KA Code	Knowledge Area
602	Business Management, Finance, and Taxation
608	Community Resource Planning and Development
805	Community Institutions, Health, and Social Services

Outcome #31

1. Outcome Measures

Enhancing Rural Economic Opportunities, Community Resilience, and Entrepreneurship: Building Community Resilience through Civic Ecology Practices

2. Associated Institution Types

- 1862 Research

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2018	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

As communities experience more and more "shocks" - whether from fire, floods, drought, loss of industries, or the drug epidemic - they need the capacity to adapt and to deploy proactive, rather than reactive, strategies to transform existing ways of doing business. While policies at the national and state level are crucial, small communities can also build local capacity and resilience. This project seeks to understand how local actors engage in voluntary environmental stewardship to build social and ecological resilience.

What has been done

We studied a host of "shock" events to evaluate the factors and policies that affect resiliency in rural communities, with a special focus on the environment. Civic ecology practices are hands-on, local volunteer efforts that can play a role in helping communities respond to natural and other ongoing challenges and prepare for future shocks. These practices can include transforming vacant lots into community gardens and pocket parks, cleaning up litter, planting native species in parks, and installing gardens to mitigate flooding. These kinds of relatively simple projects are helpful in their own right, but they are also important in establishing the community networks and volunteerism needed to build strong communities.

Results

Understanding the motivations and accomplishments of individuals and groups involved in these efforts will help communities in responding to climate change and other shocks. We found that global organizations foster participation of local groups through hosting global "events" in which people perform volunteerism in their own communities, and then report on their local efforts to the global group (e.g., international cleanup days). However, local groups focused on a particular place are likely to conduct much more frequent cleanup events than general cleanups promoted by global organizations. Local civic ecology groups can increase their impact through multiple means, such as: by organizing with other national or local movements, including faith-based

groups; by becoming part of governance networks; and by conducting work in highly visible locations. We disseminated findings from this multi-state project into four Massive Open Online Courses (MOOCs) taught in 2018, which reached 3,000 students. We also share results through ongoing social media groups focused on civic ecology and environmental education.

Website: <https://www.edx.org/course/reclaiming-broken-places-introduction-cornellx-envsci1500x-0>

PI: Marianne, Krasny, Professor

4. Associated Knowledge Areas

KA Code	Knowledge Area
602	Business Management, Finance, and Taxation
608	Community Resource Planning and Development

V(H). Planned Program (External Factors)

External factors which affected outcomes

- Natural Disasters (drought, weather extremes, etc.)
- Economy
- Appropriations changes
- Public Policy changes
- Government Regulations
- Competing Public priorities
- Populations changes (immigration, new cultural groupings, etc.)

Brief Explanation

Communities operate in a complex and volatile context involving susceptibility to weather extremes, changing governmental policies and regulations, land uses demands and shifting development patterns, evolving consumer demands and globalization related economic factors. Weather related disasters can greatly impact communities in terms of infrastructure damage and direct costs. The global, statewide, and regional economies directly impact local economies. Fundamental change is occurring in the state and regional economies. The specific implications of these external factors vary greatly by locale and across regions. Sustainability in nearly every angle of community and family life is a growing consideration for funding, interests, research and reporting. These trends are expected to continue.

V(I). Planned Program (Evaluation Studies)

Evaluation Results

Each of the plans addresses a broad combination of applied research and extension initiatives spanning multiple audiences, methods, and intended outcomes. A combination of routine program monitoring and documentation, near-term outcome assessment, and targeted follow-up activities are expected to provide a comprehensive assessment. We work towards this goal by doing two things - professional development to enhance evaluation capacity of our system and collecting quantitative and qualitative documentation of local,

regional and statewide programs.

Evaluation Capacity Building: Cornell Cooperative Extension has worked with the Cornell Office of Research on Evaluation (CORE) to strengthen evaluation practice and build evaluation capacity. CORE developed The Systems Evaluation Protocol that takes programs from logic models (columnar) to pathway models (a visual model that shows relationship of short-term, mid-term and long-term outcomes) and helps to create an evaluation strategy. CORE tested and refined The Systems Evaluation Protocol in partnership with CCE programs from 2006 - 2015. The Protocol has been integrated into professional development in CCE to promote consistent approaches to evaluation of county-based, regional, and statewide programs. Although the formal project connection with CORE ended in 2015, access to the Netway and online training continues to be available. Additionally, CCE program leaders are being trained in logic and pathway modelling through the CCE Program Development Leadership Cohort, an in-depth and comprehensive professional development experience targeting program leaders to become more proficient at program planning and evaluation.

Cornell University has a full license for Qualtrics surveys, resources and library. This tool is available to staff, faculty and the extension system for use with quantitative and qualitative surveys aiding in the development of evaluative surveys.

Regional/Statewide documentation examples. Many regional and statewide programs are receiving federal capacity funds. Documentation of outcomes is a requirement of funding. Results shape future program efforts and impact program design. **An example evaluation from a funded project can be found below.**

There is also a requirement for our local and regional programs to report on statewide outcomes/indicators: Program documentation results are aggregated in a statewide accountability database that includes both qualitative and quantitative data for reporting and helping us to better understand impacts. Quantitative system wide outcome data is reported in the outcome portion of this report.

Key Items of Evaluation

[Example evaluation for the Community & Economic Vitality plan - Cornell Regional Food Systems \(Anu Rangurajan\)](#) - use of post-evaluation paper and web-based surveys, group discussion/verbal assessment at end of trainings/presentations, Google Analytics monitoring of the website, one-on-one discussions, registration numbers at events

Extension faculty and staff worked to increase the capacity of a Local & Regional Food Systems Program (LRFS) to facilitate research, education, outreach, and collaboration for innovative practices in food systems. The goal is for the regional food system to support healthy communities by creating equitable access to locally grown foods, protect natural resources, provide economic development, and promote resilient farming practices across NYS. One focal point of this initiative has been Farm to School efforts where school meals come from locally grown food. Multidisciplinary collaborations are an important aspect of this project and were achieved through webinars, monthly emails, roundtables, a Program Work Team, and a new website.

Information about LRFS was presented at a number of events and distributed through monthly emails. Information can also be found on the redesigned website and site visits are tracked through google analytics. 59% of respondents from the Farm to School networking

webinar had a better understanding of NYS F2S efforts because of the webinar. Registration numbers at other events including "Legal Issues and Resources for Small and Mid-Sized Farms" (23 registered) as well as "Assessing Community Food Systems Opportunities: A Tool for Planning and Implementation in Your Community (30 registered) taught participants more about these respective topics.

More detail about this PI and project can be found at:

- <https://hort.cals.cornell.edu/people/anusuya-rangarajan/>
- <http://localfood.cornell.edu/>

VI. National Outcomes and Indicators

1. NIFA Selected Outcomes and Indicators

Childhood Obesity (Outcome 1, Indicator 1.c)	
88451	Number of children and youth who reported eating more of healthy foods.
Climate Change (Outcome 1, Indicator 4)	
0	Number of new crop varieties, animal breeds, and genotypes with climate adaptive traits.
Global Food Security and Hunger (Outcome 1, Indicator 4.a)	
4322	Number of participants adopting best practices and technologies resulting in increased yield, reduced inputs, increased efficiency, increased economic return, and/or conservation of resources.
Global Food Security and Hunger (Outcome 2, Indicator 1)	
0	Number of new or improved innovations developed for food enterprises.
Food Safety (Outcome 1, Indicator 1)	
0	Number of viable technologies developed or modified for the detection and
Sustainable Energy (Outcome 3, Indicator 2)	
0	Number of farmers who adopted a dedicated bioenergy crop
Sustainable Energy (Outcome 3, Indicator 4)	
0	Tons of feedstocks delivered.