1.0 Agriculture and Food Systems

Brief Summary of Program

Our research and education is directed toward improvement of food system as a whole from farm to table. Cooperative Extension (CCE) and applied research programs work together to cover multiple aspects of agriculture and food systems such as soil resources and soil health, crop plant genomics, field evaluation of crops, reliable production guidelines, genetic improvement of animals and animal production, economics of production and farm management, integrated pest management, healthy produce, fruit and vegetable production and storage and facilitation of sustainable agriculture. Education complements research by encouraging farmers to grow new crop varieties and employ new production and business practices, through programs for agriculture sector businesses, and by informing consumers about new or improved food products. Research analysis and education also affect policies to reform governmental food and agriculture related programs.

Cornell University has a commitment to agriculture, horticulture, and natural resources enterprises and assisting them in making informed choices when selecting production principles and practices to enhance economic and environmental sustainability. Cornell offers research and education programming focused on assessing existing and new production and management practices and techniques with special emphasis on both business vitality and agricultural environmental management. As part of our strategy, we emphasize integration of research and extension to accelerate: identification of problems, focusing scientific effort to resolving problems, field-testing and evaluation of technology and cultural practices, and implementation of environmentally superior innovations/practices for the agricultural, horticultural, and natural resource communities.

As a result of our applied research and cooperative extension efforts, farm businesses, horticulturist, and natural resource managers utilize research-based knowledge to continue producing a stable, safe and affordable food, feed, fiber, and fuel supplies and robust, attractive horticultural plants in economically and environmentally sustainable ways.

Situation and Priorities Statement

Agricultural and food industries contribute an estimated $30 billion a year to New York State's economy. Improving production efficiency, quality, and safety of plants and animals in agricultural, horticultural, and natural resource production systems is fundamental to improving our ability to compete in a global economy. Managers of New York's 35,000+ farms, horticultural, and forestry operations face dynamic and complex production environments. Extensive knowledge and skills are needed for identifying, selecting, and adopting principles and practices that optimize production management and improve profitability and sustainability in accordance with business goals. Technologies such as genetic engineering, satellite imagery and GIS, computer aided management decision tools are readily available today for adoption and use. Technical assistance providers have similar needs to remain up-to-date and able to provide appropriate recommendations for each enterprise.

Program priorities include: protecting and enhancing soil resources, crop plant genomics, field evaluation of crops, reliable production guidelines, genetic improvement of animals and animal production, economics of production and farm management, integrated pest management, healthy produce, fruit and vegetable
production and storage, facilitation of sustainable agriculture and analyses of food system policies. Education promotes use or development of new crop varieties and employment of new production and business practices, supports a viable agriculture business sector in the economy and informs consumers about improved food products and how to improve their food security. Promoting understanding of the economic and social roles of agriculture is important to sustainability of the agriculture sector.

Assumptions

- New science is needed for the production and procurement of adequate and acceptable nourishment for the world’s population.
- Tackling the issues of agriculture and food systems requires multidisciplinary, multi-institutional and collaborative research and extension efforts.
- Food system research and education must encompass a broad spectrum of from the study of basic plant and animal genomes, to effective and efficient production, to marketing, distribution and consumption practices, to policies affecting the quality and availability of a secure food supply.
- Integrated systems approaches are needed to expand our understanding of trade-offs and develop BMPs that better address current and future challenges as well as food safety.
- Producers, horticultural business people, and natural resource managers often are not fully aware of or skillful in managing production principles and practices that may help optimize their operations for economic and environmental sustainability and/or business management and development needs.
- Many agricultural/horticultural/natural resources businesses have opportunity to strengthen profitability through improved planning and management.
- There is opportunity for growth in the agricultural/horticultural/natural resources sectors through alternative, new, and value added enterprises which may not be apparent to potential investors.
- The supply and effective management of labor resources is a key to the viability of agricultural/horticultural/natural resources enterprises.
- Producers, horticultural business people, and natural resource managers often are not fully aware of potential environmental impacts of their operations and/or requirements and opportunities of environmental regulations and programs.
- Technical assistance providers relied upon by producers, horticultural business people, and natural resource managers have parallel needs for current information on appropriate production practices.
- In most cases, it is possible to simultaneously meet economic and environmental sustainability goals.

Ultimate Goal(s) of the Program - Boost the sustainable production of safe and nutritious food.

- Improve global capacity to meet growing food demand in spite of changing climate.
- Assure the long-term viability and well-being of the agricultural/horticulture industry and rural communities in New York State.
- Promote economically and environmentally sound products and practices, and safer and healthier products.
- Assist producers, horticulture businesses, and natural resource managers to optimize production management and improve profitability and sustainability in accordance with their goals.
- Increase the use of sustainable practices to result in improved or protected soil, air and water quality and production of high quality and safe food and fiber.
- Improve soil health and productivity, resulting in increased farm profitability and improved environmental quality.
Activities

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

- Capital Area Agriculture and Horticulture Program
- 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 Agriculture
- Northwest NY Dairy, Livestock & Field Crops Program
- Pesticide Management Education Program
- South Central NY Dairy and Field Crops Program

Target Audiences

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.

Output and Outcome Indicators

Highlighted indicators are collected and reported annually. Others are shown in logic model format to demonstrate the progression from typical planned programs (outputs) → skill & knowledge development (near-term) → behavior changes (mid-term) → societal changes (long-term). Staff are expected to use program evaluations to report on selected indicators.
<table>
<thead>
<tr>
<th>Business Management Emphasis</th>
<th>Output Indicators</th>
<th>Near-Term Outcome Indicators</th>
<th>Mid-Term Outcome Indicators</th>
<th>Long-Term Outcome Indicators</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>Number of producers/horticulture/natural resources business persons completing education programs on business management, finance, business planning and marketing, human resource management, risk management, production economics, and business transitions.</td>
<td>Number of participants demonstrating knowledge or skill gains in business management, finance, business planning and marketing, human resource management, risk management, production economics, inter-generational transfer and other business transitions.</td>
<td>(1.1a) Number of participants documented to have applied knowledge or skills gained to strengthen existing business operations.</td>
<td>(1.1c) Number of participants reporting improved agricultural/horticultural business profitability attributed at least in part to program participation.</td>
</tr>
<tr>
<td></td>
<td>Agriculture/Natural Resources Enterprises Labor</td>
<td>(1.2a) Number of participants who demonstrate knowledge gains related to needs of potential employees and/or availability of qualified employees.</td>
<td>(1.2b) Number of participants documented to have made one or more changes in human resources practices to enhance labor availability or retention.</td>
<td>(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.</td>
</tr>
<tr>
<td></td>
<td>Producer Alternatives/New Ventures</td>
<td>Number of participants demonstrating knowledge or skill gains related to expanding profitability, developing marketing options, diversifying or substituting alternative products or enterprises, and/or</td>
<td>(1.3a) Number of participants documented to have adopted innovations in food enterprises including production, allied services, processing, and distribution.</td>
<td>(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.</td>
</tr>
</tbody>
</table>
increase operational efficiencies. and/or increasing operational efficiencies to solve immediate concerns. (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.

<table>
<thead>
<tr>
<th>General Production Practices</th>
<th>Output Indicators</th>
<th>Near-Term Outcome Indicators</th>
<th>Mid-Term Outcome Indicators</th>
<th>Long-Term Outcome Indicators</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Number of producers, horticulture business persons, and/or natural resource managers completing education programs on existing and new production-management practices and techniques.</td>
<td>Number of producers, horticulture business persons, and/or natural resource managers demonstrating knowledge/skill gains in existing/new practices and techniques; improved product handling and storage to maintain quality and food safety; and/or improving production efficiency and/or environmental protection through adoption of best management practices.</td>
<td>(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.</td>
<td>(1.4d) Number of producers or horticulture business persons, reporting increased dollar returns per acre or reduced costs per acre.</td>
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<td></td>
<td>(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.</td>
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<td></td>
<td>(1.4c) Number of technical assistance providers documented to have incorporated current best management practices in their recommendations.</td>
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</tbody>
</table>
### Agricultural Environmental Management

<table>
<thead>
<tr>
<th><strong>Number of producers, horticulture businesses, and/or natural resource enterprise managers completing education programs on potential environmental impacts of practices, requirements and opportunities of environmental regulations and programs, and whole farm systems</strong></th>
<th><strong>(1.5a) Number of producers, horticulture businesses, and/or natural resource managers demonstrating knowledge/skill gains in environmental impacts of practices, environmental regulations and programs, whole farm systems including integrated nutrient management, integrated pest management, waste management, and water protection.</strong></th>
<th><strong>(1.5c) 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.</strong></th>
<th><strong>(1.5d) Number of resource managers reporting reduced environmental concerns for participating enterprises.</strong></th>
</tr>
</thead>
</table>

### External Factors

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 couple of years 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. These trends are expected to continue.
Evaluation Methods

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 provides comprehensive assessment. We work towards this goal by doing two things – professional development to enhance evaluation capacity of our system and looking for program documentation of local, regional and statewide programs.

Evaluation Capacity Building: The CORE Evaluation Capacity-Building project with CCE came to a close at the close of the 2015 fiscal year. CCE staff continue to have full use of the web-based Netway program for program modeling and evaluation planning, and that the Netway includes online training components and resources such as the measures archive. Additional staff training in evaluation planning and practices to meet system wide outcomes will continue.

Regional/Statewide documentation examples. Many of our regional and statewide programs are receiving federal capacity funds. Documentation of outcomes will continue to be a requirement of funding. Results shape future program efforts and impact program design.

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 which includes both qualitative and quantitative data for reporting and helping us to better understand impacts.

In 2016, we will continue to review the national outcome framework and connect it, as possible, to our statewide outcome framework.

Recent Example – from the CCE Cornell Vegetable Program – use of case studies

SUSTAINABLE PEST MANAGEMENT SAVES MONEY FOR HIGH TUNNEL WINTER GREENS PRODUCTION

Many NY vegetable growers are looking for ways to extend their season and provide fresh, locally grown produce to winter CSAs and winter farmers markets. High tunnels are proving to be an excellent way to produce 'off-season' greens crops with little-to-no fossil fuel based heat, contributing to environmental sustainability. These production systems also contribute to economic and social sustainability by creating year-round income and maintaining customer relations during the traditional off-season. For example NYS has now over 180 winter farmers market, with greens from hoop houses given credit in a recent USDA report for this success.

Pest infestations, such as aphids and cabbage worms, restrict the economic potential of these systems. As a grower in south west NY put it "Pest management is so much more important in the winter because your losses are so much more".

This project promoted early fall releases of parasitoids, combined with late fall and winter applications of biorational pesticides, specifically Beauvaria bassiana, a commercialized fungal pathogen of aphids. This project conducted 11 on-farm meetings, 7 formal educational seminars, and 3 professional development events with combined attendance of 516 people. Over 100 farm visits were made by project staff, 6 newsletter articles, Tweets and 1 aphid management factsheet were created.

The project team evaluated adoption and impact on farms contacted through the project.
Case-study farms were recruited in late summer from across New York State. Growers' experience with winter greens ranged from 0-10 years. Twenty-eight farms initiated case-study work with the team project. However, some farms dropped out due to unexpected changes in production schedule, crop failures, etc. Over the 4 years, there were 24 different successful case studies on 20 farms in 11 counties across New York State. Twenty-four winter greens high tunnel growers adopted biological or biorational control methods to manage pests with an average increase in revenue of $2465.13. One survey indicated 61% of increased revenue was attributable to increased awareness and skills in natural pest management.

http://cvp.cce.cornell.edu/greenhouse_tunnels.php
2.0 Climate Change

Brief Summary of Program

In the past decade, Cornell researchers have focused on identifying and quantifying the level of climatic disruption caused by heat-trapping greenhouse gases and the early, measurable impact on weather patterns, geographic bioregions, and living creatures. Now, researchers are exploring the looming challenges, investigating strategies to address expected impacts, and developing new resources to reduce the human "carbon footprint" that adds to greenhouse gas emissions.

Multidisciplinary researchers, educators, and extension faculty - from plant biologists to economists to climatologists - are engaged in three vital areas of exploration for the well-being of future generations:

- Climate science: quantifying the current trend and predicting future impact
- Adaptation: moderating expected damage and identifying potential opportunities
- Mitigation: reducing the human "carbon footprint" to slow the pace of climate change

Situation and Priorities Statement

Climate data for the last 50 years show dramatic changes in temperature and precipitation at the global, national, regional, and state levels. In New York and elsewhere, global climate change is believed responsible for more erratic weather patterns, warmer temperatures, heavier rainfall, lower snow levels, and altered season length with intensifying impact on humans, wildlife, the economy, and the environment. Without action to reduce heat-trapping emissions today, scientists predict that summer in New York will feel like current summer weather in South Carolina by the end of this century.

Cornell researchers have been at the forefront in documenting climate change and its impact in the living world. New York farmers rely on Cornell research to make crucial decisions about controlling pests, applying fertilizer and optimal planting and harvesting times. CALS Integrated Pest Management (IPM) specialists say certain crop pests are arriving weeks earlier than they used to. Scientists are studying the worrisome prospect of potential over-wintering by some pest species that normally die out during the colder months. Scientists have studied the productivity of crop plants and how plants respond to changes in temperature. Water resources issues are closely tied to climate change, including both quantity and quality issues. Higher variability of surface water flows is expected to exacerbate pollution management and mitigation efforts.

Because carbon dioxide emissions are one of the major causes of global climate change, the study of carbon sequestration is a major research emphasis. Cornell researchers are exploring technological solutions to storing excess carbon, bio-manipulative approaches to capturing carbon for use as fuel, and forest management strategies. Linking the science to the economic viability of each strategy is an area in which we have tremendous strength.
Climate change also heightens the importance of research and extension on invasive species. Invasives threaten the function and integrity of ecosystems, native species, and agricultural crops. Climate change opens new environments for invasion. Ecologically sound management of invasive species requires significant improvements in our understanding of the ecological impacts of invasives, as well as the effective management of their populations. Research spanning detection, prediction, and management of invasive species is conducted on plants, aquatic invertebrates, fish and insects.

The impact of these stressors to human habitability is borne disproportionately by the most vulnerable of human populations: the poor, the old and the young. Poor populations have limited resources to adapt to changes and stresses. Older populations are among the most at risk due to decreased mobility, changes in physiology, and more limited access to resources, all of which may limit adaptive capacity. Children, who have been underestimated in roles they might play in disaster preparedness, could face undue burdens in adapting to negative events caused by climate change and need tailored communications related to climate change challenges. Vulnerable populations will face adaptive challenges to their new environments, with potentially far-reaching implications for health as well as for societal strategies to cope with climate change effects at both the population and policy level.

Technical knowledge of climate change issues and mitigation strategies are evolving rapidly and there is much confusion, skepticism and limited climate change literacy across audiences. As climate events increase the need for education around flood control and management, soil conservation, storm water management is increasing. Individuals, businesses and communities are seeking current information in order to be better respond to changing needs.

Assumptions

- New science is needed for the reduction and mitigation of climate change.
- Adaptation to climate change is necessary and must continue, especially for climate-sensitive industries and populations.
- Tackling the issues of climate change requires multidisciplinary, multi-institutional and collaborative research and extension efforts.
- Integrated system approaches are needed to expand our understanding of trade-offs and develop approaches that address current and future challenges of climate change.
- Producers, natural resource managers, community leaders and individuals often are not fully aware of potential environmental impacts of their operations and actions and alternatives that would reduce factors that contribute to climate change.
- Technical assistance providers relied upon by producers, horticultural business people, and natural resource managers have parallel needs for current information on climate change.
- Residential, institutional and business conservation is a critical component in reducing the human carbon footprint.
- Knowledge of the interactions of environmental resources, public health, quality of life, and local economies will lead to an involved, proactive citizenry.
- As incidences of flooding and awareness of climate change increase, there will be a greater general need and request for trusted information about situational and behavioral mitigation.
- Technical assistance providers relied upon by producers, local government, individuals, organizations, and businesses have parallel needs for current information on appropriate production practices, waste management and reduction practices, and water resources management and protection practices.
Ultimate Goal(s) of the Program

- Reduce factors contributing to climate change at the individual, community, industry, and institutional levels.
- Develop an agriculture system that maintains high productivity in the face of climate changes.
- Help producers and communities adapt to changing environments.
- Sustain economic vitality, identify challenges, and take advantage of emerging economic opportunities offered by climate change mitigation technologies.

Activities

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 Institute for Climate Change and Agriculture (ICCA) 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.

- The Cornell Cooperative Extension (CCE) system extends Cornell University’s land-grant programs to citizens all across New York State.

- 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: http://www.nyis.info/ The Mission of the Clearinghouse is to be a gateway for New Yorkers to access timely, accurate scientific and policy information to assist them in making informed decisions about preventing, eradicating, controlling and managing invasive species in New York State and to focus attention on the need for invasive species prevention, eradication and management in New York. The Clearinghouse also provides
information on upcoming invasive species events and invasive species news of interest to New Yorkers. The Clearinghouse has subsumed the National Aquatic Nuisance Species Clearinghouse and its Aquatic Invasive Species Database and has formed linkages with the New York Invasive Species Database (iMapInvasives), the New York Invasive Species Research Institute at Cornell, and numerous State and Federal agency invasive species programs. The Clearinghouse works closely with the State’s eight PRISMs (Partnerships for Regional Invasive Species Management - see navigation bar PRISM tab) to support them in their invasive species activities.

- **Master Watershed Stewards Program** [http://dnr.cornell.edu/outreach/watershedsteward/](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.

- **Stormwater Management** [http://www.clrp.cornell.edu/workshops/stormwater.html](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.

- **New York State Water Resources Institute (WRI)** [http://wri.cals.cornell.edu/about/](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.

### Target Audiences

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.

### Output and Outcome Indicators

Highlighted indicators are collected and reported annually. Others are shown in logic model format to demonstrate the progression from typical planned programs (outputs) → skill & knowledge development (near-term) → behavior changes (mid-term) → societal changes (long-term). Staff are expected to use program evaluations report on selected indicators.

#### 2.1 Climate Change and Producers/Organizations/Businesses

<table>
<thead>
<tr>
<th>Output Indicators</th>
<th>Near-Term Outcome Indicators</th>
<th>Mid-Term Outcome Indicators</th>
<th>Long-Term Outcome Indicators</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of agricultural/natural resources producers, and/or organization and business representatives completing educational programs on the causes and implications of climate change and adaptive or mitigating strategies.</td>
<td><strong>(2.1a)</strong> 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 effects enhancing economic viability.</td>
<td><strong>(2.1b)</strong> Number of agricultural/ natural resources producers, organization and business representatives documented to have adopted recommended adaptation strategies for production agriculture and natural</td>
<td>Number of communities adapting successfully</td>
</tr>
</tbody>
</table>
implications of climate change and adaptive or mitigating strategies.

resources management, including invasive species, pest management, pollutant loads, wetlands, emergency preparedness etc.

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

to climate change effects.

<table>
<thead>
<tr>
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<th>Mid-Term Outcome Indicators</th>
<th>Long-Term Outcome Indicators</th>
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</thead>
<tbody>
<tr>
<td>Number of agricultural/natural resources producers, and/or organization and business representatives completing educational programs on managing water resources and/or environmental planning.</td>
<td>Number of consumers, residents, agricultural/natural resources producers, organization and business representatives, and/or local government and community leaders who demonstrate knowledge gains about managing water resources.</td>
<td>(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.</td>
<td>(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.</td>
</tr>
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</table>

2.7 Biodiversity and Natural Resources Protection and Producers/Organizations/Businesses

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<tr>
<th>Output Indicators</th>
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<th>Long-Term Outcome Indicators</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of agricultural/ natural resources producers, and/or organization and business representatives completing educational programs on managing natural resources, invasive</td>
<td>Number of consumers, residents, agricultural/ natural resources producers, organization and business representatives, and/or local government and community leaders</td>
<td>(2.3a) Number of consumers, residents, agricultural/ natural resources producers, organization and business representatives, and/or local government and community leaders</td>
<td>Number of documented instances in which implementation of natural resources management practices by consumers, residents, agricultural/ natural resources producers, organization and business representatives, and/or local government and</td>
</tr>
</tbody>
</table>
species, and/or biodiversity.

| who demonstrate knowledge gains about managing natural resources, invasive species, and/or biodiversity. | documented to have modified existing practices or technologies and/or adopted new practices to protect/enhance natural resources and/or enhance biodiversity. | community leaders lead to increased open space preservation, enhanced/protected natural resources, biodiversity, land use. |

External Factors

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 continues to elevate consumer and community interest in disaster preparedness and water quality protection for families, communities and farms. The shift in interest, program offerings and campus and research support is evident. These trends are expected to continue.

Evaluation Methods

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 provides comprehensive assessment. We work towards this goal by doing two things – professional development to enhance evaluation capacity of our system and looking for program documentation of local, regional and statewide programs.

Evaluation Capacity Building: The CORE Evaluation Capacity-Building project with CCE came to a close at the close of the 2015 fiscal year. CCE staff continue to have full use of the web-based Netway program for program modeling and evaluation planning, and that the Netway includes online training components and resources such as the measures archive. Additional staff training in evaluation planning and practices to meet system wide outcomes will continue.

Regional/Statewide documentation examples. Many of our regional and statewide programs are receiving federal capacity funds. Documentation of outcomes will continue to be a requirement of funding. Results shape future program efforts and impact program design.

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 which includes both qualitative and quantitative data for reporting and helping us to better understand impacts.

In 2016, we will continue to review the national outcome framework and connect it, as possible, to our statewide outcome framework.
3.0 Environment and Natural Resources and Sustainable Energy

Brief Summary of Program

This planned program is intended to develop and maintain connections between applied research and Cornell Cooperative Extension (CCE) programs focused on natural resources conservation/protection and sustainable energy education that work toward long term planning for sustainable energy and proper use of natural resources.

Programs in this plan reach varied audiences, addressing agricultural and natural resource producers, community decision makers, businesses, organizations, and individual consumers. The planned program includes applied research and education on natural resources management, inventory and mapping methods; habitat; solid waste management, outreach practices, and sustainable energy.

The outcomes of this plan are for individuals, families, communities, farmers, and businesses to make economically viable, sustainability-based decisions with the help of readily available research based education.

Situation and Priorities Statement

This planned program includes applied research and Cornell Cooperative Extension efforts related to bio/alternative energy, consumer energy conservation waste management and natural resource conservation.

Sustainable Energy: With some of the highest energy costs in the nation, New York residents, businesses, and organizations need current information and decision-making criteria and approaches for energy supply alternatives and practical energy conservation and cost-saving measures to maintain financial security and vitality. Additionally, with more than 1 million acres of viable and non-food producing land available for production of biomass, and organic waste streams from dairy farms and concentrated urban areas, New York has multiple resource streams to contribute to the small, distributive renewable energy systems that are considered a vital part of forward-looking national energy policy. Producers and community leaders are hungry for information on viable renewable energy production and strategies to promote energy conservation, while farmers, forest owners and agricultural producers are eager to explore new markets.

Our sustainable energy program has two broad emphases: energy and agriculture and consumer and community energy resources. The agriculture program addresses NIFA priorities related to the goal of energy independence, development of biomass for bioenergy, design of optimum forestry and crops for bioenergy production, and production of value-added bio-based industrial products. The program also addresses energy conservation through agricultural applications of additional energy alternatives such as wood and grass pellet fuel production, recycling of vegetable oils as biodiesel, wind and solar energy production. Conversion of corn to ethanol, wind energy and hydro power are currently driving alternative energy systems in the U.S. longer-term, grasses and/or wood products may provide a substantial source of cellulosic ethanol and other bioenergy to meet the world’s energy needs. We have research strengths to pursue these opportunities and the agricultural and forestry resources to contribute substantively to energy production.

Waste Management: With a wide range of waste producers, including individuals, agriculture, industry, and government, New York residents, agricultural producers, businesses/industry, and governments
need current information and solutions on techniques for managing waste, reducing waste at the source, minimizing energy use and costs, and managing the risk and environmental inequities resulting from waste generation and disposal practices.

**Environment & Natural Resources:** New York residents rely on a wide variety of natural resources including forested mountains; aquatic environments (wetlands, marshes, estuaries, streams and lakes); and an accompanying diversity of plant and animal species, for recreation, tourism, and raw products. Agricultural and natural resource producers, community decision makers, businesses, organizations, and individual consumers need current information on good management practices, alternative land uses, protection of open space, and development of environmentally-sustainable natural resource-based businesses. Communities need education targeted to their specific concerns, including the interaction of natural resources, the environment, and the economy.

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**Assumptions**

- The environment and natural resource require protecting and in some cases citizen action for remediation.
- Producers, local government, individuals, organizations, and businesses often are not fully aware of potential environmental impacts of their operations and/or requirements and opportunities of environmental regulations and programs.
- Knowledge of the interactions of environmental resources, public health, quality of life, and local economies will lead to an involved, proactive citizenry.
- It is possible to simultaneously meet economic and environmental sustainability goals; a sustainable, healthy economy depends on a healthy environment.
- There are new and renewed opportunities for locally owned energy production.
- Small distributive energy systems may be more economically feasible given biomass characteristics than large-scale production and may have other benefits in terms of local economics and energy security.
- Energy expenditures on local or in-state owned production alternatives stay in the state and local economies to the betterment of residents.
- Reduction of energy use provides cost savings to businesses and may retain dollars in the state and local economies.
- Significant barriers to the widespread adoption of renewable energy technologies—economic, environmental, social, logistic and physical—can be overcome with dedicated research and extension.
- As a major energy consumer, New York can contribute substantively to energy independence through energy conservation and adoption of renewable energy sources.
- Producers, local governments, individuals, organizations, and businesses and industry often are not fully aware of potential environmental impacts of their operations and/or requirements and opportunities of environmental regulations and programs.
- Technical assistance providers relied upon by producers, local governments, individuals, organizations, and businesses and industry have parallel needs for current information on appropriate waste management and reduction practices.
- Increased adoption of “clean” renewable energy technologies will help mitigate the threat of climate change.
- We need an energy literate public to move forward responsibly.

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**Ultimate Goals of the program**
- Healthy ecosystems
- Youth, families, communities, farms, businesses that engage in long term planning for proper use of natural resources, sustainable energy, and environmental priorities.
- Natural resources that are protected and available for multiple uses, including agroforestry, fishing, recreation, agriculture, recreation, tourism, and other businesses/industry.
- The economic vitality of agricultural/natural resources and other businesses is improved, the health of individuals and families are enhanced, and local government operations are made more sustainable through the availability of high quality natural resources.
- Improved waste management and waste reduction efforts will result in an enhanced and protected environment, including soil, air, and water, and reduced risk for individuals and families.
- New York State becomes a leader in pursuing the national goal of energy independence.
- Use of locally produced and owned energy sources and/or lower cost external sources retains energy dollars within the local and state economy providing enhanced economic well-being.
- The economic vitality of agriculture/horticulture/natural resource and supporting businesses, and the financial security of individuals and families are enhanced and local government operations made more sustainable through reduced energy costs.
- Improved waste management and waste reduction efforts will result in an enhanced and protected environment, including improved soil, air, and water quality, and reduced risk for individuals and families.
- The economic vitality of agriculture/horticulture/natural resources and other businesses is improved, the health of individuals and families is enhanced, and local government operations are made more sustainable through waste reduction and economical and safe management of waste.

Activities

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: 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
- Private Forest Stewardship Program
- Recycling Ag Plastics
- Save Energy, Save Dollars
- Urban Forestry
Target Audiences

- Key audiences served, directly and indirectly include: agricultural and natural resource producers; consumers and property owners, businesses and organizations, teachers, youth professionals and volunteers, 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. 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.

Output and Outcome Indicators

Highlighted indicators are collected annually. Highlighted indicators are collected and reported annually. Others are shown in logic model format to demonstrate the progression from typical planned programs (outputs) → skill & knowledge development (near-term) → behavior changes (mid-term) → societal changes (long-term). Staff are expected to use program evaluations report on selected indicators.
### 3.1 Bioenergy

<table>
<thead>
<tr>
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<th>Long-Term Outcome Indicators</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of agricultural producers and agribusiness representatives completing educational programs on the potential for development of biologically-based fuels.</td>
<td>Number of agricultural producers, agribusiness, or local and state leaders who demonstrate knowledge gains about the potential for development of biologically-based fuels.</td>
<td>(3.1a) Number of producers, economic development organizations and other groups who collaborate to establish bioenergy as a viable alternative crop.</td>
<td>(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.</td>
</tr>
<tr>
<td>Number of local and state leaders completing educational programs on the potential for development of biologically-based fuels such as biodiesel, ethanol, methane, recycled vegetable oils, space heating fuels etc.</td>
<td>Number of forest owners and purchasers of forest products who demonstrate knowledge or skills gains about current markets for firewood and chips/pellets and associated cropping practices.</td>
<td>(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.</td>
<td></td>
</tr>
<tr>
<td>Number of agricultural producers and agribusiness, and natural resource business representatives completing educational programs about cropping for bioenergy production.</td>
<td></td>
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</tbody>
</table>

### 3.2 Producer Energy Alternatives/ Conservation

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<th>Long-Term Outcome Indicators</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of agricultural/horticulture/natural resource and supporting business representatives completing educational programs about the availability and pros and cons of alternative energy sources and/or about potential energy savings in operations.</td>
<td>Number of agricultural/horticulture/natural resource and supporting businesses who demonstrate knowledge or skills gains about the availability and pros and cons of alternative energy sources and/or potential energy savings in operations.</td>
<td>(3.2a) Number of agricultural/horticultural/natural resource businesses documented to have adopted appropriate alternative energy sources and/or energy conservation practices.</td>
<td>(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.</td>
</tr>
</tbody>
</table>
### 3.3 Consumer Energy Alternatives

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<tr>
<th>Output Indicators</th>
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<th>Mid-Term Outcome Indicators</th>
<th>Long-Term Outcome Indicators</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of consumers and community leaders completing educational programs about the availability and pros and cons of alternative energy.</td>
<td>Number of consumers and/or community leaders who demonstrate knowledge or skills gains about the availability and pros and cons of alternative energy sources especially related to housing and transportation.</td>
<td><em>(3.3a)</em> Number of consumers documented to have adopted appropriate alternative energy sources.</td>
<td><em>(3.3b)</em> Number of consumers who report savings on energy costs attributable to adopting alternative energy sources.</td>
</tr>
</tbody>
</table>

### 3.4 Consumer Energy Costs

<table>
<thead>
<tr>
<th>Output Indicators</th>
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<th>Mid-Term Outcome Indicators</th>
<th>Long-Term Outcome Indicators</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of consumers, property managers, and/or housing officials completing educational programs about potential energy cost savings, including selecting energy providers, and energy conservation strategies and measures especially related to housing and transportation.</td>
<td>Number of consumers, property managers, and/or housing officials who demonstrate knowledge or skills gains and/or can articulate specific actions they will take related to energy cost controls and conservation measures especially related to housing and transportation.</td>
<td><em>(3.4a)</em> Number of consumers reporting to have adopted appropriate energy cost control and/or conservation practices.</td>
<td><em>(3.4c)</em> Number of consumers who report savings on energy costs attributable to adopting energy conservation measures.</td>
</tr>
<tr>
<td></td>
<td></td>
<td><em>(3.4b)</em> 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.</td>
<td></td>
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</tbody>
</table>

### 3.5 Community Energy Planning

<table>
<thead>
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<th>Long-Term Outcome Indicators</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of community members, leaders and officials completing education programs about the relationships between development patterns and energy use/costs. Number of workforce professionals, economic developers and/or entrepreneurs participating in educational programs on energy workforce and business opportunities.</td>
<td>Number of community members, leaders and officials who demonstrate knowledge gains about the relationships between development patterns and energy use/costs. Number of workforce professionals, economic developers and/or entrepreneurs demonstrating knowledge gains related to energy workforce and business opportunities. Number of municipalities that demonstrate knowledge gains about</td>
<td><em>(3.5a)</em> Number of communities documented to have assessed local energy development proposals and/or the relationships between current policies and regulations and energy conservation.</td>
<td><em>(3.5d)</em> Number of communities documented to have established or modified land use and development policies to promote energy conservation.</td>
</tr>
<tr>
<td></td>
<td></td>
<td><em>(3.5b)</em> Number of community agencies/organizations documented to have adopted appropriate alternative energy sources.</td>
<td><em>(3.5e)</em> Number of community agencies/organizations reporting savings on energy costs attributable</td>
</tr>
</tbody>
</table>

*(3.3a) Number of consumers who report savings on energy costs attributable to adopting alternative energy sources.*
| Number municipalities involved in energy literacy trainings. | systems approaches to energy transitions. | 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. | to adopting alternative energy sources. Number of communities that report increased diversification of their local economies attributable at least in part to participation in the program. |

### 3.6 Waste Management and Energy

<table>
<thead>
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<th>Long-Term Outcome Indicators</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of agricultural/natural resources producers, organization and business representatives, community leaders, and/or residents completing educational programs on managing and reducing waste</td>
<td>(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</td>
<td>(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.</td>
<td>(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.</td>
</tr>
</tbody>
</table>

### 3.7 Environment & Natural Resources

<table>
<thead>
<tr>
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</tr>
</thead>
<tbody>
<tr>
<td>Number of participants completing educational programs featuring natural resources management and the environment.</td>
<td>Number of agricultural/natural resources producers, organization and business representatives, community leaders, and/or residents who demonstrate knowledge gains that reflect a new appreciation for natural resources management and the environment.</td>
<td>(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.</td>
<td>Number of instances documented showing evidence of long term planning goals for natural resources or environmental management. Number of instances where enhanced quality of life/ecosystem indicators are observed as the end result of intentional planned programs. Number of policy changes or documented community action to protect, enhance or mitigate natural resources occurring as the result of intentional planned programs.</td>
</tr>
</tbody>
</table>
External Factors

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. Dramatic cuts in state funding for consumer energy education is a significant barrier. Public and private funders and CCE may have fewer fiscal resources and other resources to devote to energy and natural resource protection matters. These trends are expected to continue.

Evaluation

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 provides comprehensive assessment. We work towards this goal by doing two things – professional development to enhance evaluation capacity of our system and looking for program documentation of local, regional and statewide programs.

Evaluation Capacity Building: The CORE Evaluation Capacity-Building project with CCE came to a close at the close of the 2015 fiscal year. CCE staff continue to have full use of the web-based Netway program for program modeling and evaluation planning, and that the Netway includes online training components and resources such as the measures archive. Additional staff training in evaluation planning and practices to meet system wide outcomes will continue.

Regional/Statewide documentation examples. Many of our regional and statewide programs are receiving federal capacity funds. Documentation of outcomes will continue to be a requirement of funding. Results shape future program efforts and impact program design.

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 which includes both qualitative and quantitative data for reporting and helping us to better understand impacts.

In 2016, we will continue to review the national outcome framework and connect it, as possible, to our statewide outcome framework.

Recent Example – from the ForestConnect Program – use of pre-post survey

AGROFORESTRY-SILVOPASTURE

Silvopasturing is the deliberate and intensive integration of livestock in wooded pastures or pasturized woodlands. Silvopasturing uses rotational intensive grazing, and trees are managed through planting into pastures or thinning to retain low densities of high quality trees. Forest regeneration requires additional attention to prevent damage by livestock. Cooperative Extension programs on silvopasture can improve livestock producer profits, reduce environmental impacts of livestock, and improve the growth and productivity of farm woodlots.
Two day-long silvopasture workshops were offered for woodlot owners, foresters, graziers, and agency staff. There were 44 participants from NY, PA, CT, WV, VT, and NH. They owned or managed more than 235,000 acres each year. Before these workshops, participants indicated they had a moderate understanding of the definition of silvopasture (3.2/5.0 scale) recognized they had not been practicing silvopasture (2.1/5.0 scale). After the workshops, awareness of the definition increased (4.5/5), participants understood the principles (4.4/5.0), could articulate the activities necessary to begin a silvopasture system (4.0/5.0) and felt that silvopasture had good potential in the Northeast (3.5/5.0). The primary barriers to implementation of silvopasture practices were knowledge of the more complex integration of forest, forage, and livestock; the added time and labor requirement to implement the system, access to technical assistance, and the cost for implementation. The silvopasture social media site http://silvopasture.ning.com was developed to connect those interested in silvopasture. There are 162 members from Arkansas, California, Connecticut, Florida, Illinois, Indiana, Maryland, Massachusetts, Missouri, Nebraska, New Hampshire, New York, North Carolina, Pennsylvania, Rhode Island, Vermont, Virginia plus Australia and the Philippines. This site includes blogs, a forum, pictures, events, and links to resources. The development of a comprehensive statewide and regional program is underway. A professional development grant has been developed and submitted.

http://silvopasture.ning.com
4.0 Nutrition, Food Safety & Security, and Obesity Prevention

Brief Summary of Program
Programs that are framed by this plan include research and extension linked to childhood obesity; youth, family and community nutrition; food security and food safety.

Childhood Obesity Prevention: Childhood obesity prevention research and education are based on an ecological approach, focusing on individuals and their interactions among the multiple environments that surround them. This approach recognizes that there are inherent multiple levels of influence that affect a child’s body weight. Research topics include nutrition and hunger, nutrition education and behavior, built and natural environments, food psychology, physical activity promotion, and child nutrition in low wage working families.

Cornell Cooperative Extension (CCE) programs are designed to 1) connect research and practice, 2) result in behavior change, 3) build on the strengths of families and youth, 4) develop strong collaborations resulting in community changes for optimal health promotion and 5) provide policymakers with the knowledge to develop appropriate policies to promote healthy lifestyles. Extension programs target children, families and the community at large, with an emphasis on low-income audiences. The programs are collaborative and work directly with key community organizations.

Food Security: CCE programs address access to food, certainty of availability and access to food, sufficiency of food, social and cultural acceptability of food, and nutritional quality and safety of food. Work in this program area ties well with our work in agriculture, and youth, families and communities.

Food Safety: Cornell's statewide food safety research and education program serves a broad constituency including food producers, processors and retailers, as well as consumers and research scientists. The program encompasses the National Institute of Food and Agriculture food safety components: investigating causes of microbiological contamination and microbiological resistance; educating producers, consumers and food safety professionals; and developing food processing and storage technologies.

Programs are developed and delivered through many channels, including workshops, webinars, research-based publications and ongoing, technical support for constituents, policy makers and regulators.

For example, National Good Agricultural Practices Program based on the Department of Food Science at Cornell University provides growers, packing house operators, government officials and industry trade association personnel with information and strategies to protect consumer health and reduce hazards and risks in the production of fresh fruits and vegetables. National GAPs Program personnel have written and developed 12 nationally recognized, multi-lingual educational materials through collaboration with research and extension faculty at 33 Land Grant Universities, the United States Department of Agriculture, and the Food and Drug Administration. The National GAPs Program has distributed over 250,000 copies of these materials to all 50 states including territories.
such as Puerto Rico as well as internationally. These materials were developed in response to needs identified by stakeholders.

Consumer education programs focus on safe handling and preparation of foods, conveying important practices in preventing illness along with avoiding food cross-contamination. Programs target low-income adults, 4-H and other youth.

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**Situation and Priorities Statement**

**Nutrition and Obesity Prevention:** Roughly one-fifth of children and adolescents in the United States are obese and over one-third are either overweight or obese. Children and adolescents who are obese are likely to be obese as adults and have a greater risk for health problems that are placing a major strain on the U.S. health system and economy. Obesity is positively correlated with increased risk of chronic diseases such as cardiovascular disease, diabetes, stroke, hypertension, and some forms of cancer. An estimated 70% of overweight young people have at least one additional risk factor for heart disease, such as high cholesterol or high blood pressure. There is an increasing frequency of type 2 diabetes in children, even pre-adolescent children. Obese children are at greater risk for bone and joint problems, sleep apnea, and social and psychological problems such as stigmatization and poor self-esteem.

Factors contributing to obesity in children include unhealthy dietary behaviors such as high consumption of sweetened beverages; low fruit, vegetable and dairy consumption; and limited physical activity. Healthy lifestyle habits, including healthy eating and physical activity, can lower the risk of becoming overweight and developing diseases associated with increased obesity. Food insecurity and obesity or overweight can exist at the same time. This necessitates addressing hunger issues for some populations within programs on childhood obesity.

Food insecurity, refers to sustained access at all times to food adequate in quantity and quality to maintain a healthy life in socially acceptable ways. Hunger is the uneasy or painful sensation caused by a lack of food, and is a potential although not necessary, consequence of food insecurity.
insecurity. Having enough calories is not sufficient to assure nutritional adequacy. Foods available may not provide essential nutrients for health. Called “hidden hunger,” this type of malnutrition affects more than 3 billion people in developing countries. In developed countries, the problem of overweight may be characterized by high caloric consumption but inadequate levels of important nutrients. It is a priority of this plan to work with vulnerable populations to educate families and influence policies that will allow youth, families and communities to make sound nutritional decisions on a tight budget.

Food Safety: The food supply must be safe to ensure a healthy, well-nourished population. While the United States has one of the safest food supplies in the world, foodborne illness occurs and has a significant impact on both the health of Americans and the economy. By some estimates, foodborne illnesses cost the United States $77.7 billion annually in health care and other losses. Center for Disease Control compiled data indicate that known pathogens account for an estimated 48 million illnesses, 128,000 hospitalizations, and 3,000 deaths annually. An untold number of foodborne illnesses go unreported because people may not seek medical attention and because of varying capabilities of local and state health departments to collect and report incidences. Food contamination also affects the viability of firms in the food system, from small, to regional to international companies. Safety from farm to retail and then in the home can be improved through research, education and training that results in better practices that reduce contamination risks.

A variety of good agricultural and manufacturing practices can reduce the spread of microorganisms throughout the food system, farm to fork. This encompasses training of farmers, wholesalers, processors, retailers and consumers, areas where Cornell University has active research and training programs. Beginning at the farm level, both the National Good Agricultural Practices (GAPs) Program and the Produce Safety Alliance provide education and extension produce safety training programs for farmers statewide and nationally through both in-person and online delivery. Faculty in the Department of Food Science also provide Juice HACCP training for entities who are interested in juice production. The Northeast Center for Food Entrepreneurship (NECFE) offers safety and stability evaluation of food products in order to comply with state and federal regulation and to optimize product parameters such as shelf life for consumer use. The NECFE offers Better Process Control School to satisfy FDA requirements for the safe production of shelf-stable acidified (pickled) foods. The NECFE is currently working with restaurants to ensure the safety of sous vide processes which enable production flexibility, as well as ongoing work with over 700 New York State entities annually.

Assumptions

Childhood Obesity/Obesity

- Childhood overweight and obesity is best addressed ecologically through support of integrated community and family systems. These systems are necessary to promote improved eating and physical activity behaviors of New York State children and to reduce the prevalence of childhood obesity.

- The National Institute of Food and Agriculture supports childhood obesity research and education programs on affordable and available nutritious foods and guidance for individuals and families enabling science-based decisions about health and well-being.

- In New York State, research on the etiology of obesity and chronic disease is applied by CCE to locally based nutrition and wellness education developed in partnership with families, youth, and other community-based individuals and groups including nutrition and health practitioners.
• Research from Cornell and other academic institutions is applied to CCE programs promoting healthful and secure community food systems to address childhood obesity. Neighborhood and community resources complement federal, state, and local government support to implement this outreach.

Food Safety

• Food safety can be increased by improving: agricultural practices before harvest; how foods are processed, stored and marketed and how foods are handled and served in the home and commercially.
• Increasing understanding about regulations contained with the Food Safety Modernization Act will increase constituent ability to meet regulatory requirements to ensure farm and company viability.
• Policies and practices across the food system affect the safety of foods and can be improved through education and training.
• Community, federal, state, and local government support will be provided to implement extension outreach.

Ultimate Goals of Program

• Affordable, available, safe and nutritious foods.
• Food, nutrition, and physical activity knowledge and skills necessary for people to make choices consistent with a healthy lifestyle.
• Food and activity environments that support healthful eating and active living.
• Improved food safety and food-handling practices throughout the food system.
• Reduced incidence of food-borne illnesses.
• Improved community food security and healthful food-choice options.

Activities

Programs for children and youth are delivered through a variety of settings: 4-H camps, clubs, fairs and afterschool as well as through child-parent/grandparent involvement projects and in-school student education. Family-focused programs promote a positive parent/care-giver/child feeding relationship and an understanding of age appropriate nutrition and physical activity. Extension staff collaborate with community leaders to improve the local 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.

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.
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 (CHFFFF)
- Choose Health at 4-H Camps
- Choose Health Officers (CHO)
- Cornell Healthy After School Self-Assessment (CHASE)
- Cornell Farm to School Research and Extension Program
- Cornell NutritionWorks Online Professional Development Program
- Creating Healthy Places to Live, Work, and Play
- Expanded Food and Nutrition Education Program (EFNEP)
- Families Growing Together for Healthy Living
- Farmers Market Nutrition Program
- National GAPs Program Online Produce Safety Course
- Produce Safety Alliance Grower and Train-the-Trainer Programs
- Supplemental Nutrition Assistance Program Education (SNAP-Ed)/ Eat Smart New York (ESNY)
- Youth Healthy Eating and Active Living Program Work Team (YHEAL PWT)

Target Audiences

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; caregivers, nutritionists, 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.

Output and Outcome Indicators

Highlighted indicators are collected annually. Others are shown in logic model format to demonstrate the progression from typical planned programs (outputs) → skill & knowledge development (near-term) → behavior changes (mid-term) → societal changes (long-term). Staff are expected to use program evaluations report on selected indicators.

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<tbody>
<tr>
<td>Number children, youth, parents/caregivers and other adults</td>
<td><strong>(4.1a) Number of children and youth who demonstrate knowledge or skill</strong></td>
<td><strong>(4.1c) Number of youth program participants documented to</strong></td>
<td>Number of vulnerable children and youth documented to</td>
</tr>
</tbody>
</table>
reached via healthy eating and active living programs

Number of women and health providers completing education programs addressing healthy weight gain during pregnancy and breastfeeding

Number of extension educators and/or volunteers participating in training programs to enhance obesity prevention educational opportunities for children and youth, and adults who care for them

- Number of women and health providers completing education programs addressing healthy weight gain during pregnancy and breastfeeding
- Number of extension educators and/or volunteers participating in training programs to enhance obesity prevention educational opportunities for children and youth, and adults who care for them

4.2 Food Resource Management

<table>
<thead>
<tr>
<th>Output Indicators</th>
<th>Near-Term Outcome Indicators</th>
<th>Mid-Term Outcome Indicators</th>
<th>Long-Term Outcome Indicators</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of program participants reached to improve their food resource management and food security</td>
<td>Number of program participants who demonstrate knowledge or skill gains related to food resource management and food security</td>
<td>(4.2a) Number of program participants who adopt food resource management and/or food security practices</td>
<td>(4.2b) Number of program participants documented to have improved food resource management and/or food security</td>
</tr>
</tbody>
</table>

4.3 Decision Makers/Policy Education

have applied healthy eating and/or active living, recommendations

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

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

Number of extension educators and/or volunteers demonstrating increased knowledge or skill gains related to healthy weight gain during pregnancy and breastfeeding

Number of extension educators and/or volunteers demonstrating increased knowledge or skill gains related to healthy eating and active living programs for obesity prevention

Number of extension educators and/or volunteers reporting increased delivery of healthy living-related programs.

have reduced incidence of overweight and obesity as a result of participating in relevant educational programs.

Number of adult program participants documented to have reduced one or more chronic disease indicators associated with overweight.
## 4.4 Food Security and Hunger

<table>
<thead>
<tr>
<th>Output Indicators</th>
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<th>Mid-Term Outcome Indicators</th>
<th>Long-Term Outcome Indicators</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of children, youth, and adults completing education programs on: identifying food insecurity, how to obtain food assistance, how to balancing available resources by planning food choices, and improve the sufficiency and quality of the diet. Number of policy makers and citizens participating in education programs on status of food security in their communities and possible actions to promote increased food security.</td>
<td>Number of program participants who demonstrate knowledge or skill gains related to status of food security in their communities and possible actions to promote increased food security.</td>
<td>(4.4a) Number of program participants who have acted to improve their food security status. (4.4b) Number of community action plans implemented as a result of community based assessment.</td>
<td>(4.4c) Number of individuals or households documented to have improved food security status. Number of participating communities reporting declines in food insecurity indicators.</td>
</tr>
<tr>
<td>Output Indicators</td>
<td>Near-Term Outcome Indicators</td>
<td>Mid-Term Outcome Indicators</td>
<td>Long-Term Outcome Indicators</td>
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</tr>
<tr>
<td><strong>4.5 Food Safety and Consumers</strong></td>
<td></td>
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<td></td>
</tr>
<tr>
<td>Number of consumers participating in programs on: reducing food safety and/or food borne risks and illnesses including recommended purchasing, handling, storage, and preparation practices.</td>
<td>(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.</td>
<td>(4.5b) Number of consumers documented to have implemented new and/or increased application of ongoing safe food purchasing, handling, storage, and preparation practices.</td>
<td>Number of consumers who reduced incidence of foodborne illness among program participants. (no target).</td>
</tr>
<tr>
<td><strong>4.6 Food Safety and Producers/Processors/Retailers/Food Service Providers</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Number of producers/processors/food service providers participating in programs on: reducing food safety and/or food borne risks and illnesses including recommended production, processing, storage, handling, marketing, and preparation practices.</td>
<td>Number of producers/processors/food service providers who demonstrate knowledge or skill gains related to reducing food safety and/or foodborne risks and illnesses including recommended production, processing, storage, handling, marketing, and preparation practices.</td>
<td>(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.</td>
<td>Number of producers/processors/retailers/food service providers who improved safety of foods available through wholesale and retail outlets and institutional foods.</td>
</tr>
<tr>
<td><strong>4.7 Food Safety and Decision Makers</strong></td>
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<td></td>
</tr>
</tbody>
</table>
## Output Indicators

<table>
<thead>
<tr>
<th>Near-Term Outcome Indicators</th>
<th>Mid-Term Outcome Indicators</th>
<th>Long-Term Outcome Indicators</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of food safety decision-makers, policy makers and other officials reached with science-based information to improve food safety practices and policies.</td>
<td>(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.</td>
<td>(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.</td>
</tr>
</tbody>
</table>

## External Factors

The scope and scale of outcomes is greatly enhanced by augmenting Federal Formula Funds with external sources of support. However, external grant funds may only support certain activities or aspects of this plan. Local governments, an important funder for local extension staff, face diminished revenues and increased mandated costs outside of the non-mandated extension programs. Thus having professionals available to implement new research-based programming is not always possible.

A very slow recovery from the recession and pockets of high unemployment in the state affect how public and private funds are allocated to educational activities. In some instances, family subsistence will be a higher priority than improved nutrition and physical activity behaviors, or improved access to healthy food and activity opportunities. As an example of the latter, in New York State, cost cutting proposals include closing some public parks and reducing recreational physical activity programs. In addition, some decision-makers and others in the community may not agree with all aspects of an ecological approach to childhood obesity prevention. They may disagree with community or institutional policy changes such as eliminating non-nutritious snacks from after school activities and place all responsibility on the individual and the family, disregarding environmental influences outside the family.

In 2014, the NYS Office of Temporary and Disability Assistance released an RFA to competitively fund SNAP-Ed. Previously about half the state SNAP-Ed funding had supported CCE programs on a non-competitive basis. Seven regions across the state outside of NYC received awards and will continue to deliver SNAP-Ed programming. However, the approach has shifted dramatically in two ways: (1) The focus has shifted to include major efforts to address policy, systems and environmental approaches. Direct education of participants is still required but at a reduced effort. (2) Educators must have degrees in nutrition, public health, or health education and we are no longer able to employ paraprofessional nutrition educators to conduct nutrition programming.
Produce safety training programs are supported almost entirely through external, federal funds. Genesee Valley Regional Marketing Authority has provided some statewide funding for grower training but most comes from grants such as those offered by Risk Management Agency and cooperative agreement funding for the Food and Drug Administration and the United States Department of Agriculture and Markets.

**Evaluation Methods**

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 provides comprehensive assessment. We work towards this goal by doing two things – professional development to enhance evaluation capacity of our system and looking for program documentation of local, regional and statewide programs.

**Evaluation Capacity Building**: The CORE Evaluation Capacity-Building project with CCE came to a close at the close of the 2015 fiscal year. CCE staff continue to have full use of the web-based Netway program for program modeling and evaluation planning, and that the Netway includes online training components and resources such as the measures archive. Additional staff training in evaluation planning and practices to meet system wide outcomes will continue.

**Regional/Statewide documentation examples**: Many of our regional and statewide programs are receiving federal capacity funds. Documentation of outcomes will continue to be a requirement of funding. Results shape future program efforts and impact program design.

**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 which includes both qualitative and quantitative data for reporting and helping us to better understand impacts. In 2016, we will continue to review the national outcome framework and connect it, as possible, to our statewide outcome framework.

**Recent Example – from Good Agricultural Practices (GAPs) Training and Implementation – use of mid-event and post-event survey and follow-up event survey**

New York has had an active GAPs training program for produce farmers since 1999, but as with research and technology, our training evolved to meet growers’ needs for having a farm food safety plan. Developing a written farm food safety plan is valuable because it helps guide the implementation of GAPs and is required if the farm needs to have a third party audit to meet buyer demands. In December of 2009, personnel from the National GAPs Program at Cornell University in collaboration with Cornell Cooperative Extension Regional Fruit and Vegetable Teams and the New York State Department of Agriculture and Markets began a new multi-day GAPs training program for produce growers in New York.

Given the time, effort, and expense of both conducting and attending the trainings, it was critically important to evaluate the trainings to make sure they were productive and valuable. Every training
was evaluated after each day of instruction to determine if growers found the information valuable and made some progress towards understanding GAPs and developing a written farm food safety plan. A long term evaluation was completed by surveying training participants at least 6 months after they finished the multi-day course to determine what progress they had made, costs they had incurred, market access impacts, and assess other indicators to determine the long term impact of attending the training.

In the spring of 2014, 80 past participants, each representing a different farm, were asked to complete a 20 question survey administered by Cornell Cooperative Extension personnel. Though a formal research paper will be written, this summary is intended to share some preliminary findings from both the training evaluations and the long-term survey with growers since there will be additional GAPs training opportunities this winter throughout New York and the information may be valuable to growers attempting to decide if attending a GAPs training would benefit them and their farms.

Evaluations completed by participants on the first day of the GAPs trainings indicated that 13% of participants had a written farm food safety plan. By the end of day two, 48% of participants report having 50-100% of their farm food safety plans written. At the end of day two, participants were asked if they would recommend the training to others. Of those who completed the evaluations, all except one say they would recommend the training to others, with the one individual reporting “maybe”.

Of those responding to the long-term survey 63% (50/80) report having a written farm food safety plan and 38% (30/80) have completed a third party audit. Growers responding to the long-term survey had farms that varied in size from 0.25 acres to 4000 acres in fruit and vegetable production with a median size of 70 acres. They also reported having operations that included animals (28%) and having the public on their farm (32%), showing that growers from diversified farms and farms that direct market to consumers participated in both the GAPs trainings and the survey. This data highlights the progress that growers make during and after attending the workshop as well as the diversity of growers who have attended the multi-day trainings.

Thirty five (43%) growers reported maintaining sales valued from $14,000 to $2,000,000, while 14 (16%) growers reported expanded sales valued at $15,000 to $300,000. The three top reasons growers report for implementing GAPs are their personal commitment to food safety (24%), maintaining market access (20%), and reducing liability (17%).

Based on the evaluations, both short and long-term, the multi-day GAPs training programs are helping growers increase their understanding of produce safety issues, develop a written farm food safety plan, and implement practices to reduce microbial risks.

www.gaps.cornell.edu.

Recent Example – from the CCE EFNEP Program – use of pre-post, qualitative individual behavior change data collection

Some of the food and nutrition programs implemented through Cornell Cooperative Extension are the result of larger grant/contract supported projects that require specific evaluation strategies. Programs like EFNEP, Eat Smart New York, and Choose Health Action Teens are evaluated with consistent measures and strategies across the state. This information now feeds into our State Defined Outcomes related to Nutrition and Childhood Obesity.
Some The Expanded Food and Nutrition Education Program (EFNEP) and Supplemental Nutrition Assistance Program - Education (SNAP-Ed) are nutrition education programs designed to enhance the quality of life for a low-income (<=185% of poverty) participants and their families. EFNEP is provided to participants who are parenting, pregnant, or influencing the nutritional well-being of children under the age of 19 years, and who meet the income guidelines. SNAP-Ed is provided to any person who meets the income guidelines.

Participants complete an assessment form at entry into the program and at exit. The question sets used are based on the content of classes delivered. Enrollment in the program is usually limited to 4 - 12 lessons, but may occasionally be longer, depending upon the needs and desires of the individual participant. The assessment form collects demographic information, a maximum of 25 behavior checklist items and a 24-hour dietary recall. These collected data are entered into a web-based electronic database, specifically designed by the USDA to capture these evaluation data.

The web-based system provides multiple levels of assessment on participant and program outputs. The web-based system provides individual assessment: providing output reports which summarize participant reported behaviors to use with program participants to facilitate awareness of current practices and improved practices, at the conclusion of the sessions. The web-based system provide aggregated reports of program participant data which summarizes output and outcome (reported behavior and diet changes) at the local county level. The web-based system then enables to aggregation of data at the state and federal levels, to facilitate program reporting and evaluation assessment at each of these levels.

Participants reached through one-time education complete a form which captures demographic characteristics and an assessment of topic-specific intent to change behavior, e.g. intent to choose water and low-fat milk instead of sweetened beverages. Data will not be linked to participant's name or address. Data on enrolled participants are used to 1) assist staff in establishing goals and objectives with the participants for program delivery and 2) assess outcomes of the program. Aggregated data are shared with the Federal and State funding agencies at the end of each Federal Fiscal Year as required for Cornell University and Cornell Cooperative Extension to receive the Federal funding.

https://fnec.cornell.edu/Home.cfm
5.0 4-H Youth Development / Children, Youth, and Families

Brief Summary of Program

This plan frames applied research and Cornell Cooperative Extension (CCE) programs connected to 4-H Youth Development/Children, Youth and Families.

Youth development is defined as an ongoing process that enables individuals to lead a healthy, satisfying, and productive life as youth and later as adults, because they gain the competence to earn a living, to engage in civic activities, to nurture others and to participate in social relations and cultural activities; Youth development is also defined as an approach emphasizing active support for the growing capacity of young people by individuals, organizations, and institutions, especially at the community level. The practice of youth development refers to the application of principles to a planned set of practices, or activities, that foster the developmental process in young people (Hamilton, Hamilton, & Pittman, 2003). Positive youth development is an approach that assumes all young people have assets regardless of their socio-economic status, race/ethnicity and gender.

The Youth Development program applies positive youth development including life skill development to the 4-H national mission mandates of science, technology engineering and math (STEM), civic engagement (citizenship), and healthy living (Components of the latter focused on healthy eating and active living are described in the Childhood Obesity and Nutrition Plan of Work). Each Youth Development mandate has NYS and national logic models to guide program priorities and to identify youth outcomes.

The family emphases in this plan include human development and social wellbeing, economic wellbeing, and quality of home and work environments. This emphasis area includes parenting and care practices, and care programs and policies affect the quality of life for children, youth, elders and their families. Cornell Cooperative Extension parenting and dependent care programs are designed to integrate research with community education on parenting and infant/child care-giving practices and policies. Current research focuses include behavioral and psychological development from conception through later life.

Also included in this plan is an emphasis on family economic security. This emphasis aims to increase our service to and empower low and moderate-income households who are especially vulnerable to financial setbacks and have less disposable income to commit to savings. The effort includes education to low-income households where housing may have a greater incidence of indoor air issues: high levels of radon, carbon monoxide, lead, asbestos, and basement mold. Research draws on a broad-based and diverse set of social science and design methodologies to understand how planning, design and management of the built environment affects individuals, groups, organizations and communities, and how this knowledge can generate innovative design solutions for pressing social and cultural issues.

Situation and Priorities Statement

Youth development through experiential learning is the foundation of 4-H programming. Participation in high quality out-of-school programs is linked with a lower incidence of problem behaviors, such as decreased academic failure, substance abuse, and delinquency (Lerner, Lerner, & Phelps, 2008). Relative to science literacy, in international comparisons, U.S. student performance in mathematics and science is at or below levels attained by students in other countries in the developed world (Provasnik et al 2012). Science (or STEM) literacy is routinely identified as a key to our economic future and a significant public value of 4-H STEM

Effective parenting practices differ across several developmental stages of childhood, and include a range of outcomes, some of which can be customized to meet special needs, address cultural differences and still be sensitive to the needs of particular family structures. There is a continuing need for education on what constitutes high quality child care to help parents and guardians select and monitor their children’s care, and targeted education for other stakeholders and decision-makers affecting these issues. Economic security, financial and other household resource management are educational priorities. There are a multitude of economic challenges facing communities in New York State and the nation as well.

Assumptions

Youth
- Curricula, programs, and learning experiences incorporate evidence and best practices for building life skill competencies (i.e., college and career readiness). Best practices related to specific delivery methods provide rich opportunities for deep impact.
- Program educators and volunteers working with youth receive professional development and support on how to incorporate research findings and evaluation plans into program design. These efforts focus on best practices to meet the needs of youth at various stages of their development.
- Youth have different interests and needs; therefore, they may respond differently to the same opportunities. Youth should have choices about activities in which they participate, including the chance to help shape those activities.
- Many opportunities exist to connect youth to the educational resources of Cornell University and other Land Grant Universities in the area of STEM, Healthy Living, and Civic Engagement.

Family
- Most parents and relative caregivers want to do the best they can for their children.
- Parenting and child development knowledge and skills are applicable to many family situations and can improve parent-child interactions and child nurturance over time.
- Selection of high quality childcare can be improved through education.
- Increased household disposable income and improved indoor environments will result in improved quality of life for individuals, more prosperous communities and overall improvement in the NYS economy.

Ultimate Goals of the Program

Youth
- Facilitate programming that promotes positive youth development
- Prepare youth for success in 1) postsecondary education and 2) career pursuits by engaging children and youth in a variety of learning opportunities
- Youth lead healthy, satisfying, and productive lives
- Youth become caring and contributing members of society
- Youth become life-long learners
- Youth become knowledgeable, contributing participants in STEM, Healthy Living, and Civic Engagement issues in their communities

Family
- Improve parenting practices that result in better child and youth outcomes.
- Improve parent/caregiving practices resulting in parents and caregivers reporting increased confidence in their roles.
- Improve financial status of targeted NYS residents.
- Improve indoor air quality in low income households resulting in better health outcomes.

Activities

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), and county-based educators are all involved in designing, implementing, and evaluating program efforts.

A variety of educational strategies are 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 initiatives (i.e., Mission Mandates). Trained 4-H educators and staff, volunteers, youth, schoolteachers, community agency staff and others lead youth in 4-H projects.

4-H projects are a planned series of experiential learning opportunities in a variety of settings. Through their projects, youth develop knowledge, practical skills, and life skills (e.g., robotics, self-awareness, public presentation, responsible decision-making).

Delivery Modes

4-H takes place in a variety of settings including: after-school programming, camps, 4-H clubs, school enrichment activities, camps, and community events.

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 and NYS Library Partnership
- 4-H National Mentoring Program
- 4-H Youth Development Program (clubs, events, camps, afterschool, school enrichment)
- ACT (Assets Coming Together) for Youth
- 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, Capital Days, 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
• PROSPER
• 4-H Public Presentations
• Role of Grandparents in the Lives of Adolescent Grandchildren
• Volunteer development opportunities and events

Target Audiences

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
• Priority audiences include youth not formerly served and military youth and families

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
Output and Outcome Indicators
Highlighted indicators are collected and reported annually. Others are shown in logic model format to demonstrate the progression from typical planned programs (outputs) → skill & knowledge development (near-term) → behavior changes (mid-term) → societal changes (long-term). Staff are expected to use program evaluations report on selected indicators.

<table>
<thead>
<tr>
<th>5.1 Human Development: Positive Youth Development*</th>
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</thead>
<tbody>
<tr>
<td><strong>Output Indicators</strong></td>
<td><strong>Near-Term Outcome Indicators</strong></td>
<td><strong>Mid-Term Outcome Indicators</strong></td>
</tr>
<tr>
<td>Number of youth program educators and adult volunteers participating in programs on positive youth development</td>
<td>Number of youth participants who demonstrate gains in vocational/citizenship skills – knowledge, attitudes, and/or aspirations</td>
<td>(5.1a) Number of youth participants who learn life skills (e.g., self-motivation, goal-setting, conflict resolution, resilience, empathy, decision-making)</td>
</tr>
<tr>
<td>Number of youth participating in projects related to vocational skills and/or citizenship</td>
<td>Number of youth program educators and adult volunteers who demonstrate knowledge and/or skill gains in meeting the needs of youth at various stages of development</td>
<td>(5.1b) Number of youth participants who demonstrate ability to express their ideas confidently and competently</td>
</tr>
<tr>
<td>Number of youth participating in projects related to healthy eating, active living, and social-emotional wellness</td>
<td></td>
<td>(5.1c) Number of adult volunteers documented to mentor and advise youth and other adult volunteers in an effective and positive manner</td>
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<td></td>
<td></td>
<td>(5.1d) Number of youth participants documented as serving in age-appropriate leadership roles engaged in youth voice (i.e. youth engaged in youth-led opportunities, youth participants solving community issues, participants who work with elected officials on community issues)</td>
</tr>
</tbody>
</table>

* For 4-H Healthy Living outcomes (i.e., related to nutrition and fitness), please refer to the Plan of Work 4.0: Nutrition, Food Safety and Security, and Obesity Prevention. Specifically: outcomes 4.1a-d
### 5.2 Human Development: Science, Technology, Engineering, and Math (STEM) Literacy

<table>
<thead>
<tr>
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</tr>
</thead>
<tbody>
<tr>
<td>Number of participants enrolled in 4-H STEM project areas</td>
<td><strong>(5.2a)</strong> Number of participants demonstrating increased awareness of STEM, interest in STEM, improved STEM abilities, and/or increased awareness of opportunities to contribute to society using STEM skills.</td>
<td><strong>(5.2b)</strong> Number of participants that report improved school achievement or have been observed to improve academic improvement and/or success in school science.</td>
<td>Number of participants who increased number and diversity of 4-H youth pursuing education and careers in STEM-related fields.</td>
</tr>
<tr>
<td>Number of youth reached through STEM school enrichment, special interest, camp, and after school programs Number and diversity of 4-H and other youth program educators and adult volunteers participating in programs on STEM for youth</td>
<td><strong>(5.2c)</strong> Number of youth applying STEM learning to contexts outside 4-H programs, e.g., school classes, science fairs, invention contests, etc.</td>
<td><strong>(5.2d)</strong> Number of youth expressing interest/demonstrating aspirations towards STEM careers, e.g., career fairs, job shadowing, volunteer work or internships.</td>
<td>Number of participants who increased and more diverse pool of trained educators, engineers, and other scientists.</td>
</tr>
<tr>
<td>Number of youth and adult volunteers documented to become contributing participants in STEM related issues in their communities and/or choose STEM related professions</td>
<td><strong>(5.2e)</strong> Number of youth adopting and using new scientific methods or improved technology.</td>
<td></td>
<td>Number of participants who increased STEM literacy and application of STEM knowledge and skills to civic engagement.</td>
</tr>
<tr>
<td>Output Indicators</td>
<td>Near-Term Outcome Indicators</td>
<td>Mid-Term Outcome Indicators</td>
<td>Long-Term Outcome Indicators</td>
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<tr>
<td>Number of youth participating in education programs leading to civic engagement initiatives</td>
<td>Number of youth and adults demonstrating knowledge gains related to Youth/Adult Partnerships and civic engagement initiatives</td>
<td>(5.3a) Number of youth documented to have practiced life skills in authentic decision-making partnerships with adults.</td>
<td>(5.3d) Number of youth documented instances in which youth and adults partner to improve quality of life within a community.</td>
</tr>
<tr>
<td>Number of youth participating in train-the-trainer programs related to civic engagement</td>
<td>Increased number of youth organizations/ programs documented as incorporating youth voice in programming to reflect youth needs, interests, and excitement for learning (i.e., youth-adult partnerships, youth taking political action, mentors, and youth voice in communities)</td>
<td>(5.3b) Number of youth who demonstrate application of skills to civic life, within and beyond the 4-H context.</td>
<td></td>
</tr>
<tr>
<td>Number of adults participating train-the-trainer programs related civic engagement</td>
<td>Number of communities participating in 4-H civic engagement initiatives</td>
<td>(5.3c) Number of youth who demonstrate improved or advanced workforce skills.</td>
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</tbody>
</table>

**Family**

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<thead>
<tr>
<th>Output Indicators</th>
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<th>Mid-Term Outcome Indicators</th>
<th>Long-Term Outcome Indicators</th>
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</thead>
<tbody>
<tr>
<td>Number of adults who complete parent education programs.</td>
<td>Number of parents, grandparents and other adults providing parental care who demonstrate knowledge or skills gains in developmentally appropriate and effective parenting behaviors and methods.</td>
<td>(5.4a) Number of parents and other adults providing parental care who adopt developmentally appropriate and effective parenting behaviors and methods.</td>
<td>(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.</td>
</tr>
</tbody>
</table>
### 5.5 Human Development: Individual

<table>
<thead>
<tr>
<th>Output Indicators</th>
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<th>Mid-Term Outcome Indicators</th>
<th>Long-Term Outcome Indicators</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of infant and child caregivers completing non-formal education programs about quality dependent care giving.</td>
<td>Number of participating infant and child caregivers who demonstrate knowledge or skill gains related care-giving practices.</td>
<td>(5.5a) Number of participating infant and child caregivers reporting to have applied positive care-giving practices.</td>
<td>(5.5c) Number of participating persons with care-requiring dependents reporting positive change in childcare as a result of participating in educational programs.</td>
</tr>
<tr>
<td>Number of persons with care-requiring dependents completing non-formal education programs on selection of care-giving individuals and facilities.</td>
<td>Number of participating persons with care-requiring dependents who demonstrate ability to evaluate the quality of care programs.</td>
<td>(5.5b) Number of participating persons with care-requiring dependents reporting to have used childcare quality characteristics in their care selection.</td>
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</table>

### 5.6 Human Development: Community Level

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<tr>
<th>Output Indicators</th>
<th>Near-Term Outcome Indicators</th>
<th>Mid-Term Outcome Indicators</th>
<th>Long-Term Outcome Indicators</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of organizations, agencies, and institutions participating in non-formal educational programs about social and public policy issues to enhance opportunities for safe, economical, and developmentally appropriate care-giving programs for infants, children and youth.</td>
<td>Number of program participants who demonstrate knowledge or skills gains regarding community approaches to family care.</td>
<td>(5.6a) Number of program participants reporting to have been involved in community level assessments of family care needs.</td>
<td>(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.</td>
</tr>
</tbody>
</table>
### 5.7 Economic Security

<table>
<thead>
<tr>
<th>Output Indicators</th>
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<th>Mid-Term Outcome Indicators</th>
<th>Long-Term Outcome Indicators</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of persons completing education programs on age-appropriate topics like spending and saving concepts, appropriate use of money, financial goals, tracking expenses, budgeting, credit management, financial planning, and/or wealth generation strategies.</td>
<td>Number of participants who demonstrate knowledge or skill gains and/or can articulate specific actions they will take related to spending and saving concepts, appropriate use of money, setting financial goals, tracking expenses, budgeting, credit management, financial planning, and/or wealth generation strategies.</td>
<td>(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.</td>
<td>(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.</td>
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<tr>
<td></td>
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<td></td>
<td>(5.7c) Number of program participants reporting to have reduced debts and/or increased savings.</td>
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</tbody>
</table>

#### 5.8 Indoor Environment

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<thead>
<tr>
<th>Output Indicators</th>
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<th>Mid-Term Outcome Indicators</th>
<th>Long-Term Outcome Indicators</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of consumers and property managers completing programs on indoor air quality issues.</td>
<td>Number of consumers and property managers gaining awareness and knowledge of indoor air quality issues and remediation options.</td>
<td>(5.8a) Number of program participants documented to have taken measures to prevent or remediate indoor air quality issues.</td>
<td>Number of program participants documented to have reduced short-term health effects of indoor air pollutants (such as irritation of the eyes, nose, and throat, headaches, dizziness, and fatigue) as a result of participating in educational programs.</td>
</tr>
<tr>
<td></td>
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<td></td>
<td>Number of participants reducing risks of respiratory diseases, heart disease, and cancer by implement measures such as radon remediation, controlling indoor triggers of asthma: secondhand smoke, dust mites, pet dander, and pests.</td>
</tr>
</tbody>
</table>

### External Factors

#### Youth

Fiscal pressures internal to Extension and among community organizations influence the scope and quality 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.
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 more diverse cultures and 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 funders 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.

Evaluation Methods

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 provides comprehensive assessment. We work towards this goal by doing two things – professional development to enhance evaluation capacity of our system and looking for program documentation of local, regional and statewide programs.

Evaluation Capacity Building: The CORE Evaluation Capacity-Building project with CCE came to a close at the close of the 2015 fiscal year. CCE staff continue to have full use of the web-based Netway program for program modeling and evaluation planning, and that the Netway includes online training components and resources such as the measures archive. Additional staff training in evaluation planning and practices to meet system wide outcomes will continue.

Regional/Statewide documentation examples. Many of our regional and statewide programs are receiving federal capacity funds. Documentation of outcomes will continue to be a requirement of funding. Results shape future program efforts and impact program design.

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In 2016, we will continue to review the national outcome framework and connect it, as possible, to our statewide outcome framework.

Recent Example – from the Parenting In Context program – use of pre-post survey

The Parenting In Context CCE statewide program has an online Data Collection System for program evaluation. A program work team of faculty, associates and extension professionals developed, piloted and revised a pre-and post-survey for statewide use. This information now feeds into our State Defined Outcomes related to parenting education.

The Cornell Cooperative Extension (CCE) system offers a variety of programs for parents and caregivers. These programs reach a wide range of families and seek to promote positive parenting and, ultimately, healthy
family and child development. Data were collected from CCE parent education program participants between July 2013 to July 2014 at the first session (a pre-test) and at the last session (a post-test). Participants included parents and caregivers taking part in programs that comprised at least six hours of content delivery.

**Demographics of Participants in CCE Parent Education Programs**

A total of thirteen parent education programs were evaluated. The largest number of participants took part in Parenting A Second Time Around (PASTA) (21% of all participants) and the Parenting Skills Workshop Series (17%).

The majority (71%) of participants in parent education classes were female. The highest level of educational attainment reached among the participants varied widely, with the greatest number of participants reaching 12th grade or a GED (32%) followed by those having attended, but not graduated from, college (24%). The vast majority of the participants in parent education classes were white (63%), and 40% of the participants were married or partnered.

**Pre-Post Survey Results**

This study used a pre- and post-test evaluation, in which the participants were asked to answer two identical surveys—one given at the first session of the class and another given after the completion of the last parenting class. The survey included ten questions about parenting attitudes, behaviors, and knowledge. The pre/post study design allows researchers to see if participants’ attitudes, behaviors, and knowledge change during the course of the parenting programs. Using this type of research design does not allow one to determine whether taking part in the parent education class *caused* a change in knowledge, attitude or behaviors; such changes could occur for other reasons outside of the program. However, it is possible that any significant pre-to-post changes in parenting attitudes, behaviors and knowledge that are observed may have resulted from taking part in the program.

The following evaluation is based on information provided by 385 participants, who completed a parent education program and completed both a pre- and a post-test survey. Six of the ten items on the survey showed significant improvements from the pre- to the post-test. Specifically, participants of CCE parent education classes reported increased patience with their child, increased confidence in making rules that take their child’s needs into consideration, increased belief that they have the skills necessary to be a good caregiver, decreases in how often they yell at their child, increased time spent reading with their child, and decreases in the number of hours their children spend watching television.

A p-value generated from a paired t-test was used as a statistical measure to determine whether a change in a given survey question between the pre- and post-test was significant. A p-value of .10 or less was considered statistically significant. This means that we can say with 90% certainty that the pre-to-post changes in participant responses are not due to chance. These results indicate that six out of ten measures of parenting attitudes, behaviors and knowledge improved significantly from the pre- to the post-test. This suggests that, across the state, CCE parent education programs may have had a positive impact on their participants.

http://www.human.cornell.edu/pam/outreach/parenting/
6.0 Community and Economic Vitality

Brief Summary of Program

This plan frames the programs aimed at empowering 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.

Community emphases include community and economic development processes, community sustainability and resiliency, agriculture and food systems development, land use and energy, emergency preparedness and to some extent entrepreneurship and workforce development. Cornell has a commitment to New York citizens and local officials to build their capacities so they can solve problems and build strong and vibrant communities. Agriculture and food systems development includes efforts that promote community farmland protection initiatives, promote local foods, supports agricultural entrepreneurship, public issues education related to specific agriculture/community conflict. Our educational programs support inter-municipal and regional collaborations, and new public-private partnerships that spur innovative strategies to address complex community development issues.

This plan also includes the Master Gardener Volunteer (MGV) Program. Programs developed by MGVs are managed by individual Cornell Cooperative Extension (CCE) and applied research associations and are related to local needs, talents and interests. Because the focus is very multidisciplinary it doesn't fit neatly into one of the other planned programs, but instead is looked upon as a community vitality initiative.

Situation and Priorities Statement

Our focus is on developing capacity among citizens, leaders, and local officials so they are better prepared to address challenges and opportunities, improve quality of life, and build strong and vibrant communities. Building local capacity for governance, enhancing local economies, and investing in human capital by providing research-based knowledge, public issues education, and education and training are keys. We work toward the long term sustainability and well-being of communities through collaborations and partnerships and promote active and representative participation toward enabling all community members to shape their collective future. Even in the most rural areas, changing populations and land use patterns often bring agriculture/horticulture/natural resource enterprises in contact with neighbors or visitors who do not understand or appreciate the nature of their operations and contributions to the community. Local municipal leaders strive to balance private property rights, community growth, quality of life issues and environmental protection. Partnerships, based on mutual respect and trust, provide a foundation for innovative strategies and informed decision making to create positive and lasting change for communities.

Assumptions

- The institutional capacity and needs of New York’s smaller and rural local governments are far different than is often defined by larger municipal and state government organizations.
- When a number of communities have a common goal, but each is unable to pursue it separately, collaboration may be a possible solution.
• Local governments experience a "boundary problem" when each community operating alone cannot see
the problem nor identify what needs to be done because the problem has a multi-jurisdictional nature.
• Knowledge of the interactions of environmental resources, quality of life, and local economies will lead
to an involved, proactive citizenry.
• Citizens are concerned about the impacts of a variety of decisions on the environment and on quality of
life issues, and they are interested in the connections among family, work, and civic life.
• Collaboration between agriculture/horticulture/natural resource enterprises, community leaders and
members can lead to identification of mutual interests and minimization or resolution of conflicts.
• Economic development occurs in a different context than in the past.
• There is increased interest in community readiness and resiliency, especially in efforts to adapt to a
changing climate.
• Communities that utilize a community development approach to areas like ag and food systems, land
use and energy will learn to use that approach for other community issues.

Ultimate Goal(s) of the Program

• Ensure that diverse interests and populations in communities are reflected and engaged as
stakeholders.
• Provide a framework for communities to navigate conflicts when they occur.
• Help communities to see agriculture/horticulture/natural resource enterprises as contributing and
positive elements.
• Grow community leadership capacity so that community residents experience high quality of
life, ecological integrity, effective decision making, and new economic opportunities.
• Institutionalize sustainable practices so that communities actively manage their financial, leadership
practices, human, environmental, and social capitals.

Activities

CCE, CUAES and 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 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

Target Audiences

- 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
Output and Outcome Indicators

Highlighted indicators are collected and reported annually. Others are shown in logic model format to demonstrate the progression from typical planned programs (outputs) → skill & knowledge development (near-term) → behavior changes (mid-term) → societal changes (long-term). Staff are expected to use program evaluations report on selected indicators.

### 6.1 Community and Economic Development

<table>
<thead>
<tr>
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<th>Long-Term Outcome Indicators</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of local officials, residents, community leaders, entrepreneurs, economic and community development professionals participating in programs re: workforce, entrepreneurial climate, diversification, economic impact analysis, e-commerce, market development, business planning, partnerships.</td>
<td>Number of local officials, residents, community leaders, entrepreneurs, economic development professionals demonstrating knowledge/skill gains re: workforce, entrepreneurial climate, diversification, economic impact analysis, e-commerce, market development, business planning, and partnerships.</td>
<td>(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.</td>
<td>(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.</td>
</tr>
<tr>
<td>Number of neighborhoods and communities, economic developers and/or entrepreneurs participating in educational programs on “green” business opportunities.</td>
<td>Number of local officials, residents and/or community leaders, demonstrating knowledge/skill gains about enhancing facilities and/or other community resources or services.</td>
<td>(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.</td>
<td>(6.1e) Number of communities documenting improvements in facilities and/or other community resources or services.</td>
</tr>
<tr>
<td>Number of citizen groups, workforce professionals, economic developers and/or entrepreneurs demonstrating knowledge gains related to “green” workforce, business opportunities, and community development.</td>
<td>Number of new workers trained and “green” businesses established at least in part due to participation in the program.</td>
<td>Number of sustainability initiatives adopted.</td>
<td>Number of communities that report increased diversification of their local economies attributable at least in part to participation in the program.</td>
</tr>
<tr>
<td>Number of communities that report increased diversification of their local economies attributable at least in part to participation in the program.</td>
<td>(6.1c) Number of municipalities that were part of an intentional process re: intergovernmental cooperation</td>
<td>(6.1f) Number of new shared services among municipalities</td>
<td></td>
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<tr>
<td>Output Indicators</td>
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<td>Mid-Term Outcome Indicators</td>
<td>Long-Term Outcome Indicators</td>
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</tr>
<tr>
<td>Number of community members participating in educational programs related to leadership development, community decision-making, public participation, planning and monitoring processes, and collaborative approaches.</td>
<td>Number of community members demonstrating knowledge or skills gains related to community decision-making, public participation, planning and monitoring processes, collaborative approaches, and/or emergency preparedness.</td>
<td>(6.2a) Number of communities instituting new or enhanced participatory processes related to community and economic vitality. Number of collaborative partnerships established within and across communities for issue resolution and collective action and/or to improve community services.</td>
<td>(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. Number of communities reporting specific improvements in quality or scope of community services.</td>
</tr>
<tr>
<td></td>
<td>Number of Extension Educators intentionally packaging relevant research for local officials</td>
<td>(6.2b) Number of local officials who cite LGU research and data as having influenced a decision</td>
<td>Number of communities who report being satisfied with local officials’ decision making process.</td>
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<td></td>
<td>Number of venues held for community decision makers about research that can assist with integrated decision making</td>
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<td></td>
<td>Number of communities who use socio-economic demographic information</td>
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</table>
### 6.3 Land Use and Energy

<table>
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<tr>
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</thead>
<tbody>
<tr>
<td>Number of neighborhoods and communities, municipalities participating in educational programs related to land use and/or community and energy issues</td>
<td>Number of citizen groups, communities and municipalities demonstrating knowledge gains related to effective use of their land base and community-based energy development scenarios.</td>
<td>(6.3a) Number of communities and municipalities that address the connection between their land base and possible energy scenarios.</td>
<td>(6.3d) Number of communities that incorporate energy use and development in their comprehensive plans.</td>
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<td></td>
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<td>(6.3b) Number of sustainability initiatives adopted.</td>
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<td>(6.3c) Number of communities that address climate change and energy issues in an integrated manner.</td>
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</table>

### 6.4 Community Sustainability and Resiliency Decision-making

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<thead>
<tr>
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</tr>
</thead>
<tbody>
<tr>
<td>Number of residents and community leaders participating in programs on community sustainability, community assets, citizen involvement, property rights, land use, conservation, interaction between environmental, economic, and quality of life issues.</td>
<td>Number of residents and/or community leaders demonstrating knowledge or skill gains related to community sustainability, community assets, property rights, land use, environmental conservation, interaction between environmental, economic issues, quality of life indicators.</td>
<td>(6.4b) Number of community leaders documented to apply community economic development and quality of life indicators to support decision-making.</td>
<td>(6.4d) Number of communities implementing projects that enhance community sustainability and/or protect public health and community well-being through sound environmental management.</td>
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<td>(6.4a) Number of communities utilizing information of NY-EDEN.</td>
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<td>Number of residents who were better prepared to deal with emergencies and disasters.</td>
<td>(6.4c) Number of communities who were better prepared to deal with emergencies and disasters.</td>
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<td></td>
<td>Number of communities that report increased balance of environmental, social cohesion, and economic vibrancy.</td>
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<td>Number of communities that state they are more resilient.</td>
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### 6.5 Land Use

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<tbody>
<tr>
<td></td>
<td></td>
<td><strong>(6.5a)</strong> 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.</td>
<td>Number of additional acres covered by open space preservation, environmental conservation and/or protection programs attributable at least in part to participation in the program.</td>
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<tr>
<td></td>
<td></td>
<td><strong>(6.5b)</strong> Number of communities adopting or updating farmland preservation and/or agricultural economic development plans.</td>
<td>Increase in percentage of food produced locally and regionally that is consumed locally or regionally.</td>
</tr>
</tbody>
</table>

### 6.6 Land Use and Public Spaces

<table>
<thead>
<tr>
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</thead>
<tbody>
<tr>
<td></td>
<td>Number of residents and/or community leaders, demonstrating knowledge/ skill gains about sustainable communities and enhancing public spaces.</td>
<td><strong>(6.6a)</strong> Number of residents and/or community leaders who plan for and initiate steps to enhance public spaces.</td>
<td><strong>(6.6b)</strong> Number of new or enhanced community organizations or networks linking diverse sub-groups and focused on enhancing community sustainability.</td>
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<td><strong>(6.6c)</strong> Number of communities documenting improvements in public spaces.</td>
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</tbody>
</table>

### 6.7 Agriculture and Food Systems Development: Community and Economy

<table>
<thead>
<tr>
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<th>Long-Term Outcome Indicators</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of agriculture/ horticulture/ natural resource business persons participating in education programs on potential environmental, health, social, and cultural impacts of their operations from the perspective of the</td>
<td>Number of agriculture/horticulture/natural resource business persons demonstrating knowledge or skill gains related to potential environmental, health, social, and cultural impacts of their operations from the perspective of the community.</td>
<td><strong>(6.7a)</strong> Number of instances in which producers/ horticulture businesses/ natural resource enterprises, residents and community leaders work together to address issues.</td>
<td><strong>(6.7e)</strong> Number of documented instances in which agriculture/community conflicts are resolved locally.</td>
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<td></td>
<td><strong>(6.7b)</strong> Number of agriculture/horticulture/natural resource business persons who are better prepared to deal with disasters and emergencies.</td>
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<td></td>
<td><strong>(6.7f)</strong> Number of communities documented to adopt, maintain, or expand policies supportive of appropriate</td>
</tr>
<tr>
<td>Number of community members and/or local leaders participating in education programs on the roles of agriculture/horticulture/natural resource enterprises in the local community, tax base, and environment.</td>
<td>Number of community members and/or local leaders demonstrating knowledge or skill gains related to the roles of agriculture/horticulture/natural resource enterprises in the local community, tax base, and environment and how they are affected by local policy.</td>
<td>(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.</td>
<td></td>
</tr>
<tr>
<td>Number of local community members and/or leaders participating in programs on the potential benefits of community-based agriculture and opportunities for promoting same community.</td>
<td>Number of youth demonstrating knowledge or skill gains related to the agriculture and food system and/or natural resource enterprises.</td>
<td>(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.</td>
<td></td>
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</tbody>
</table>
### 6.9 Master Gardener Program

<table>
<thead>
<tr>
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<tr>
<td>Number of hours of instruction by Master Gardener volunteers in educational programs for youth and adult audiences.</td>
<td>Number of community residents gaining knowledge and skill in weighing the environmental impacts and consequences of management actions taken in residential landscapes and homes.</td>
<td>(6.8a) Number of community residents practicing management tactics in residential landscapes and homes that work to sustain or enhance a healthy community and environment.</td>
<td>Increased and informed participation in local environmental issues.</td>
</tr>
<tr>
<td>Number of hours by Master Gardener volunteers in general program support.</td>
<td>Number of community residents enhancing knowledge and skill in using research-based information to make plant and management choices among alternatives.</td>
<td>(6.8b) Number of community residents with improved availability and access to fresh fruits and vegetables.</td>
<td>Enhanced community-based support for environmental enhancement policies and initiatives.</td>
</tr>
<tr>
<td></td>
<td>Number of community residents gaining knowledge and skill in choosing and growing food crops for home, school and community gardens.</td>
<td>(6.8c) Number of community education/demonstration food gardens established or maintained.</td>
<td>Availability of high quality local foods increases at the community level.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Pounds of produce donated for distribution through local food organizations.</td>
<td>Individuals experience improved nutrition and health status.</td>
</tr>
</tbody>
</table>

**External Factors**

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.

**Evaluation Methods**

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