

# 2010 Rutgers Combined Research and Extension Annual Report of Accomplishments and Results

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## I. Report Overview

### 1. Executive Summary

The New Jersey Annual Report of Accomplishments and Results is an integrated report reflecting Cooperative Research and Cooperative Extension programs. The report addresses all of the requirements regarding the use of Hatch Funds, Smith-Lever 3 (b) and (c) and required non federal funds. As recommended we have streamlined our report to focus on significant qualitative outcomes.

The report reflects the work of the New Jersey Agricultural Experiment Station (NJAES). The mission of NJAES is to enhance the vitality, health, sustainability, and overall quality of the life in New Jersey by developing and delivering practical effective solutions to current and future challenges relating to agriculture; fisheries; food; natural resources; environments; public health; and economic, community, and youth development. NJAES through station supported Cooperative Research and Cooperative Extension focuses on innovative approaches to applying the land grant model to address the diverse needs of a highly urbanized state. Stakeholders have been active partners in identifying critical issues to be addressed.

NJAES values the contributions that stakeholders make to ensure that all research and extension projects and programs are relevant and responsive to the needs of New Jersey residents. Cooperative Extension continues to expand its programmatic outreach to fully engage new audiences with a special focus on reaching those who have traditionally been underrepresented and/or underserved. Emphasis is given to increasing our urban audience base and to deliver programs which are culturally appropriate to meet the diverse needs of our many publics.

Planned programmatic focus areas which are being reported against are:

Climate Change-Water Quality & Quantity

Childhood Obesity-Youth/Adult Obesity

4-H Youth Development

Global Food Security and Hunger-Agricultural Viability

Sustainability of the NJ Equine Industry and its Impact on Agriculture and Open Space

Climate Change-Home, Garden and Environment

Global Food Security and Hunger-Integrated Pest Management

Global Food Security and Hunger-Aquaculture

Food Safety

Sustainable Energy

You will note that we have expanded the names of our programs to include the National Institute of Food and Agriculture (NIFA) priority issues where appropriate.

NJAES researchers and extension faculty and staff have concentrated on these focus areas with relevant, innovative science-based educational programming and research solutions to address critical needs identified by New Jersey residents.

The Rutgers Cooperative Extension Water Resources Program has implemented innovative means

to manage storm water through the development and evaluation of best management practices, nutrient trading programs and the preparation of regional storm water management plans. Master Gardeners, Environmental Stewards, 4-H youth and others have been actively engaged in establishing rain gardens and installing rain barrels to conserve water resources and have made a positive foot print on the environment. During NJ Environmental Production Agency's Earth Day 's 40<sup>th</sup> Anniversary celebration, the RCE statewide "Stormwater Management in Your Backyard" was honored.

In 2010 Rutgers University announced the establishment of the Institute of Food, Nutrition and Health. This institute will bring together all professionals at Rutgers, who are engaged in research and extension activities related to nutrition and associated health impacts. The top priority of the institute is obesity.

Rutgers Cooperative Extension nutrition education programs targeted to limited resource families, have documented diet summaries to support a positive change at exit recalls with increased consumption of fruits, vegetables, grains and milk. These efforts, in conjunction with the New Jersey Get Moving Get Healthy, a joint Family and Community Health Sciences and 4-H Youth Development initiative, are changing the way that NJ families and youth eat and make behavior changes to address the critical issues related to health and obesity. Program impacts have resulted in improved health decisions and increased community capacity to address issues related to obesity. 4-H teen Food and Fitness Ambassadors are an instrumental part of the New Jersey 4-H's healthy living programming, providing leadership to the training of 4-H Club Health Officers, a new position in the club structure. The Get Moving Get Healthy New Jersey was the recipient of two national awards in 2010.

Volunteers recruited, trained and managed by RCE faculty and staff continues to be the engine for extending educational outreach. The value of volunteer service in support of the 4-H Youth Development and Master Gardener programs is at \$16 million. The Rutgers Environment Steward volunteers have worked as advocates and stewards of public lands providing significant value-added to NJ.

In 2010, using a learn-by-doing approach, NJ 4-H has enabled 50,412 youth to develop the knowledge, attitudes and skills they need to become competent, caring and contributing citizens of the world.

The 4-H Science Engineering and Technology (SET) Program is reaching youth through a variety of delivery modes providing youth with experiential learning that makes the mystery of science not only real but fun. The Rutgers 4-H Urban Summer Program brings high school youth from 5 urban centers to campus for one week during the summer to explore first hand, with faculty and Rutgers students, biochemistry, biotechnology, environmental sciences, geometrics and marine science. Youth participants become 4-H SET Ambassadors who upon return to their home communities work to promote 4-H and science to other youth. This is representative of one of the many opportunities that the 4-H SET programming has done to meet the national challenge of One Million New Scientists, One Million New Ideas. In addition to science programs targeting urban youth, the 4-H program teaches and encourages scientific exploration of the world, how scientists think and collect scientific evidence and provide youth ways to reflect on their own ideas about science.

The Rutgers Food Innovation Center (FIC), a unique business incubation and economic development acceleration program, provides business and technology expertise to startup and established food companies in the mid-Atlantic region, and utilizes its outreach capacity to reach food and agribusinesses throughout the world. During 2010 FIC graduated its first international client into a new 50,000 sq. ft. facility to be constructed in NJ. The investment of \$15 million for this facility producing gluten-free products will bring a significant economic boost to southern New Jersey, creating about 50 new jobs.

NJAES researchers are at the forefront in providing research solutions addressing global food

security and agricultural viability which is evidenced by the application for 18 patents and issuance of 27 during 2010. NJAES researchers continue to be competitive leaders in specialty crops both fruits and vegetables providing growers with new and improved cultivars that are adapted to local growing conditions and markets. New propagation methods developed by NJAES researchers at the Marucci Center for Blueberry and Cranberry Research have optimized the production of healthy, disease-free, true-to-type cranberry stolons, providing the first virus-indexed and DNA fingerprinted cranberry varieties for cranberry growers. The higher field and fruit quality of the new cranberry varieties will contribute to higher productivity in food provision, increasing the efficiency of US cranberry growers and enhancing US agricultural sustainability.

NJAES researchers working to identify new uses of traditional fruits, vegetables and herbs successfully demonstrated that both oregano and mint (as case studies representing all members of the Lamiaceae Family) contained powerful bioactive compounds distinct from their essential oils; some of these compounds specifically exhibit potent anti-inflammatory activity. These products can be potentially commercialized as supplements to reduce pain and discomfort from inflammation in both humans and animals. A patent application was submitted for this process.

NJAES specialty crops research group has worked on farmer-to-consumer direct marketing and producer consumer characteristics focused on ethnic produce items that have the potential to provide market opportunities for farmers. The consumer research and crop production trials focused on four ethnic groups: Asian Indians, Chinese, Mexicans and Puerto Ricans, which represents the diversity of New Jersey. The market intelligence from this research can assist growers in tailoring their products and promotional activities to better meet the consumer needs as well as provide opportunities for mid- to small size farmers.

NJAES is engaged in both fundamental and applied scientific research on developing renewable alternative energy sources. Of note is the work on bioenergy grasses, the world-class switched grass breeding program that provides feed stocks for local energy production models.

The urban entomology program has been engaged in current research on insect behavior, monitoring insecticide resistance, novel control techniques, and integrated pest management to find the most effective and least toxic strategies for public use. The extension specialist in urban entomology has worked in limited resource communities with tenants and home owners on the management of household insects and pests. A fact sheet on bed bugs has been transmitted into Spanish to meet the language needs of our diverse clientele.

NJAES is committed to serving the diverse needs of the residents of NJ and has an organizational commitment to engage underserved communities in our urban centers where language differences, limited resources, and access have been barriers in the past.

The Community FoodBank of New Jersey reports a 20% increase in the number of people seeking food assistance. To address this critical issue, Rutgers Against Hunger (RAH), a university presidential initiative working in collaboration with Rutgers Cooperative Extension, works to increase the awareness of hunger and encourage community involvement to those in need. During 2010 26 tons of food was collected and distributed to families in need, additionally \$12,000 was donated.

To address the special needs of seniors and the disabled, NJAES research has revealed that Japanese gardens can reduce stress level rates of Alzheimer patients while in the garden within 10 minutes. Many patients who normally cannot retain memory of the garden for more than 2-3 hours can retain their memory of the garden for more than 10 days. The implications for health care costs are high.

The Master Gardeners project at Anderson House, a residential treatment program for women

recovering from alcohol and drug addiction provided 5 women with skills that resulted in them securing employment in the horticultural industry.

Agricultural and Resource Management Agents have engaged individuals with developmental disabilities in horticultural therapy programming. Teachers and administrators have observed positive behavioral changes in students involved in the program such as genuine interest and engagement, better following of directions and task completion, while in sessions.

Rutgers Entomology researchers and Extension Specialists are engaged in research to develop control strategies for a new invasive pest species in New Jersey, *Halyomorpha halys* (Stål) (Hemiptera: Pentatomidae). This species, more commonly known as "stinkbug," poses a potential threat to agriculture and a nuisance to residents. *H. halys* has a wide host range including tree fruit, vegetables, and ornamental plants. In its native habitat, *H. halys* causes crop loss due to stippling, catfacing and bruising of plants and transmits a plant pathogen responsible for Paulownia Witches Broom. While not harmful to humans, *H. halys* adults enter houses to overwinter during cooler month, posing a nuisance due to the noxious odors emitted when the insect is killed. NJAES entomologists continue to track the dispersion of this pest throughout the United States, with the objective of developing effective control strategies. Trapping study results are being used to develop monitoring schemes for farmers, and may allow the use of this technology to control *halyomorpha* populations on commercial and private properties.

Extension Marine Agents continue their efforts to maintain and restore marine environments through volunteer efforts and a newly instituted junior shellfish program reaching grade school children in Ocean, Warren and Hunterdon Counties, teaching bay ecology and water quality.

Funding from government sources provided NJAES with a foundation for program development and delivery, while competitive grants, contracts and gifts increase the scope and impact of applied research and education programs.

Thirty-nine percent (39%) of funding is from federal grants and contracts; 28.5% state appropriations; 16.6% other sources; 9.4% federal appropriations and 6.9% county appropriations.

New Jersey's integrated annual report is a reflection of our commitment to multidisciplinary, multistate integrated work across departments, centers and internal and external collaborative partners to meet the varied and critical needs of our diverse audiences.

**Total Actual Amount of professional FTEs/SYs for this State**

Year: 2010	Extension		Research	
	1862	1890	1862	1890
Plan	156.0	0.0	65.0	0.0
Actual	178.0	0.0	54.0	0.0

**II. Merit Review Process**

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

- Combined External and Internal University External Non-University Panel

## **2. Brief Explanation**

Peer institutions in the Northeast had an opportunity to review the 2010 Plan of Work update. They are asked to comment on the merit and scientific quality of the plan. In addition to the peer review, both the extension and research committees of the NJ Agricultural Experiment Station Board of Managers serve as internal reviewers.

## **III. Stakeholder Input**

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

- Use of media to announce public meetings and listening sessions
- Targeted invitation to traditional stakeholder groups
- Targeted invitation to non-traditional stakeholder groups
- Targeted invitation to traditional stakeholder individuals
- Targeted invitation to non-traditional stakeholder individuals
- Targeted invitation to selected individuals from general public
- Survey of the general public
- Other (focus group sessions)

#### **Brief explanation.**

A variety of methods were utilized to engage our many publics in the program planning and budget process. During 2010 county stakeholder meetings were held throughout the state. The Director and Associate Director of Extension attended a selected number of these meetings. These meetings serve as an open forum for state residents to identify critical issues and needs. Attendees of stakeholder meetings were representative of the diversity of the state's population. Efforts are made to ensure that underserved and/or non-traditional groups and individuals were actively engaged. These meetings also engaged strategic collaborative partners in identifying research needs and extension program direction. Input from these meetings was used to identify emerging issues and guide the program and the budget process.

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

#### **1. Method to identify individuals and groups**

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

#### **Brief explanation.**

At the county and state levels faculty and staff engage partners and potential clientele in a variety of processes to collect input. Individuals who participate in these processes are those who serve on advisory boards, special research and extension committees, leaders

of commodity groups, partners who participate on government and service related boards, and individuals who participate in programs. Opportunities to participate in the process of gathering input are widely publicized through newsletters, websites, mass media and word of mouth. Engagement of input from groups and individuals who are underrepresented is proactively done to ensure that extension programs and research initiatives are relevant, responsive and address the diverse needs of our many publics.

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

**1. Methods for collecting Stakeholder Input**

- Meeting with traditional Stakeholder groups
- Survey of traditional Stakeholder groups
- Meeting with traditional Stakeholder individuals
- Survey of traditional Stakeholder individuals
- Meeting with the general public (open meeting advertised to all)
- Survey of the general public
- Meeting specifically with non-traditional groups
- Survey specifically with non-traditional groups
- Meeting specifically with non-traditional individuals
- Survey specifically with non-traditional individuals
- Meeting with invited selected individuals from the general public
- Survey of selected individuals from the general public

**Brief explanation.**

Through our county stakeholder meetings individuals participate in open forums where current issues and concerns which impact the county are identified. Stakeholders are active participants in strategic planning processes conducted to identify priority needs which guide research and extension programming. Surveys sent to a variety of different audiences are also utilized to gather data. Extension Specialists engage stakeholders, collaborators, commodity groups, public, private and government officials to identify research needs both applied and basic.

**3. A statement of how the input will be considered**

- In the Budget Process
- To Identify Emerging Issues
- Redirect Extension Programs
- Redirect Research Programs
- In the Staff Hiring Process
- In the Action Plans
- To Set Priorities

**Brief explanation.**

Stakeholder meetings and other processes result in the identification of priority needs

on the local and state levels that could benefit from Cooperative Extension programs and or Cooperative Research solutions. Our partners in the educational process are key to helping faculty and staff identify effective methods for providing the researchbased information which is the core of the land grant mission of transformational education that impacts individuals, communities, the environment and the quality of life of all.

**Brief Explanation of what you learned from your Stakeholders**

NJAES truly values the input of our stakeholders. We have created welcoming environments where stakeholders feel comfortable and trust what is shared will be carefully considered and as policies are set, programs are developed, research direction is set and budget priorities are identified. Stakeholders are critical partners, and their input is necessary to ensure that the work we engage in is relevant and responsive.

The Research and Extension Committees of the NJAES Board of Managers are stakeholders who are actively engaged in the process of providing input on an ongoing basis throughout the year. They attend regular meetings with the Extension and Research Directors to share their knowledge of their local county or special interest areas they represent. They are true representatives of the diversity of research and extension that NJAES extends to the residents of NJ and beyond. Not only do they provide invaluable feedback on issues they also function in supportive roles as advocates for our research initiatives and extension educational outreach.

**IV. Expenditure Summary**

<b>1. Total Actual Formula dollars Allocated (prepopulated from C-REEMS)</b>			
<b>Extension</b>		<b>Research</b>	
<b>Smith-Lever 3b &amp; 3c</b>	<b>1890 Extension</b>	<b>Hatch</b>	<b>Evans-Allen</b>
2629600	0	3047817	0

<b>2. Totaled Actual dollars from Planned Programs Inputs</b>				
<b>Extension</b>			<b>Research</b>	
	<b>Smith-Lever 3b &amp; 3c</b>	<b>1890 Extension</b>	<b>Hatch</b>	<b>Evans-Allen</b>
<b>Actual Formula</b>	3380830	0	2817274	0
<b>Actual Matching</b>	11485245	0	8811506	0
<b>Actual All Other</b>	2508765	0	9181646	0
<b>Total Actual Expended</b>	17374840	0	20810426	0

<b>3. Amount of Above Actual Formula Dollars Expended which comes from Carryover funds from previous</b>				
<b>Carryover</b>	0	0	0	0



**V. Planned Program Table of Content**

S. No.	PROGRAM NAME
1	Water Quality & Quantity
2	Youth/Adult Obesity
3	Indoor Air Quality
4	4-H Youth Development
5	Agricultural Viability
6	Sustainability of NJ Equine Industry and Its Impact on Agriculture and Open Space
7	Home, Garden and Environment
8	Integrated Pest Management
9	Aquaculture
10	Food Safety
11	Sustainable Energy

**V(A). Planned Program (Summary)**

**Program # 1**

**1. Name of the Planned Program**

Water Quality & Quantity

**V(B). Program Knowledge Area(s)**

**1. Program Knowledge Areas and Percentage**

KA Code	Knowledge Area	%1862 Extension	%1890 Extension	%1862 Research	%1890 Research
102	Soil, Plant, Water, Nutrient Relationships	10%		10%	
111	Conservation and Efficient Use of Water	20%		20%	
112	Watershed Protection and Management	40%		40%	
133	Pollution Prevention and Mitigation	20%		20%	
605	Natural Resource and Environmental Economics	10%		10%	
	<b>Total</b>	100%		100%	

**V(C). Planned Program (Inputs)**

**1. Actual amount of professional FTE/SYs expended this Program**

Year: 2010	Extension		Research	
	1862	1890	1862	1890
Plan	7.0	0.0	4.0	0.0
Actual	10.0	0.0	5.0	0.0

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

Extension		Research	
Smith-Lever 3b & 3c	1890 Extension	Hatch	Evans-Allen
229461	0	238764	0
1862 Matching	1890 Matching	1862 Matching	1890 Matching
634752	0	1231803	0
1862 All Other	1890 All Other	1862 All Other	1890 All Other
177843	0	1053185	0

**V(D). Planned Program (Activity)**

**1. Brief description of the Activity**

- Work with municipalities to help them meet their regulatory responsibilities on stormwater management and watershed restoration
- Perform experiments to investigate what the current nutrient loads are in NJ water
- Determine the best methodologies for developing Total Maximum Daily Load (TMDL) values for NJ waterways
- Examine the effectiveness of alternative onsite wastewater treatment systems
- Provide scientifically sound advice to state regulatory bodies on water quality issues
- Math modeling of contamination transport in surface and groundwaters
- Create a program comprising of faculty, staff, volunteers, industry partners and government officials

**2. Brief description of the target audience**

- Municipalities
- State Department of Environmental Protection
- Staff and students who gain valuable scientific experience
- Industry partners who learn ways to meet water quality standards
- Communities who learn watershed restoration methods
- NJAES Faculty and Staff involved in water research/outreach
- School age youth
- Residents

**V(E). Planned Program (Outputs)**

**1. Standard output measures**

2010	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
<b>Plan</b>	3500	50000	800	2000
<b>Actual</b>	4950	7500	11336	1500

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

**Patent Applications Submitted**

Year: 2010  
 Plan: 0  
 Actual: 0

**Patents listed**

**3. Publications (Standard General Output Measure)**

**Number of Peer Reviewed Publications**

2010	Extension	Research	Total
<b>Plan</b>	7	30	
<b>Actual</b>	6	37	43

**V(F). State Defined Outputs**

## **Output Target**

### **Output #1**

#### **Output Measure**

- A variety of strategies will be implemented to reach target audiences. This will include and not be limited to workshops, field visits, classes, newsletters, media releases, electronic communications, and publications. In addition a trained volunteer teaching base will be developed. Quantitative reports of participation will be collected.  
Not reporting on this Output for this Annual Report

**V(G). State Defined Outcomes**

**V. State Defined Outcomes Table of Content**

O. No.	OUTCOME NAME
1	Short term - Knowledge of nutrient loads in various NJ waterways. Find the best methodologies for determining TDMLs
2	Medium term - To identify representative pollutants and aquifer systems in New Jersey. To develop equilibrium isotherms to quantify the adsorption/desorption kinetics for the pollutant/soil/water systems. To develop breakthrough and leaching data for the pollutant/soil/water systems.
3	Long Term - A safe and secure water supply for all communities and industries in the state. An effective and efficient nutrient-trading program that meets the needs of industry and meets the standards set by the state regulatory bodies.
4	Medium Term - To identify representative pollutants and aquifer systems in New Jersey. To develop equilibrium isotherms to quantify the adsorption/desorption kinetics for the pollutant/soil/water systems. To develop breakthrough and leaching data for the pollutant/soil/water systems.
5	Long Term - A safe and secure water supply for all communities and industries in the state. An effective and efficient nutrient-trading program that meets the needs of industry and meets the standards set by the state regulatory bodies.

**Outcome #1**

**1. Outcome Measures**

Short term - Knowledge of nutrient loads in various NJ waterways. Find the best methodologies for determining TDMLs

Not Reporting on this Outcome Measure

**Outcome #2**

**1. Outcome Measures**

Medium term - To identify representative pollutants and aquifer systems in New Jersey. To develop equilibrium isotherms to quantify the adsorption/desorption kinetics for the pollutant/soil/water systems. To develop breakthrough and leaching data for the pollutant/soil/water systems.

**2. Associated Institution Types**

- 1862 Extension
- 1862 Research

**3a. Outcome Type:**

Change in Action Outcome Measure

**3b. Quantitative Outcome**

Year	Quantitative Target	Actual
2010	21000	0

**3c. Qualitative Outcome or Impact Statement**

**Issue (Who cares and Why)**

Stormwater Management Education and Extension Programs

Urban development, suburban sprawl, agriculture and other modified land uses continue to be major contributors to waterway degradation in New Jersey.

**What has been done**

Rain garden training was provided for professional landscapers through the Stormwater Management in Your Backyard (SWMIYB) program with the intention of offering rain gardens as a new service to their clientele. In-class lectures and hands-on training are the major components of this program. During 2010, the RCE Water Resources program has trained 60 landscape professionals in New Jersey, 25 landscape professionals from Ulster County, New York, 25 landscape professionals in Frederick and Shenandoah Counties, Virginia, 65 landscape professionals from Bridgeport and Hartford, Connecticut, and 60 landscape professionals from Portsmouth, New Hampshire. Approximately 100 people from the environmental and gardening

communities participated in the Rain Garden Certification programs that were held in North, Central, and South Jersey. The participants' training included in-class modules on stormwater management and rain garden design, a mock rain garden site visit, and installation of demonstration rain gardens at nearby community locations. The program delivered the Rain Garden Certification program for the Bronx Environmental Stewardship Trainees (BEST) at Sustainable South Bronx in Bronx, New York. In 2010, the RCE Water Resources Program helped to install approximately thirty-two (32) demonstration rain gardens at publicly-accessible locations in five (5) states, including New Jersey, New York, Connecticut, New Hampshire, and Virginia. The staff of the RCE Water Resources Program has established working relationships with the stakeholders in each of these states to provide educational programs for each demonstration rain garden project installed.

**Results**

Pre- and post-tests as well as program evaluations are administered as part of the SWMIYB rain garden and rain barrel trainings and presentations. The results from the pre/post tests and program evaluations indicate that the respondents that have attended the SWMIYB rain garden and rain barrel programming are interested in changing their behavior when it comes to sustainable landscaping practices. Impacts included increased knowledge by educational class participants and their indication that they would implement practices at their homes to conserve water or prevent water pollution. For example, students in the environmentally-friendly turfgrass classes reported their knowledge on a range of lawn care practices increased from an overall average of 2.8 out of 5.0 to 4.5 out of 5.0. Eighty percent of these participants reported that following the class they would follow good management practices such as having their soil tested and seeking current best-management-practice guidelines for lawn fertilization. Similar results were documented for participants in rain barrel workshops, where an increase in knowledge about water conservation was documented and 83% percent of participants reported they would follow good stormwater management practices at their homes such as redirecting gutter downspouts to impervious areas.

During 2010, there were approximately 3,206 page loads, 2,269 unique visitors, 1,836 first time visitors, and 433 returning visitors to the rain garden main web page ([http://water.rutgers.edu/Rain\\_Gardens/RGWebsite/raingardens.html](http://water.rutgers.edu/Rain_Gardens/RGWebsite/raingardens.html)). During 2010, there were approximately 1,033 page loads, 855 unique visitors, 693 first time visitors, and 162 returning visitors to the "One Barrel at a Time" web page, ([http://water.rutgers.edu/Stormwater\\_Management/One\\_Barrel\\_Co-op.html](http://water.rutgers.edu/Stormwater_Management/One_Barrel_Co-op.html)). A comprehensive Rain Barrel webpage was maintained throughout 2010. There were approximately 6,560 page loads, 5,412 unique visitors, 4,355 first time visitors, and 1,057 returning visitors to the rain barrel web page, ([http://water.rutgers.edu/Stormwater\\_Management/rainbarrels.html](http://water.rutgers.edu/Stormwater_Management/rainbarrels.html)).

**4. Associated Knowledge Areas**

<b>KA Code</b>	<b>Knowledge Area</b>
102	Soil, Plant, Water, Nutrient Relationships
111	Conservation and Efficient Use of Water
112	Watershed Protection and Management
133	Pollution Prevention and Mitigation
605	Natural Resource and Environmental Economics

**Outcome #3**

**1. Outcome Measures**

Long Term - A safe and secure water supply for all communities and industries in the state. An effective and efficient nutrient-trading program that meets the needs of industry and meets the standards set by the state regulatory bodies.

Not Reporting on this Outcome Measure

**Outcome #4**

**1. Outcome Measures**

Medium Term - To identify representative pollutants and aquifer systems in New Jersey. To develop equilibrium isotherms to quantify the adsorption/desorption kinetics for the pollutant/soil/water systems. To develop breakthrough and leaching data for the pollutant/soil/water systems.

**2. Associated Institution Types**

- 1862 Extension
- 1862 Research

**3a. Outcome Type:**

Change in Action Outcome Measure

**3b. Quantitative Outcome**

Year	Quantitative Target	Actual
2010	{No Data Entered}	0

**3c. Qualitative Outcome or Impact Statement**

**Issue (Who cares and Why)**

Atmospheric Exchange of Organic Pollutants in the Aquatic and Terrestrial Environments

New Jersey is the most densely populated state in the nation as well as being home to industry and agricultural producers who unknowingly add pollutants to our water systems. This passes a risk to the Delaware River Basin.

**What has been done**

Data from the Contamination Assessment and Reduction Project (CARP) was analyzed in order to identify the sources of PCB 11 to the NY/NJ Harbor. DRBC, on the concentrations of PCB congeners in the effluents from dischargers on the Delaware River was analyzed via factor analysis methods. This analysis demonstrated that PCBs are dechlorinated in landfills, sewers, and in the groundwater at many contaminated sites.

**Results**

The measurements of atmospheric concentrations of PCBs in the Delaware River Basin demonstrate that atmospheric PCB levels in this region are declining over time. This information changed the calculation of how long it will take for the Delaware River to recover from PCB contamination and eventually achieve the water quality standard for PCBs. Analysis of the data from the CARP resulted in a change in knowledge by demonstrating that PCB 11 comes from a unique source: the use of printing inks containing diarylide yellow pigments. Therefore the current efforts employed to reduce PCB contamination to surface waters will not help to reduce PCB 11 concentrations. Concentrations of this congener alone often exceed the water quality standard for the sum of all PCB congeners. Thus, research analysis demonstrated that additional efforts are needed to control the sources of PCB 11 in order to achieve water quality standards for PCBs throughout the US. Analysis of the data set on PCB concentrations in effluents from NPDES permitted discharges to the Delaware River resulted in a change in knowledge by demonstrating the bacteria are able to dechlorinate (i.e. partially degrade) PCBs in a variety of environments. Dechlorination was previously thought to be a rare phenomenon occurring only in some sediments with high PCB concentrations. NJAES researchers' analysis indicates that this process is in fact widespread.

**4. Associated Knowledge Areas**

<b>KA Code</b>	<b>Knowledge Area</b>
102	Soil, Plant, Water, Nutrient Relationships
111	Conservation and Efficient Use of Water
112	Watershed Protection and Management
133	Pollution Prevention and Mitigation
605	Natural Resource and Environmental Economics

**Outcome #5**

**1. Outcome Measures**

Long Term - A safe and secure water supply for all communities and industries in the state. An effective and efficient nutrient-trading program that meets the needs of industry and meets the standards set by the state regulatory bodies.

**2. Associated Institution Types**

- 1862 Extension
- 1862 Research

**3a. Outcome Type:**

Change in Condition Outcome Measure

**3b. Quantitative Outcome**

<b>Year</b>	<b>Quantitative Target</b>	<b>Actual</b>
2010	{No Data Entered}	0

### 3c. Qualitative Outcome or Impact Statement

#### Issue (Who cares and Why)

##### Watershed Restoration and Protection Planning

Misuse of water resources by unknowing participants can create situations where too much fresh water is quickly diverted to streams and is routed out of the watershed in the cause of drainage. New Jersey continues to add urban and suburban areas while decreasing agriculture and open spaces. These changes in land use alter the hydrologic cycle by preventing rainwater from naturally infiltrating to the groundwater. If rainwater is allowed to infiltrate close to where it falls, natural aquifer recharge will occur. This will also reduce large volumes of runoff from entering streams quickly after rainfall. This simple bypassing of the natural hydrologic cycle eventually causes reduced aquifer recharge, flooding, stream bank erosion and reduced water quality.

#### What has been done

The RCE Water Resources Program has worked with state, county and municipal officials, as well as residents and non-profit groups, to clearly define and prioritize the issues facing New Jersey watersheds.

The RCE Water Resources Program has secured funding for Watershed Restoration and Protection Planning from several different agencies. Stormwater management projects have been installed within this watershed to increase groundwater recharge and improve water quality. These projects include the installation of porous pavers, bioretention systems and the stabilization of degrading slopes. The public works yard, long a source of high volume runoff with heavy concentrations of total suspended solids, was targeted for several projects that would result in a greener public works yard. This effort alone has spawned additional interest in addressing the concerns of sustainability by the public works departments of other municipalities.

#### Results

Implementation has started with the three Regional Stormwater Management Plans recently funded through NJDEP's 319(h) program. The implementation of these plans has been devised to reduce excess phosphorus, nitrogen, and total suspended solids to the waterways. These plans will also lead to a reduction of pathogens that are discharged to these impaired waters. Sustainable use and proper management of water resources will ensure there will be plenty available for future needs including agricultural drinking water, recreation and ecological sustenance.

### 4. Associated Knowledge Areas

KA Code	Knowledge Area
102	Soil, Plant, Water, Nutrient Relationships
111	Conservation and Efficient Use of Water
112	Watershed Protection and Management
133	Pollution Prevention and Mitigation
605	Natural Resource and Environmental Economics

## **V(H). Planned Program (External Factors)**

### **External factors which affected outcomes**

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

### **Brief Explanation**

## **V(I). Planned Program (Evaluation Studies and Data Collection)**

### **1. Evaluation Studies Planned**

- Before-After (before and after program)
- During (during program)
- Time series (multiple points before and after program)
- Comparisons between program participants (individuals, group, organizations) and non-participants
- Comparisons between different groups of individuals or program participants experiencing different levels of program intensity.
- Comparison between locales where the program operates and sites without program intervention

### **Evaluation Results**

See Qualitative Outcome or Impact Statements

### **Key Items of Evaluation**

**V(A). Planned Program (Summary)**

**Program # 2**

**1. Name of the Planned Program**

Youth/Adult Obesity

**V(B). Program Knowledge Area(s)**

**1. Program Knowledge Areas and Percentage**

KA Code	Knowledge Area	%1862 Extension	%1890 Extension	%1862 Research	%1890 Research
701	Nutrient Composition of Food	10%		10%	
702	Requirements and Function of Nutrients and Other Food Components	10%		10%	
703	Nutrition Education and Behavior	25%		25%	
704	Nutrition and Hunger in the Population	15%		15%	
724	Healthy Lifestyle	40%		40%	
	<b>Total</b>	100%		100%	

**V(C). Planned Program (Inputs)**

**1. Actual amount of professional FTE/SYs expended this Program**

Year: 2010	Extension		Research	
	1862	1890	1862	1890
Plan	6.0	0.0	5.0	0.0
Actual	30.0	0.0	5.0	0.0

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

Extension		Research	
Smith-Lever 3b & 3c	1890 Extension	Hatch	Evans-Allen
679733	0	143691	0
1862 Matching	1890 Matching	1862 Matching	1890 Matching
1587707	0	1026378	0
1862 All Other	1890 All Other	1862 All Other	1890 All Other
438905	0	1386536	0

**V(D). Planned Program (Activity)**

**1. Brief description of the Activity**

- To identify the factors that promote excessive weight gain as well as protect against childhood obesity
- Measure how children born small for age are different with respect to body composition and risk for diabetes prior to developing diabetes or obesity.
- Investigate how perilipin A works in adipocytes to control fat storage and fat breakdown.
- Collect and analyze data on obesity-related measures (i.e., BMI) in adults and children
- Examine how weight loss affects calcium absorption and bone mass
- Create a multidisciplinary program comprising of faculty, staff, the medical community, industry partners and government officials
- Conduct adult/youth education and deliver targeted messages on healthy food choices and increased physical activity education using the following strategies:

**Direct Methods:**

- Educate Youth
- Educate Parents
- Educate Volunteers
- Food and Fitness Ambassadors
- Educate Child Health Summit Professionals
- Educate Teachers/School Nurses
- Educate Communities

**Indirect Methods:**

- Website
- Social Marketing

**2. Brief description of the target audience**

- Clinicians, Physicians and Nurses
- Health Care Professionals
- Hospitals (including teaching hospitals)
- Staff and students who gain valuable scientific experience
- Industry partners that benefit from fundamental and applied research in obesity and related chronic diseases
- Communities that benefit from increased knowledge about the mechanisms involved in obesity
- Other faculty and staff working on similar research
- Health-related organizations and foundations interested in obesity/nutrition issues
- School Age Youth
- Teens
- Teachers
- After School Providers
- Parents
- Volunteers
- Extension Professionals
- State and County Agencies and Organizations
- Schools

**V(E). Planned Program (Outputs)**

**1. Standard output measures**

2010	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
<b>Plan</b>	4500	22000	2500	2000
<b>Actual</b>	20641	16404	2134	2134

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

**Patent Applications Submitted**

Year: 2010  
 Plan: 0  
 Actual: 0

**Patents listed**

**3. Publications (Standard General Output Measure)**

**Number of Peer Reviewed Publications**

2010	Extension	Research	Total
<b>Plan</b>	6	22	
<b>Actual</b>	26	37	63

**V(F). State Defined Outputs**

**Output Target**

**Output #1**

**Output Measure**

- A variety of strategies will be implemented to reach target audiences. This will include and not be limited to workshops, field visits, classes, newsletters, media releases, electronic communications, publications. In addition a trained volunteer teaching base will be developed. Quantitative reports of participation will be collected  
 Not reporting on this Output for this Annual Report

**V(G). State Defined Outcomes**

**V. State Defined Outcomes Table of Content**

O. No.	OUTCOME NAME
1	Short Term - Individuals gain awareness, knowledge, skills related to: Attitudes about healthy eating for adults/youth. Healthy food choices for adults/youth. Selection of healthy foods for adults/youth. Benefits of physical activity (reduced overweight and obesity, reduced risk of diabetes, heart disease and cancer.) Physical activity recommendations for health for adults/youth. Identify factors that promote excessive weight gain and protect against childhood obesity. Understand the molecular mechanisms of lipid transport in the intestinal cell. Demonstrate the affects on calcium absorbtion and bone mass by weight loss
2	Medium Term - Individuals incorporate skills/change behaviors related to: Increased adoption of healthy food practices. Increased consumption of fruits, vegetables, whole grains and low-fat dairy. Increased participation in family meals. Increased participation in physical activity. Increased participation in family-related physical activity. Increased use of new 'campaign' website. Improved understanding of the relationship between early nutrition and later risk for chronic disease. Understanding the process by which perilipins at the surface of lipid droplets control how much energy is released from the adipocyte at times of need. Understanding how the intestines and body uptake and process dairy fat. Identify genes, their protein product and how the proteins influence the way the body processes fat.
3	Long Term - Individuals experience: Decreased overweight and obesity for youth/adults. Decreased risk factors for nutrition-related health problems and chronic diseases that are affected by diet and physical activity for youth/adults. A clear and comprehensive understanding of the genetic and physiological mechanisms of obesity and related chronic diseases. Pharmacological and/or medical treatments to alleviate the effects of obesity and related diseases.
4	Medium Term - Healthy Teen Expo: Individuals incorporate skills/change behaviors related to: Increased adoption of healthy food practices. Increased consumption of fruits, vegetables, whole grains and low-fat dairy. Increased participation in family meals. Increased participation in physical activity. Increased participation in family-related physical activity. Increased use of new 'campaign' website. Improved understanding of the relationship between early nutrition and later risk for chronic disease. Understanding the process by which perilipins at the surface of lipid droplets control how much energy is released from the adipocyte at times of need. Understanding how the intestines and body uptake and process dairy fat. Identify genes, their protein product and how the proteins influence the way the body processes fat.
5	Medium Term - Health Finance Education: Individuals incorporate skills/change behaviors related to: Increased adoption of healthy food practices. Increased consumption of fruits, vegetables, whole grains and low-fat dairy. Increased participation in family meals. Increased participation in physical activity. Increased participation in family-related physical activity. Increased use of new 'campaign' website. Improved understanding of the relationship between early nutrition and later risk for chronic disease. Understanding the process by which perilipins at the surface of lipid droplets control how much energy is released from the adipocyte at times of need. Understanding how the intestines and body uptake and process dairy fat. Identify genes, their protein product and how the proteins influence the way the body processes fat.
6	Medium Term - Promoting Healthful Eating to Prevent Excessive Weight in Young Adults: Individuals incorporate skills/change behaviors related to: Increased adoption of healthy food practices. Increased consumption of fruits, vegetables, whole grains and low-fat dairy. Increased participation in family meals. Increased participation in physical activity. Increased

	<p>participation in family-related physical activity. Increased use of new 'campaign' website. Improved understanding of the relationship between early nutrition and later risk for chronic disease. Understanding the process by which perilipins at the surface of lipid droplets control how much energy is released from the adipocyte at times of need. Understanding how the intestines and body uptake and process dairy fat. Identify genes, their protein product and how the proteins influence the way the body processes fat.</p>
7	<p>Medium Term - Instrumental and Sensory Characteristics of Nutritionally Improved School Meals: Individuals incorporate skills/change behaviors related to: Increased adoption of healthy food practices. Increased consumption of fruits, vegetables, whole grains and low-fat dairy. Increased participation in family meals. Increased participation in physical activity. Increased participation in family-related physical activity. Increased use of new 'campaign' website. Improved understanding of the relationship between early nutrition and later risk for chronic disease. Understanding the process by which perilipins at the surface of lipid droplets control how much energy is released from the adipocyte at times of need. Understanding how the intestines and body uptake and process dairy fat. Identify genes, their protein product and how the proteins influence the way the body processes fat.</p>
8	<p>Medium Term - Aspartame Impact: Individuals incorporate skills/change behaviors related to: Increased adoption of healthy food practices. Increased consumption of fruits, vegetables, whole grains and low-fat dairy. Increased participation in family meals. Increased participation in physical activity. Increased participation in family-related physical activity. Increased use of new 'campaign' website. Improved understanding of the relationship between early nutrition and later risk for chronic disease. Understanding the process by which perilipins at the surface of lipid droplets control how much energy is released from the adipocyte at times of need. Understanding how the intestines and body uptake and process dairy fat. Identify genes, their protein product and how the proteins influence the way the body processes fat.</p>

**Outcome #1**

**1. Outcome Measures**

Short Term - Individuals gain awareness, knowledge, skills related to: Attitudes about healthy eating for adults/youth. Healthy food choices for adults/youth. Selection of healthy foods for adults/youth. Benefits of physical activity (reduced overweight and obesity, reduced risk of diabetes, heart disease and cancer.) Physical activity recommendations for health for adults/youth. Identify factors that promote excessive weight gain and protect against childhood obesity. Understand the molecular mechanisms of lipid transport in the intestinal cell. Demonstrate the affects on calcium absorbtion and bone mass by weight loss

Not Reporting on this Outcome Measure

**Outcome #2**

**1. Outcome Measures**

Medium Term - Individuals incorporate skills/change behaviors related to: Increased adoption of healthy food practices. Increased consumption of fruits, vegetables, whole grains and low-fat dairy. Increased participation in family meals. Increased participation in physical activity. Increased participation in family-related physical activity. Increased use of new 'campaign' website. Improved understanding of the relationship between early nutrition and later risk for chronic disease. Understanding the process by which perilipins at the surface of lipid droplets control how much

energy is released from the adipocyte at times of need. Understanding how the intestines and body uptake and process dairy fat. Identify genes, their protein product and how the proteins influence the way the body processes fat.

**2. Associated Institution Types**

- 1862 Extension
- 1862 Research

**3a. Outcome Type:**

Change in Action Outcome Measure

**3b. Quantitative Outcome**

Year	Quantitative Target	Actual
2010	14500	0

**3c. Qualitative Outcome or Impact Statement**

**Issue (Who cares and Why)**

Diabetes Caregiver Training Program

Diabetes presents a serious life challenge to both the individuals directly affected by this disease, as well as the caregivers, family members, coworkers, and others who live, work, or otherwise support the activities of daily living of people with diabetes.

**What has been done**

In 2010 3 different organizations participated in training sessions. Key content areas reflect information/skills pertinent to consumer decision making for better health outcomes with diabetes, including separating myths from facts about diabetes, preventing hypoglycemia (low blood glucose), understanding the role of food on blood glucose levels, and identifying strategies to eat healthier and to be more physically active.

**Results**

Improved nutrition/physical activity practices, better supporting diabetes management, and improved practices for social services agencies serving people at risk/diagnosed with diabetes: At follow-up, 93% of respondents ranked the program as very valuable or valuable 83% reported being able to use the information in some way, and an additional 13% planned to.

Specifically:

- 98% were planning/preparing healthier meals/snacks
- 90% of participants reported a better understanding of the issues of living with diabetes
- 94% reported feeling more confident in helping themselves or others live better with diabetes
- 94% reported being more aware of personal risk factors for diabetes
- 94% reported being more prepared to prevent/recognize/treat hypoglycemia
- 93% reported using a food label to identify nutrients in foods
- 85% were able to locate/use reliable resources on diabetes

Staff participation in this training has led to successful and continued re-licensing of a participating social services organization, due to improved education and skills in client nutrition

management. Training is now mandatory and conducted bi-annually for all new group home staff.

**4. Associated Knowledge Areas**

<b>KA Code</b>	<b>Knowledge Area</b>
701	Nutrient Composition of Food
702	Requirements and Function of Nutrients and Other Food Components
703	Nutrition Education and Behavior
704	Nutrition and Hunger in the Population
724	Healthy Lifestyle

**Outcome #3**

**1. Outcome Measures**

Long Term - Individuals experience: Decreased overweight and obesity for youth/adults. Decreased risk factors for nutrition-related health problems and chronic diseases that are affected by diet and physical activity for youth/adults. A clear and comprehensive understanding of the genetic and physiological mechanisms of obesity and related chronic diseases. Pharmacological and/or medical treatments to alleviate the effects of obesity and related diseases.

**2. Associated Institution Types**

- 1862 Extension
- 1862 Research

**3a. Outcome Type:**

Change in Condition Outcome Measure

**3b. Quantitative Outcome**

<b>Year</b>	<b>Quantitative Target</b>	<b>Actual</b>
2010	19000	0

**3c. Qualitative Outcome or Impact Statement**

**Issue (Who cares and Why)**  
{No Data Entered}

**What has been done**  
{No Data Entered}

**Results**  
{No Data Entered}

#### 4. Associated Knowledge Areas

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

#### Outcome #4

##### 1. Outcome Measures

Medium Term - Healthy Teen Expo: Individuals incorporate skills/change behaviors related to: Increased adoption of healthy food practices. Increased consumption of fruits, vegetables, whole grains and low-fat dairy. Increased participation in family meals. Increased participation in physical activity. Increased participation in family-related physical activity. Increased use of new 'campaign' website. Improved understanding of the relationship between early nutrition and later risk for chronic disease. Understanding the process by which perilipins at the surface of lipid droplets control how much energy is released from the adipocyte at times of need. Understanding how the intestines and body uptake and process dairy fat. Identify genes, their protein product and how the proteins influence the way the body processes fat.

##### 2. Associated Institution Types

- 1862 Extension
- 1862 Research

##### 3a. Outcome Type:

Change in Action Outcome Measure

##### 3b. Quantitative Outcome

Year	Quantitative Target	Actual
2010	{No Data Entered}	0

##### 3c. Qualitative Outcome or Impact Statement

###### Issue (Who cares and Why)

Healthy Teen Expo

According to the Centers for Disease Control (CDC), more than one third of U.S. adults, more than 72 million people, and 17% of children are obese. From 1980 through 2008, obesity rates for adults have doubled and rates for children have tripled. The health consequences of obesity are numerous, including heart disease, Type 2 diabetes, various cancers, high blood pressure, high cholesterol and other conditions.

###### What has been done

The Healthy Teen Expo is a highly interactive wellness event that engages middle and high school students in a school-based event that takes existing knowledge of healthy lifestyle and physical activity and improves the retention of learning after the event. The goal is for students to

live longer, healthier lives by understanding the importance of proper nutrition and physical activity, learning ways to make healthy eating and physical activity a part of their daily lives, changing eating habits by making healthy food choices, and including physical activity in their daily lives.

**Results**

Follow-up results revealed the following changes in behavior:

- 35% eat more meals with the family
- 45% increased consumption of fruits and vegetables
- 33% controlled portion sizes
- 59% increased physical activity to 60 minutes per day
- 50% decreased screen time on TV/computers/video games
- 46% decreased consumption of sugar-sweetened beverages
- 25% read nutrition fact labels for serving size or calorie information

**4. Associated Knowledge Areas**

<b>KA Code</b>	<b>Knowledge Area</b>
701	Nutrient Composition of Food
702	Requirements and Function of Nutrients and Other Food Components
703	Nutrition Education and Behavior
704	Nutrition and Hunger in the Population
724	Healthy Lifestyle

**Outcome #5**

**1. Outcome Measures**

Medium Term - Health Finance Education: Individuals incorporate skills/change behaviors related to: Increased adoption of healthy food practices. Increased consumption of fruits, vegetables, whole grains and low-fat dairy. Increased participation in family meals. Increased participation in physical activity. Increased participation in family-related physical activity. Increased use of new 'campaign' website. Improved understanding of the relationship between early nutrition and later risk for chronic disease. Understanding the process by which perilipins at the surface of lipid droplets control how much energy is released from the adipocyte at times of need. Understanding how the intestines and body uptake and process dairy fat. Identify genes, their protein product and how the proteins influence the way the body processes fat.

**2. Associated Institution Types**

- 1862 Extension
- 1862 Research

**3a. Outcome Type:**

Change in Action Outcome Measure

**3b. Quantitative Outcome**

Year	Quantitative Target	Actual
2010	{No Data Entered}	0

**3c. Qualitative Outcome or Impact Statement**

**Issue (Who cares and Why)**

Health Finance Education

With passage of a new health care law and high unemployment rates during 2010, much attention was paid to health and personal finances and relationships between both aspects of people's lives. Major societal problems that have been widely reported in recent years include an increasing incidence of diabetes, more overweight and obese adults and children, low household savings rates, and high household debt and bankruptcy rates.

**What has been done**

An NJAES Specialist provides national leadership to Small Steps to Health and Wealth (SSHW), a national Cooperative Extension program that integrates health and personal finance subject matter and encourages participants to simultaneously improve both aspects of their lives. The target audience for SSHW and its associated Small Steps to Health and Wealth (SSHW) Challenge is persons age 25 to 65. Program outputs during the past year include new archived monthly health and financial messages on the SSHW web page, <http://njaes.rutgers.edu/sshw/>, and continued capacity building training for Cooperative Extension staff nationwide including SSHW Webinars for two national professional organizations.

**Results**

In 2010, steps were taken to position Small Steps to Health and Wealth (SSHW) as a "signature" program of NIFA, USDA. Three five- or six-week competitive online SSHW Challenges were held in 2010. Survey findings indicated that the online SSHW challenge fostered positive health and financial behavior changes with the following results reported in the three challenges: Eat healthier foods (60%, 68%, 71%), Increased physical activity (40%, 46%, 86%), Improved spending habits (36%, 47%, 57%), Lost weight (13%, 33%, 43%), and Saved money (27%, 47%, 71%).

**4. Associated Knowledge Areas**

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

**Outcome #6**

**1. Outcome Measures**

Medium Term - Promoting Healthful Eating to Prevent Excessive Weight in Young Adults: Individuals incorporate skills/change behaviors related to: Increased adoption of healthy food practices. Increased consumption of fruits, vegetables, whole grains and low-fat dairy. Increased participation in family meals. Increased participation in physical activity. Increased participation in family-related physical activity. Increased use of new 'campaign' website. Improved understanding of the relationship between early nutrition and later risk for chronic disease. Understanding the process by which perilipins at the surface of lipid droplets control how much energy is released from the adipocyte at times of need. Understanding how the intestines and body uptake and process dairy fat. Identify genes, their protein product and how the proteins influence the way the body processes fat.

**2. Associated Institution Types**

- 1862 Extension
- 1862 Research

**3a. Outcome Type:**

Change in Action Outcome Measure

**3b. Quantitative Outcome**

Year	Quantitative Target	Actual
2010	{No Data Entered}	0

**3c. Qualitative Outcome or Impact Statement**

**Issue (Who cares and Why)**

Promoting Healthful Eating to Prevent Excessive Weight in Young Adults

The obesity epidemic impacts young adults and the rates of obesity are extremely high in New Jersey. Interventions may impact weight gain for 18-24 year old population.

**What has been done**

A multi-state community based participatory research project guided by the PRECEDE-PROCEED model involved the community directly in the research process to help the community gain awareness of, and interest in the issues that must be addressed to successfully prevent obesity in young adults. A 10-week online intervention (Young Adults Eating and Active for Health [Y.E.A.H] project trained 10 undergraduate research assistants to conduct anthropometric (height, weight, waist circumference), blood pressure, and biochemical measurements (blood glucose and lipids).

**Results**

The Y.E.A.H. project is the first to systematically develop and test a tailored, web-based program to prevent excessive weight gain in the 18-24 year old population using the community

based research process of PRECEDE-PROCEED. Results of the pilot test indicate that this intervention is on track to promote healthy weights in the target population. Involving the community directly in the assessment of the physical environment in terms of how it advocates and supports physical activity, consumption of healthful foods, and overall health helps the community gain awareness of an interest in the issues that must be addressed to prevent obesity in young adults.

**4. Associated Knowledge Areas**

<b>KA Code</b>	<b>Knowledge Area</b>
701	Nutrient Composition of Food
702	Requirements and Function of Nutrients and Other Food Components
703	Nutrition Education and Behavior
704	Nutrition and Hunger in the Population
724	Healthy Lifestyle

**Outcome #7**

**1. Outcome Measures**

Medium Term - Instrumental and Sensory Characteristics of Nutritionally Improved School Meals: Individuals incorporate skills/change behaviors related to: Increased adoption of healthy food practices. Increased consumption of fruits, vegetables, whole grains and low-fat dairy. Increased participation in family meals. Increased participation in physical activity. Increased participation in family-related physical activity. Increased use of new 'campaign' website. Improved understanding of the relationship between early nutrition and later risk for chronic disease. Understanding the process by which perilipins at the surface of lipid droplets control how much energy is released from the adipocyte at times of need. Understanding how the intestines and body uptake and process dairy fat. Identify genes, their protein product and how the proteins influence the way the body processes fat.

**2. Associated Institution Types**

- 1862 Extension
- 1862 Research

**3a. Outcome Type:**

Change in Action Outcome Measure

**3b. Quantitative Outcome**

<b>Year</b>	<b>Quantitative Target</b>	<b>Actual</b>
2010	{No Data Entered}	0

**3c. Qualitative Outcome or Impact Statement**

**Issue (Who cares and Why)**

### Instrumental and Sensory Characteristics of Nutritionally Improved School Meals

In New Jersey 31% of youth ages 10-17 are considered overweight or obese and 35% of younger children age 3-5 are considered obese. These rates are unacceptably high and a very serious problem.

#### What has been done

NJAES researchers have shared project results with the staff of New Jersey Child Nutrition Bureau and New Jersey Food Distribution Program. Presented information provided scientific support to help in the implementation of new State and Federal guidelines counteracting growing rate of obesity among children and adolescents. Researchers also evaluated and compared the quality of the selected traditional and nutritionally improved school lunch products.

#### Results

The results of this research contributed to the efforts to improve eating and nutritional quality of over 500,000 school lunches served daily in New Jersey. The findings of this project were made available to the local New Jersey food processors to help them meet new quality requirements for school meals. These results provide scientific basis that will contribute to the actions of government agencies and food processors in the implementation of new nutritional standards and requirements.

#### 4. Associated Knowledge Areas

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

#### Outcome #8

##### 1. Outcome Measures

Medium Term - Aspartame Impact: Individuals incorporate skills/change behaviors related to: Increased adoption of healthy food practices. Increased consumption of fruits, vegetables, whole grains and low-fat dairy. Increased participation in family meals. Increased participation in physical activity. Increased participation in family-related physical activity. Increased use of new 'campaign' website. Improved understanding of the relationship between early nutrition and later risk for chronic disease. Understanding the process by which perilipins at the surface of lipid droplets control how much energy is released from the adipocyte at times of need. Understanding how the intestines and body uptake and process dairy fat. Identify genes, their protein product and how the proteins influence the way the body processes fat.

##### 2. Associated Institution Types

- 1862 Extension
- 1862 Research

**3a. Outcome Type:**

Change in Action Outcome Measure

**3b. Quantitative Outcome**

Year	Quantitative Target	Actual
2010	{No Data Entered}	0

**3c. Qualitative Outcome or Impact Statement**

**Issue (Who cares and Why)**

Aspartame Impact

Nationally, obesity is at epidemic levels. In an effort to combat obesity consumers are turning to non-nutritive sweetness such as aspartame, which is added to diet sodas and food products.

**What has been done**

Over the last few years, NJAES researchers have been examining the effects of aspartame, a widely-used sugar substitute, in rats given a junk-food diet. As expected, rats on a junk food diet gain more weight than rats fed Purina rat chow. The data thus far suggest that aspartame prevents weight gain when a low-calorie, healthy diet is eaten, but promotes weight gain when an unhealthy, high-calorie diet is consumed.

**Results**

Results to date also indicate that aspartame increases cravings for carbohydrates and fats but decreases cravings for sugar. Another focus of this research is on long-term effects of aspartame in tissues of animals fed a junk food diet. Very few long-term aspartame studies exist to demonstrate the compound's effects. Aspartame is known to be completely metabolized in the gut and absorbed as phenylalanine (50%), aspartic acid (40%), and methanol (10%). Methanol is converted in the body to formate, which can either be excreted or produce byproducts like formaldehyde, diketopiperazine (a carcinogen), and a number of other highly toxic derivatives. Therefore, it is possible that long-term accumulation of aspartame byproducts may cause changes in tissue morphology. An evaluation of the slides indicates that the rats that drank the aspartame solution were more prone to tubular proteinosis in the kidneys and fatty degeneration in the liver. This data suggest that long-term ingestion of aspartame may result in kidney and liver pathologies. These preliminary laboratory-based findings raise some troubling questions about the longer-term potential health impacts of aspartame, which is the primary non-nutritive sweetener in diet soda and a common additive in many individuals' diets. Certainly, more research is needed to determine confirm these results in the laboratory and to explore the implications for human consumption of aspartame.

**4. Associated Knowledge Areas**

**KA Code    Knowledge Area**

701	Nutrient Composition of Food
702	Requirements and Function of Nutrients and Other Food Components
703	Nutrition Education and Behavior
704	Nutrition and Hunger in the Population
724	Healthy Lifestyle

#### **V(H). Planned Program (External Factors)**

##### **External factors which affected outcomes**

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

##### **Brief Explanation**

#### **V(I). Planned Program (Evaluation Studies and Data Collection)**

##### **1. Evaluation Studies Planned**

- After Only (post program)
- Retrospective (post program)
- Before-After (before and after program)
- Time series (multiple points before and after program)
- Comparisons between program participants (individuals, group, organizations) and non-participants
- Comparisons between different groups of individuals or program participants experiencing different levels of program intensity.
- Comparison between locales where the program operates and sites without program intervention

##### **Evaluation Results**

See Qualitative or Impact Statements

##### **Key Items of Evaluation**

**V(A). Planned Program (Summary)**

**Program # 3**

**1. Name of the Planned Program**

Indoor Air Quality

**V(B). Program Knowledge Area(s)**

**1. Program Knowledge Areas and Percentage**

KA Code	Knowledge Area	%1862 Extension	%1890 Extension	%1862 Research	%1890 Research
723	Hazards to Human Health and Safety				
804	Human Environmental Issues Concerning Apparel, Textiles, and Residential and Commercial Structures				
	<b>Total</b>				

**V(C). Planned Program (Inputs)**

**1. Actual amount of professional FTE/SYs expended this Program**

Year: 2010	Extension		Research	
	1862	1890	1862	1890
Plan	0.0	0.0	3.0	0.0
Actual	{NO DATA ENTERED}	{NO DATA ENTERED}	{NO DATA ENTERED}	{NO DATA ENTERED}

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

Extension		Research	
Smith-Lever 3b & 3c	1890 Extension	Hatch	Evans-Allen
{NO DATA ENTERED}	{NO DATA ENTERED}	{NO DATA ENTERED}	{NO DATA ENTERED}
1862 Matching	1890 Matching	1862 Matching	1890 Matching
{NO DATA ENTERED}	{NO DATA ENTERED}	{NO DATA ENTERED}	{NO DATA ENTERED}
1862 All Other	1890 All Other	1862 All Other	1890 All Other
{NO DATA ENTERED}	{NO DATA ENTERED}	{NO DATA ENTERED}	{NO DATA ENTERED}

**V(D). Planned Program (Activity)**

**1. Brief description of the Activity**

**2. Brief description of the target audience**

**V(E). Planned Program (Outputs)**

**1. Standard output measures**

2010	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
<b>Plan</b>	200	2000	0	0
<b>Actual</b>	0	0	0	0

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

**Patent Applications Submitted**

Year: 2010  
 Plan: 0  
 Actual: 0

**Patents listed**

**3. Publications (Standard General Output Measure)**

**Number of Peer Reviewed Publications**

2010	Extension	Research	Total
<b>Plan</b>	0	10	
<b>Actual</b>	0	0	0

**V(F). State Defined Outputs**

**Output Target**

**Output #1**

**Output Measure**

- Targetted audiences will be engaged in workshops and participant in demonstrations, training sessions and field visits.

Year	Target	Actual
2010	2200	0

**V(G). State Defined Outcomes**

**V. State Defined Outcomes Table of Content**

O. No.	OUTCOME NAME
1	Short Term - Increased recognition of environmental respiratory disease hazards in the residential dwellings provide service to realtors, lenders, inspectors, construction trades. Increased awareness of policies related to indoor air. Increased knowledge of indoor air pollution composition, especially particulate matter. Establish a comprehensive asthma surveillance program. Individuals have fewer emergency room and acute care visits related to asthma and other respiratory disease. Health professionals have increased continuing professional development on environmental respiratory disease. Families with children at-risk for lead poisoning have their children tested. Public health work force and healthcare providers have knowledge of environmental hazards in the home.
2	Medium Term - Increased number of buildings constructed to meet indoor air quality guidelines. Increased awareness of environmental respiratory disease among communities, healthcare providers and individuals. Increased access to knowledgeable healthcare providers and information sources. Increased use of uniform case definition and diagnostic protocols for respiratory disease. Increased ability to respond to indoor air problems by public health agencies. Increased number of homes at-risk that have participated in the NJ 'Lead-Safe' or 'Lead-Safe' Registry.
3	Long Term - Residents have reduced exposure to environmental determinants that contribute to respiratory disease. Residents with respiratory disease successfully manage their disease in accordance with recommended practices. Accurate diagnosis of environmental respiratory disease. New construction meets the criteria to have good indoor air quality. The best available technology is used to remediate homes for lead or radon.

### **Outcome #1**

#### **1. Outcome Measures**

Short Term - Increased recognition of environmental respiratory disease hazards in the residential dwellings provide service to realtors, lenders, inspectors, construction trades. Increased awareness of policies related to indoor air. Increased knowledge of indoor air pollution composition, especially particulate matter. Establish a comprehensive asthma surveillance program. Individuals have fewer emergency room and acute care visits related to asthma and other respiratory disease. Health professionals have increased continuing professional development on environmental respiratory disease. Families with children at-risk for lead poisoning have their children tested. Public health work force and healthcare providers have knowledge of environmental hazards in the home.

Not Reporting on this Outcome Measure

### **Outcome #2**

#### **1. Outcome Measures**

Medium Term - Increased number of buildings constructed to meet indoor air quality guidelines. Increased awareness of environmental respiratory disease among communities, healthcare providers and individuals. Increased access to knowledgeable healthcare providers and information sources. Increased use of uniform case definition and diagnostic protocols for respiratory disease. Increased ability to respond to indoor air problems by public health agencies. Increased number of homes at-risk that have participated in the NJ 'Lead-Safe' or 'Lead-Safe' Registry.

Not Reporting on this Outcome Measure

### **Outcome #3**

#### **1. Outcome Measures**

Long Term - Residents have reduced exposure to environmental determinants that contribute to respiratory disease. Residents with respiratory disease successfully manage their disease in accordance with recommended practices. Accurate diagnosis of environmental respiratory disease. New construction meets the criteria to have good indoor air quality. The best available technology is used to remediate homes for lead or radon.

Not Reporting on this Outcome Measure

### **V(H). Planned Program (External Factors)**

#### **External factors which affected outcomes**

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

#### **Brief Explanation**

{No Data Entered}

### **V(I). Planned Program (Evaluation Studies and Data Collection)**

#### **1. Evaluation Studies Planned**

- Before-After (before and after program)
- During (during program)
- Time series (multiple points before and after program)
- Comparisons between program participants (individuals, group, organizations) and non-participants
- Comparisons between different groups of individuals or program participants experiencing different levels of program intensity.
- Comparison between locales where the program operates and sites without program intervention

#### **Evaluation Results**

{No Data Entered}

#### **Key Items of Evaluation**

{No Data Entered}

**V(A). Planned Program (Summary)**

**Program # 4**

**1. Name of the Planned Program**

4-H Youth Development

**V(B). Program Knowledge Area(s)**

1. Program Knowledge Areas and Percentage

KA Code	Knowledge Area	%1862 Extension	%1890 Extension	%1862 Research	%1890 Research
806	Youth Development	100%		100%	
	<b>Total</b>	100%		100%	

**V(C). Planned Program (Inputs)**

1. Actual amount of professional FTE/SYs expended this Program

Year: 2010	Extension		Research	
	1862	1890	1862	1890
Plan	30.0	0.0	1.0	0.0
Actual	36.0	0.0	0.0	0.0

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

Extension		Research	
Smith-Lever 3b & 3c	1890 Extension	Hatch	Evans-Allen
447278	0	0	0
1862 Matching	1890 Matching	1862 Matching	1890 Matching
1624387	0	0	0
1862 All Other	1890 All Other	1862 All Other	1890 All Other
576765	0	0	0

**V(D). Planned Program (Activity)**

1. Brief description of the Activity

- Positive Youth Development:**
- Employ Essential Elements (belonging, independence, mastery and generosity) as the basis for life skill development and related workforce development skills.
  - Utilize Experiential Education Model (Experience, Share, Process, Generalize, Apply).

Provide opportunities for youth to:

- Feel and believe that they are cared about by others (Attachment, Belonging, Connection)
- Feel and believe they are capable and successful (Achievement, Mastery, Competence)
- Know they are able to influence people and events (Autonomy, Power, Confidence)
- Practice helping others through youth's own generosity (Altruism, Purpose, Contribution)

**Subject matter:**

(USDA/CSREES Mission Mandates)

Science, Engineering, Technology (includes: science literacy, animal science, plant science, environmental science, life sciences, etc) Citizenship (includes youth engagement, community youth development, community service, character development, civic engagement, etc) Healthy Lifestyles (includes chemical health, mental and emotional health, foods & nutrition, physical health and safety, etc).

**2. Brief description of the target audience**

- School Age Youth (K - 13, one year out of high school) and their Parents
- 4-H Volunteers (adult and youth)
- Teachers/Educators/other Youth Development Educators
- School Age Child Care Providers
- College Students (interns, collegiate 4-H)
- Other Extension Professionals and University Partners
- Communities: Stakeholders and Non-Profit, Social Service, Government Agencies
- Under-served and Under-represented Audiences

**Delivery modes:**

- 4-H Clubs and Related Activities
- 4-H Afterschool (clubs and short-term programs)
- 4-H School Enrichment
- 4-H Special Interest
- 4-H Camping (day camps and overnight camping)
- 4-H Mentoring and Individual Study

**V(E). Planned Program (Outputs)**

**1. Standard output measures**

2010	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
<b>Plan</b>	2350	11500	46500	21500
<b>Actual</b>	2298	29410	50412	43350

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

**Patent Applications Submitted**

Year: 2010  
 Plan: 0  
 Actual: 0

**Patents listed**

**3. Publications (Standard General Output Measure)**

**Number of Peer Reviewed Publications**

<b>2010</b>	<b>Extension</b>	<b>Research</b>	<b>Total</b>
<b>Plan</b>	7	0	
<b>Actual</b>	22	0	22

**V(F). State Defined Outputs**

**Output Target**

**Output #1**

**Output Measure**

- A variety of strategies will be implemented to reach target audiences. This will include and not be limited to workshops, field visits, classes, newsletters, media releases, electronic communications, and publications. In addition a trained volunteer teaching base will be developed. Quantitative reports of participation will be collected.  
Not reporting on this Output for this Annual Report

**V(G). State Defined Outcomes**

**V. State Defined Outcomes Table of Content**

O. No.	OUTCOME NAME
1	Short Term - Youth increase awareness, knowledge, attitudes, and skills related to essential elements, workforce development, life skill development, and relevant subject matter. Volunteers increase knowledge and awareness of practices fostering positive youth development, including youth/adult partnerships. Youth development professionals and stakeholders increase awareness and knowledge of problems and solutions supporting positive youth development, including: policies that need to be addressed, community resources and support.
2	Medium Term - Youth apply knowledge, attitudes, skills, and behaviors needed to become competent, caring and contributing citizens by: taking on leadership roles in their youth organizations and schools, and working in partnership with adults in a variety of settings. Youth and adults demonstrate effective partnerships through increased youth participation on advisory committees and other governing bodies. Volunteers and youth development professionals apply practices fostering positive youth development.
3	Long Term - Youth demonstrate mastery and competencies needed to become engaged citizens by assuming leadership positions in communities; developing and implementing action plans to address community needs, and becoming productive members of the workforce. 4-H youth are engaged partners in decision making regarding RCE programming including but not limited to 4-H youth development programming. 4-H alumni and volunteers become engaged citizens by assuming leadership positions in communities. Youth development professionals and stakeholders influence decision makers in policy development related to youth development needs and issues.
4	Medium Term - State 4-H Youth Residential Summer Camp Program: Youth apply knowledge, attitudes, skills, and behaviors needed to become competent, caring and contributing citizens by: taking on leadership roles in their youth organizations and schools, and working in partnership with adults in a variety of settings. Youth and adults demonstrate effective partnerships through increased youth participation on advisory committees and other governing bodies. Volunteers and youth development professionals apply practices fostering positive youth development.
5	Medium Term - State Rutgers 4-H Summer Science Program: Youth apply knowledge, attitudes, skills, and behaviors needed to become competent, caring and contributing citizens by: taking on leadership roles in their youth organizations and schools, and working in partnership with adults in a variety of settings. Youth and adults demonstrate effective partnerships through increased youth participation on advisory committees and other governing bodies. Volunteers and youth development professionals apply practices fostering positive youth development.
6	Medium Term - 4-H Science, Engineering and Technology State Programs: Youth apply knowledge, attitudes, skills, and behaviors needed to become competent, caring and contributing citizens by: taking on leadership roles in their youth organizations and schools, and working in partnership with adults in a variety of settings. Youth and adults demonstrate effective partnerships through increased youth participation on advisory committees and other governing bodies. Volunteers and youth development professionals apply practices fostering positive youth development.
7	Medium Term - A Parenting Education Series: Improving Homework, Communication, Self-Esteem, Parenting, and Discipline Skills: Youth apply knowledge, attitudes, skills, and behaviors needed to become competent, caring and contributing citizens by: taking on leadership roles in their youth organizations and schools, and working in partnership with

	adults in a variety of settings. Youth and adults demonstrate effective partnerships through increased youth participation on advisory committees and other governing bodies. Volunteers and youth development professionals apply practices fostering positive youth development.
8	Medium Term - Strengthening the Families of Grandparents who are Raising Their Grandchildren (and other relative caregivers), and Improving Their Health, Quality of Life, and Their Communities: Youth apply knowledge, attitudes, skills, and behaviors needed to become competent, caring and contributing citizens by: taking on leadership roles in their youth organizations and schools, and working in partnership with adults in a variety of settings. Youth and adults demonstrate effective partnerships through increased youth participation on advisory committees and other governing bodies. Volunteers and youth development professionals apply practices fostering positive youth development.
9	Long Term - New Brunswick 4-H Program: Youth demonstrate mastery and competencies needed to become engaged citizens by assuming leadership positions in communities; developing and implementing action plans to address community needs, and becoming productive members of the workforce. 4-H youth are engaged partners in decision making regarding RCE programming including but not limited to 4-H youth development programming. 4-H alumni and volunteers become engaged citizens by assuming leadership positions in communities. Youth development professionals and stakeholders influence decision makers in policy development related to youth development needs and issues.

**Outcome #1**

**1. Outcome Measures**

Short Term - Youth increase awareness, knowledge, attitudes, and skills related to essential elements, workforce development, life skill development, and relevant subject matter. Volunteers increase knowledge and awareness of practices fostering positive youth development, including youth/adult partnerships. Youth development professionals and stakeholders increase awareness and knowledge of problems and solutions supporting positive youth development, including: policies that need to be addressed, community resources and support.

Not Reporting on this Outcome Measure

**Outcome #2**

**1. Outcome Measures**

Medium Term - Youth apply knowledge, attitudes, skills, and behaviors needed to become competent, caring and contributing citizens by: taking on leadership roles in their youth organizations and schools, and working in partnership with adults in a variety of settings. Youth and adults demonstrate effective partnerships through increased youth participation on advisory committees and other governing bodies. Volunteers and youth development professionals apply practices fostering positive youth development.

**2. Associated Institution Types**

- 1862 Extension
- 1862 Research

**3a. Outcome Type:**

Change in Action Outcome Measure

**3b. Quantitative Outcome**

Year	Quantitative Target	Actual
2010	38000	0

**3c. Qualitative Outcome or Impact Statement**

**Issue (Who cares and Why)**

Becoming an Outdoor Family

While working with youth in the community, many parents expressed the need to become reconnected with their children and the environment. The Becoming an Outdoor Family program gave parents and their children the opportunity to hone their outdoor skills in a fun and family oriented environment with professional staff.

**What has been done**

The "Get Outdoors, It's Yours" National Campaign program's initiatives are to promote, address, and instill in the general public a basic understanding of environmental conservation, safety, and fun in the outdoors. The variety of experiences include: wildlife, forestry, orienteering skills, hiking, natural arts, outdoor cooking, kayaking, canoeing, firearm safety, fishing and more.

**Results**

A total of 128 participants took part in the weekend (over 100% increase over last year). Sixty-one adults and 67 children attended; 31 different family groups participated. All family groups said they would return again if they were able and would recommend the program to friends. A hundred percent of the families surveyed would return next year.

**4. Associated Knowledge Areas**

KA Code	Knowledge Area
806	Youth Development

**Outcome #3**

**1. Outcome Measures**

Long Term - Youth demonstrate mastery and competencies needed to become engaged citizens by assuming leadership positions in communities; developing and implementing action plans to address community needs, and becoming productive members of the workforce. 4-H youth are engaged partners in decision making regarding RCE programming including but not limited to 4-H youth development programming. 4-H alumni and volunteers become engaged citizens by assuming leadership positions in communities. Youth development professionals and stakeholders influence decision makers in policy development related to youth development needs and issues.

## 2. Associated Institution Types

- 1862 Extension
- 1862 Research

### 3a. Outcome Type:

Change in Condition Outcome Measure

### 3b. Quantitative Outcome

Year	Quantitative Target	Actual
2010	41000	0

### 3c. Qualitative Outcome or Impact Statement

#### Issue (Who cares and Why)

Seeds to Success Youth Farmstand Project

Provide workforce preparation to special needs teens from the urban-aid communities of Woodbury, Paulsboro and Glassboro, Gloucester County. Create retail outlets that bring affordable, nutritious foods to consumers. Teach at-risk, special need teens valuable life skills. Offer economic development opportunities to local farmers and urban-aid communities.

#### What has been done

Seeds to Success prepares at-risk, special needs youth for the workforce and life through classroom and on-the-job training. During the school year, youth participate in nutrition, food safety, money management and banking education. During the summer, students work at youth farmstands.

#### Results

Significant improvements ( $p < .05$ ) also noted in youth's ability to practice safe food handling practices.

When asked how this program impacted their health lifestyles:

85% of participants indicated that they will do something new or different.

75% of participants indicated that they plan to use or share what they learned.

68% indicated that they are more interested in nutrition.

64% of participants indicated that they will change the way they think, act or behave.

Seeds to Success yielded a number of conditional changes:

Created three retail outlets and economic development in each urban-aid community (Glassboro, Paulsboro and Woodbury). These three urban-aid communities benefit by gaining access to locally grown, nutritious produce. Low-income residents and seniors can purchase this produce with their WIC and Senior farmstand vouchers, which accounts for 11% of summer farmstand sales.

Enabled 6 special needs youth to acquire permanent jobs outside of the farmstands.

Created improved quality of life and nutrition for seniors and families who received \$2300 of donated produce.

Improved food security and nutritional wellbeing for Seniors, WIC clients and SNAP recipients by increasing access to fresh produce that could be purchased via FMNP vouchers and SNAP benefits. Four farmers were able to expand their market by selling approximately \$13,000 of produce to the farmstands.

**4. Associated Knowledge Areas**

<b>KA Code</b>	<b>Knowledge Area</b>
806	Youth Development

**Outcome #4**

**1. Outcome Measures**

Medium Term - State 4-H Youth Residential Summer Camp Program: Youth apply knowledge, attitudes, skills, and behaviors needed to become competent, caring and contributing citizens by: taking on leadership roles in their youth organizations and schools, and working in partnership with adults in a variety of settings. Youth and adults demonstrate effective partnerships through increased youth participation on advisory committees and other governing bodies. Volunteers and youth development professionals apply practices fostering positive youth development.

**2. Associated Institution Types**

- 1862 Extension
- 1862 Research

**3a. Outcome Type:**

Change in Action Outcome Measure

**3b. Quantitative Outcome**

Year	Quantitative Target	Actual
2010	{No Data Entered}	0

**3c. Qualitative Outcome or Impact Statement**

**Issue (Who cares and Why)**

State 4-H Youth Residential Summer Camp Program

Lindley G. Cook 4-H Camp provides youth with a safe environment for fun, hands-on residential outdoor educational experiences; fostering independence, leadership development, respect, tolerance and positive self-esteem. This is accomplished under the guidelines of 4-H and Rutgers Cooperative Extension principles and missions.

**What has been done**

4-H Camp offers challenging and exciting programs, tailored to the campers' individual interests and guided by experienced staff at all times. Opportunities for learning and growth are abundant at camp. For example: youth are submerged in the residential experience, sharing living quarters with eight to fourteen other children. They are partnered with young adults who are hired

and trained to be role models of responsible, caring citizens. Campers self choose classes in which the importance of learning and practicing a skill is emphasized. Also, youth are given social opportunities in a safe and monitored setting.

Lindley G. Cook 4-H Camp was home to a Science, Engineering and Technology (S.E.T.) camp with 42 participants taking part in four exciting subject areas. (a 90% increase over last year). Chuck-It class explored the math and physics of catapults, air cannons and water-powered rockets. Students built roller-coasters with electric circuits which turned lights on and off as marbles rolled down the roller coasters in the Coaster class. In COOL Camp, campers explored the pond ecology and investigated reef ecosystems. CSI campers solved a mystery by dissecting a crime scene at camp using the tried and true scientific approach. A highlight of this new program included fingerprinting with an Officer from the County Sheriff's office.

### Results

Camper evaluations are conducted at the conclusion of each session. Random campers were selected to fill out a survey before they left camp. When asked the following questions, the campers rated camp high in the respect and acceptance categories:

98% of the campers felt that staff treated them with respect

96% felt that other campers treated them with respect.

96% felt that they were accepted by campers in their cabin

100% of the campers felt safe at camp.

98% of campers surveyed want to come back next summer.

According to the end of camp adult surveys, 100% of the parents said they would send their children back to camp next year and rated the camp services as excellent.

### 4. Associated Knowledge Areas

KA Code	Knowledge Area
806	Youth Development

### Outcome #5

#### 1. Outcome Measures

Medium Term - State Rutgers 4-H Summer Science Program: Youth apply knowledge, attitudes, skills, and behaviors needed to become competent, caring and contributing citizens by: taking on leadership roles in their youth organizations and schools, and working in partnership with adults in a variety of settings. Youth and adults demonstrate effective partnerships through increased youth participation on advisory committees and other governing bodies. Volunteers and youth development professionals apply practices fostering positive youth development.

#### 2. Associated Institution Types

- 1862 Extension
- 1862 Research

#### 3a. Outcome Type:

Change in Action Outcome Measure

**3b. Quantitative Outcome**

Year	Quantitative Target	Actual
2010	{No Data Entered}	0

**3c. Qualitative Outcome or Impact Statement**

**Issue (Who cares and Why)**

Rutgers 4-H Summer Science Program

The Rutgers 4-H Summer Science Program was established in 2009 as an opportunity for traditionally underserved youth to 1)learn more about science, explore research occurring on campus, and gain a better understanding of opportunities available in science, engineering, and technology, 2)explore opportunities available at Rutgers University, experience campus-life, and learn about post-secondary education, and 3)prepare to serve as a 4-H SET Ambassador in their home community.

**What has been done**

High school youth from five urban communities throughout New Jersey participated in the campus-based portion of the program, July 12-16, at the Rutgers School of Environmental and Biological Sciences on activities in biochemistry, biotechnology, environmental sciences, and marine science. The youth spent 3 hours in each of these areas - participating in workshops and lab tours by faculty, staff, and graduate students. In addition to exploring science, the youth participated in personal development and teambuilding activities the experience helped prepare them to become 4-H SET (Science, Engineering and Technology) Ambassadors. They also prepared and presented posters of their experience to partners, administrators, parents, and other guests. As 4-H SET Ambassadors, they returned home and worked with their local 4-H program to promote 4-H and science to other youth.

**Results**

Pre/post surveys were administered to determine changes in youth perception of science and knowledge and interest in science. Evaluation results show positive shifts in young people's perception of what science is and what scientists do. Participants indicated they strongly agree that:

Science is for everyone and is useful to all (not for only highly trained people).

Science builds on the knowledge of their peers/others.

Science is dynamic and subject to change based on new evidence.

Science contributes to our understanding of the natural world.

**4. Associated Knowledge Areas**

KA Code	Knowledge Area
806	Youth Development

**Outcome #6**

**1. Outcome Measures**

Medium Term - 4-H Science, Engineering and Technology State Programs: Youth apply knowledge, attitudes, skills, and behaviors needed to become competent, caring and contributing citizens by: taking on leadership roles in their youth organizations and schools, and working in partnership with adults in a variety of settings. Youth and adults demonstrate effective partnerships through increased youth participation on advisory committees and other governing bodies. Volunteers and youth development professionals apply practices fostering positive youth development.

**2. Associated Institution Types**

- 1862 Extension
- 1862 Research

**3a. Outcome Type:**

Change in Action Outcome Measure

**3b. Quantitative Outcome**

Year	Quantitative Target	Actual
2010	{No Data Entered}	0

**3c. Qualitative Outcome or Impact Statement**

**Issue (Who cares and Why)**

4-H Science, Engineering and Technology State Programs

The 4-H Science, Engineering, and Technology (SET) Initiative is the 4-H program's contribution to improving science technology, engineering and math (STEM) education in New Jersey. 4-H is responding to our nation's concern for improving human capacity and workforce abilities in STEM areas by combining non-formal education with hands-on inquiry-based learning in a youth development context.

**What has been done**

The 4-H Rutgerscience Saturday program brings young people on campus and introduces them to university resources in science, technology, engineering and mathematics. A second objective is to build awareness of 4-H on campus among faculty and staff. Additionally it assists county 4-H faculty and staff with high quality science resources to improve quantity and quality of science programming.

**Results**

The 4-H Rutgerscience Saturday program has met its goal of exposing youth to the world of science that is being explored at Rutgers. Youth have learned science by doing. New Jersey 4-H is committed to the national mission mandate of "one million new scientists and one million new ideas." Youth involved in this program are at the critical middle school years where they are

encouraged to engage in STEM experiential activities which have the potential to lead to careers in science, engineering and technology.

**4. Associated Knowledge Areas**

<b>KA Code</b>	<b>Knowledge Area</b>
806	Youth Development

**Outcome #7**

**1. Outcome Measures**

Medium Term - A Parenting Education Series: Improving Homework, Communication, Self-Esteem, Parenting, and Discipline Skills: Youth apply knowledge, attitudes, skills, and behaviors needed to become competent, caring and contributing citizens by: taking on leadership roles in their youth organizations and schools, and working in partnership with adults in a variety of settings. Youth and adults demonstrate effective partnerships through increased youth participation on advisory committees and other governing bodies. Volunteers and youth development professionals apply practices fostering positive youth development.

**2. Associated Institution Types**

- 1862 Extension
- 1862 Research

**3a. Outcome Type:**

Change in Action Outcome Measure

**3b. Quantitative Outcome**

Year	Quantitative Target	Actual
2010	{No Data Entered}	0

**3c. Qualitative Outcome or Impact Statement**

**Issue (Who cares and Why)**

A Parenting Education Series: Improving Homework, Communication, Self-Esteem, Parenting, and Discipline Skills

Teachers and school administrators see a need for parents to improve their communication skills with the schools and the self-esteem of their children, to understand the value of homework and management skills needed for their child to succeed in school and the basics of child discipline. Many limited resource parents are not familiar with discipline techniques that are healthy for their child.

**What has been done**

The RCE faculty member has taught classes on the four topics: "Taming the Homework Monster", "Discipline is NOT a Dirty Word" Improving Self-Esteem: Reaching Your Potential,

"Improving Parent-Child Communication Skills' and 9 Tips to More Effective Parenting.

**Results**

Class discussion was lively and parents were motivated to change their discipline techniques and to improve their communication with their children and the school. They also learned techniques to help their child improve their self-esteem and how to discipline their child.

Program participants self-reported that:

89% gained knowledge and skills on how to improve their own communication skills, as well as, the skills of their children.

71% gained knowledge about types of communication and its importance in the classroom and at home.

65% gained new methods of building self-esteem in children.

76% learned new child discipline techniques and the importance of listening skills.

88% learned how to discipline their child with love rather than physical force.

**4. Associated Knowledge Areas**

<b>KA Code</b>	<b>Knowledge Area</b>
806	Youth Development

**Outcome #8**

**1. Outcome Measures**

Medium Term - Strengthening the Families of Grandparents who are Raising Their Grandchildren (and other relative caregivers), and Improving Their Health, Quality of Life, and Their Communities: Youth apply knowledge, attitudes, skills, and behaviors needed to become competent, caring and contributing citizens by: taking on leadership roles in their youth organizations and schools, and working in partnership with adults in a variety of settings. Youth and adults demonstrate effective partnerships through increased youth participation on advisory committees and other governing bodies. Volunteers and youth development professionals apply practices fostering positive youth development.

**2. Associated Institution Types**

- 1862 Extension
- 1862 Research

**3a. Outcome Type:**

Change in Action Outcome Measure

**3b. Quantitative Outcome**

<b>Year</b>	<b>Quantitative Target</b>	<b>Actual</b>
2010	{No Data Entered}	0

**3c. Qualitative Outcome or Impact Statement**

### **Issue (Who cares and Why)**

Strengthening the Families of Grandparents who are Raising Their Grandchildren (and other relative caregivers), and Improving Their Health, Quality of Life, and Their Communities

For more than thirty years there has been a dramatic increase in this country in the number of children living with and being cared for by their grandparents or other relatives. The national average of children under 18 living with a grandparent rose from 3% in 1970 to 6.3% in 2000. Based on 2000 census data in NJ 6.1% of children under 18 are living in a grandparents' home.

### **What has been done**

RCE continues to be the sole organization providing educational support to this population in Cape May County. Educational topics included: parenting skills, stress management, bullying prevention, nutrition and quick and thrifty meals, school involvement, holiday safety, family literacy and raising our children's children. Each workshop is preceded by a light family meal for grandparents and their grandchildren. The workshops provide a safe, comfortable forum for grandparents to discuss concerns and provide support to one another.

### **Results**

One county reports that 288 grandparents and youth participated in the educational programs and support group meetings. As a result of our ongoing educational and support program, grandparents self-reported the following:

- 95% Have discussed bullying prevention with their grandchildren since the program.
- 82% Agreed to communicate with their grandchild's teacher
- 78% Read together more often.
- 100% Met at least one new grandparent/grandchild.
- 95% Feel more confident in their role as a parent
- 86% Drink more water.
- 88% Eat more fruits and vegetables.
- 79% Eat family meals together more frequently.

## **4. Associated Knowledge Areas**

<b>KA Code</b>	<b>Knowledge Area</b>
806	Youth Development

## **Outcome #9**

### **1. Outcome Measures**

Long Term - New Brunswick 4-H Program: Youth demonstrate mastery and competencies needed to become engaged citizens by assuming leadership positions in communities; developing and implementing action plans to address community needs, and becoming productive members of the workforce. 4-H youth are engaged partners in decision making regarding RCE programming including but not limited to 4-H youth development programming. 4-H alumni and volunteers become engaged citizens by assuming leadership positions in communities. Youth development professionals and stakeholders influence decision makers in policy development related to youth development needs and issues.

### **2. Associated Institution Types**

- 1862 Extension
- 1862 Research

**3a. Outcome Type:**

Change in Action Outcome Measure

**3b. Quantitative Outcome**

Year	Quantitative Target	Actual
2010	{No Data Entered}	0

**3c. Qualitative Outcome or Impact Statement**

**Issue (Who cares and Why)**  
New Brunswick 4-H Program

Research shows that supportive, community based educational programs offer a means of reaching at-risk youth, and that establishing programs for youth at an early age increases the likelihood of significant positive impact on the skills, attitudes, and experiences of young people, (Villarruel, Perkins, Borden, & Keith, 2003). A significant portion of New Jersey’s Spanish speaking youth are at a substantial risk for negative life outcomes including poor health, substance abuse, school failure and violence, due to poverty - many are new immigrants and live in communities facing generational poverty and the concurrent challenges of such poverty. At the same time, Latino communities are further isolated due to language and cultural barriers.

**What has been done**

In an effort to engage the Latino community the New Brunswick 4-H program was developed provide a sustained youth development program, utilizing the structure and philosophy of 4-H, while working in collaboration with community organizations such as Lazos America Unida. Lazos is a non-profit organization whose mission is to integrate the public, private and civic sectors of New Brunswick through a variety of community projects, and empower them by obtaining educational, economic, cultural, and social equity.

**Results**

In 2010, efforts to maintain and expand the New Brunswick 4-H program were achieved. Clubs were formed and youth were registered, promotional efforts were put in place and additional collaborations were formed with local agencies and organization.

Continued with translation of program promotional materials and volunteer Leader Training Series materials to enable usage by Spanish speaking volunteers.

Formed collaborations with New Brunswick schools, local youth organizations and service organizations to begin the development of new 4-H clubs.

Developed four volunteer program management committees - a Program Advisory Board, Parent Council, Community Outreach Committee, and Fund Raising Committee.

Recruitment of 20 additional 4-H volunteers to serve as club leaders.

Assisted with the implementation of a Lead Safe Backyard Gardening Program through an EPA Environmental Justice grant, they formed a collaboration with the RU Water Resource Program and RCE of Middlesex County Agricultural Department to enable 4-H youth in the gardening club to be a part of the implementation of this program. Youth will assist with surveying adults in the

community and providing educational programs on Lead-Safe backyard gardening. Strategic collaborative partnerships have been formed to reach out to a previously underserved population. These efforts have resulted a positive community development to the benefit of all involved.

#### 4. Associated Knowledge Areas

KA Code	Knowledge Area
806	Youth Development

#### V(H). Planned Program (External Factors)

##### External factors which affected outcomes

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

##### Brief Explanation

#### V(I). Planned Program (Evaluation Studies and Data Collection)

##### 1. Evaluation Studies Planned

- After Only (post program)
- Retrospective (post program)
- Before-After (before and after program)
- During (during program)
- Time series (multiple points before and after program)
- Case Study
- Comparisons between program participants (individuals, group, organizations) and non-participants
- Comparisons between different groups of individuals or program participants experiencing different levels of program intensity.

##### Evaluation Results

See Qualitative Outcome or Impact Statements

##### Key Items of Evaluation



**V(A). Planned Program (Summary)**

**Program # 5**

**1. Name of the Planned Program**

Agricultural Viability

**V(B). Program Knowledge Area(s)**

1. Program Knowledge Areas and Percentage

KA Code	Knowledge Area	%1862 Extension	%1890 Extension	%1862 Research	%1890 Research
205	Plant Management Systems	20%		20%	
211	Insects, Mites, and Other Arthropods Affecting Plants	20%		20%	
215	Biological Control of Pests Affecting Plants	20%		20%	
601	Economics of Agricultural Production and Farm Management	20%		20%	
604	Marketing and Distribution Practices	20%		20%	
	<b>Total</b>	100%		100%	

**V(C). Planned Program (Inputs)**

1. Actual amount of professional FTE/SYs expended this Program

Year: 2010	Extension		Research	
	1862	1890	1862	1890
Plan	70.0	0.0	36.0	0.0
Actual	41.0	0.0	19.0	0.0

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

Extension		Research	
Smith-Lever 3b & 3c	1890 Extension	Hatch	Evans-Allen
1177924	0	1501360	0
1862 Matching	1890 Matching	1862 Matching	1890 Matching
3177068	0	3935384	0
1862 All Other	1890 All Other	1862 All Other	1890 All Other
360433	0	2873377	0

**V(D). Planned Program (Activity)**

**1. Brief description of the Activity**

Identify critical programmatic foci/needs based on Extension and stakeholder assessment. These can be broadly defined under three areas:

- Production BMPs (nutrient, pest, waste/by-products management, water quality and quantity, energy)
- Financial BMPs (marketing, labor, risk management, policy e.g. farmland preservation)
- Ag Systems (sustainable ag, organic ag, new crops and use/alternative)

Develop an inventory of local (county based), regional and statewide programs designed to meet these needs; identify team members and their roles.

Create a multi-task effort to generate and share research-based information with clientele through demonstrations, educational meetings and workshops, certification programs, trainings, development of recommendation and decision making guides, etc.

**2. Brief description of the target audience**

Stakeholders (broadly defined to include producers, processors, marketers, end-users, policymakers, legislators).

Commercial agriculture producers and end-users (such as marketers, processors, consumers, etc.).

Municipalities and other governmental and non-governmental agencies, etc.

**V(E). Planned Program (Outputs)**

**1. Standard output measures**

2010	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
<b>Plan</b>	8800	1317000	100	170
<b>Actual</b>	38750	467800	7680	800

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

**Patent Applications Submitted**

Year: 2010  
 Plan: 2  
 Actual: 7

**Patents listed**

Tech ID No. Patent/Trademark # Intellectual Property Title

2004-1677,704,716 Use of Geraniol Synthase  
to Produce Geraniol

2005-0557,641,913 An Isolated Species of  
Steinernematid Nematode and  
Methods of White Grub Control Therewith

2006-076PP18,252 Cranberry Variety Named  
NJS98-23 - Crisom Queen

2007-071PP 20,804 P3 Interspecific Ilex Hybrid  
Designated 'Spartan'

2008-050PP21,170 Male Asparagus Hybrid  
Plant NJ953

2008-051PP21,066 P3 Female Asparagus Hybrid  
Plant NJ977

2009-030PP21,206 A Lily Plant Named 'BJM  
006' - cultivar 46 (Jersey Flame)

**3. Publications (Standard General Output Measure)**

**Number of Peer Reviewed Publications**

2010	Extension	Research	Total
Plan	55	20	
Actual	160	110	270

**V(F). State Defined Outputs**

**Output Target**

**Output #1**

**Output Measure**

- A variety of strategies will be implemented to reach target audiences. This will include and not be limited to workshops, field visits, classes, newsletters, media releases, electronic communications, and publications. In addition a trained volunteer teaching base will be developed. Quantitative reports of participation will be collected.  
Not reporting on this Output for this Annual Report

**V(G). State Defined Outcomes**

**V. State Defined Outcomes Table of Content**

O. No.	OUTCOME NAME
1	Short Term - Increases in knowledge and skills of agricultural and horticultural industry professionals will occur relating to: Nutrient management Pest management Waste/by-products management and utilization Improving water quality and conserving water Conserving energy Marketing skills Labor management Risk management Policy e.g. farmland preservation Sustainable ag and organic ag production methods New crops and use/alternative crops
2	Medium Term - Productive agricultural land is stabilized to meet the needs of the agricultural industry and the "open space" needs of people of NJ. Agriculture remains a relevant and viable economic sector as profits increase (through reduced costs and/or increased or new sales or revenue streams). Measurable reductions in environmental impact (clear and adequate sources of water, reduced waste, reduced soil losses, reductions in non-point source pollution, etc.) will occur through the adoption of improved and sound management practices. Overall state environmental quality will be enhanced by agriculture, such as through the utilization and recycling of biowastes generated by the non-ag sector or the enhancement of air quality. The products of NJ agriculture will add to the nutritional quality of New Jerseyans food supply.
3	Long Term - New Jersey's agriculture will remain a viable and important industry. New Jersey residents will recognize the importance of agriculture's contributions to societal well being (open space, quality of life) and will support the agricultural industry socially, politically and economically.
4	Medium Term - Native Bee Conservation and Crop Pollination: Productive agricultural land is stabilized to meet the needs of the agricultural industry and the "open space" needs of people of NJ. Agriculture remains a relevant and viable economic sector as profits increase (through reduced costs and/or increased or new sales or revenue streams). Measurable reductions in environmental impact (clear and adequate sources of water, reduced waste, reduced soil losses, reductions in non-point source pollution, etc.) will occur through the adoption of improved and sound management practices. Overall state environmental quality will be enhanced by agriculture, such as through the utilization and recycling of biowastes generated by the non-ag sector or the enhancement of air quality. The products of NJ agriculture will add to the nutritional quality of New Jerseyans food supply.
5	Medium Term - Resistance Management for Fresh-Market and Processing Vegetable Crops Grown in New Jersey: Productive agricultural land is stabilized to meet the needs of the agricultural industry and the "open space" needs of people of NJ. Agriculture remains a relevant and viable economic sector as profits increase (through reduced costs and/or increased or new sales or revenue streams). Measurable reductions in environmental impact (clear and adequate sources of water, reduced waste, reduced soil losses, reductions in non-point source pollution, etc.) will occur through the adoption of improved and sound management practices. Overall state environmental quality will be enhanced by agriculture, such as through the utilization and recycling of biowastes generated by the non-ag sector or the enhancement of air quality. The products of NJ agriculture will add to the nutritional quality of New Jerseyans food supply.
6	Medium Term - Breeding and Germplasm Enhancement for New Jersey Cranberry and Blueberry Industries: Productive agricultural land is stabilized to meet the needs of the agricultural industry and the "open space" needs of people of NJ. Agriculture remains a relevant and viable economic sector as profits increase (through reduced costs and/or increased or new sales or revenue streams). Measurable reductions in environmental impact

	(clear and adequate sources of water, reduced waste, reduced soil losses, reductions in non-point source pollution, etc.) will occur through the adoption of improved and sound management practices. Overall state environmental quality will be enhanced by agriculture, such as through the utilization and recycling of biowastes generated by the non-ag sector or the enhancement of air quality. The products of NJ agriculture will add to the nutritional quality of New Jerseyans food supply.
7	Medium Term - The Great Tomato Tasting: Productive agricultural land is stabilized to meet the needs of the agricultural industry and the "open space" needs of people of NJ. Agriculture remains a relevant and viable economic sector as profits increase (through reduced costs and/or increased or new sales or revenue streams). Measurable reductions in environmental impact (clear and adequate sources of water, reduced waste, reduced soil losses, reductions in non-point source pollution, etc.) will occur through the adoption of improved and sound management practices. Overall state environmental quality will be enhanced by agriculture, such as through the utilization and recycling of biowastes generated by the non-ag sector or the enhancement of air quality. The products of NJ agriculture will add to the nutritional quality of New Jerseyans food supply.
8	Medium Term - AgrAbility: Productive agricultural land is stabilized to meet the needs of the agricultural industry and the "open space" needs of people of NJ. Agriculture remains a relevant and viable economic sector as profits increase (through reduced costs and/or increased or new sales or revenue streams). Measurable reductions in environmental impact (clear and adequate sources of water, reduced waste, reduced soil losses, reductions in non-point source pollution, etc.) will occur through the adoption of improved and sound management practices. Overall state environmental quality will be enhanced by agriculture, such as through the utilization and recycling of biowastes generated by the non-ag sector or the enhancement of air quality. The products of NJ agriculture will add to the nutritional quality of New Jerseyans food supply.
9	Long Term - Farm Management: New Jersey's agriculture will remain a viable and important industry. New Jersey residents will recognize the importance of agriculture's contributions to societal well being (open space, quality of life) and will support the agricultural industry socially, politically and economically.
10	Long Term - Development and Use of Dollar Spot Tolerant Creeping Bentgrass for Golf Courses: New Jersey's agriculture will remain a viable and important industry. New Jersey residents will recognize the importance of agriculture's contributions to societal well being (open space, quality of life) and will support the agricultural industry socially, politically and economically.
11	Long Term - Nuances of Marketing Ethnic Specialty Vegetables & Herbs: New Jersey's agriculture will remain a viable and important industry. New Jersey residents will recognize the importance of agriculture's contributions to societal well being (open space, quality of life) and will support the agricultural industry socially, politically and economically.

**Outcome #1**

**1. Outcome Measures**

Short Term - Increases in knowledge and skills of agricultural and horticultural industry professionals will occur relating to: Nutrient management Pest management Waste/by-products management and utilization Improving water quality and conserving water Conserving energy Marketing skills Labor management Risk management Policy e.g. farmland preservation Sustainable ag and organic ag production methods New crops and use/alternative crops

Not Reporting on this Outcome Measure

**Outcome #2**

**1. Outcome Measures**

Medium Term - Productive agricultural land is stabilized to meet the needs of the agricultural industry and the "open space" needs of people of NJ. Agriculture remains a relevant and viable economic sector as profits increase (through reduced costs and/or increased or new sales or revenue streams). Measurable reductions in environmental impact (clear and adequate sources of water, reduced waste, reduced soil losses, reductions in non-point source pollution, etc.) will occur through the adoption of improved and sound management practices. Overall state environmental quality will be enhanced by agriculture, such as through the utilization and recycling of biowastes generated by the non-ag sector or the enhancement of air quality. The products of NJ agriculture will add to the nutritional quality of New Jerseyans food supply.

**2. Associated Institution Types**

- 1862 Extension
- 1862 Research

**3a. Outcome Type:**

Change in Action Outcome Measure

**3b. Quantitative Outcome**

Year	Quantitative Target	Actual
2010	55000	0

**3c. Qualitative Outcome or Impact Statement**

**Issue (Who cares and Why)**

Optimizing Peach Fruit Quality by Improving Harvest and Postharvest Handling

Peach consumption has been flat or decreasing for the last 20 years. Increasing peach consumption requires that we provide peaches that are consistently high in eating quality. Storing peaches for too long or at inappropriate temperatures can result in development of flesh mealiness, "off" flavors, and internal browning. This disorder results in visually attractive but inedible fruit reaching the consumer. The industry urgently needs to develop and implement harvesting and handling protocols that preserve maximum fruit quality.

**What has been done**

A research project has been initiated to characterize peach and nectarine cultivar susceptibility to internal breakdown. Preliminary results indicate that most commercial eastern peach and nectarine cultivars are susceptible to internal breakdown when stored at supra-optimal temperatures (i.e. >40°F). Gloria, a stony-hard cultivar from the Rutgers Stone-fruit breeding program, had fruit that retained firmness during storage whether harvested at commercial maturity (Aug. 9) or at commercial maturity plus 2 or 4 days.

**Results**

Preliminary results have been of great interest to growers and packers. Decisions for cultivar planting are being made that will translate into production of the highest-value, best-adapted-to-marketing-channels peaches being planted, including new releases from the Rutgers Stone Fruit Breeding Program. This has the potential to result in increased demand and prices for peaches and, therefore greater profitability for the industry.

**4. Associated Knowledge Areas**

<b>KA Code</b>	<b>Knowledge Area</b>
205	Plant Management Systems
211	Insects, Mites, and Other Arthropods Affecting Plants
215	Biological Control of Pests Affecting Plants
601	Economics of Agricultural Production and Farm Management
604	Marketing and Distribution Practices

**Outcome #3**

**1. Outcome Measures**

Long Term - New Jersey's agriculture will remain a viable and important industry. New Jersey residents will recognize the importance of agriculture's contributions to societal well being (open space, quality of life) and will support the agricultural industry socially, politically and economically.

**2. Associated Institution Types**

- 1862 Extension
- 1862 Research

**3a. Outcome Type:**

Change in Condition Outcome Measure

**3b. Quantitative Outcome**

<b>Year</b>	<b>Quantitative Target</b>	<b>Actual</b>
2010	70000	0

**3c. Qualitative Outcome or Impact Statement**

**Issue (Who cares and Why)**

Introducing New Crops, Nutraceuticals and other Value-Added Products

To maintain the viability of New Jersey agriculture it is essential to explore new crops, value-added products and nutraceuticals.

**What has been done**

NJAES researchers are identifying new uses of traditional fruits, vegetables and herbs and strengthening domestic and international programs on new crops and natural plant products.

## Results

This program has contributed to the development and introduction of new varieties, new ethnic specialty produce, plant products and value-added products. Impact has been in the improved quality control of botanicals used for human health and nutrition through a robust focus on natural products chemistry. In 2010, we confirmed sources of resistance to basil downy mildew from other *Ocimum* species, a new disease in the USA, which can be used for breeding into sweet basil (*O. basilicum*). In 2010 researchers successfully demonstrated that both oregano and mint (as case studies representing all members of the Lamiaceae Family) contained powerful bioactive compounds distinct from their essential oils; some of these compounds specifically exhibit potent anti-inflammatory activity. Methods to enrich the anti-inflammatory components from less concentrated oregano and mint plant materials were developed; these products can be potentially commercialized as supplements to reduce pain and discomfort from inflammation in both humans and animals. A patent application was submitted for this process.

We also developed high oil and nepetalactone bearing catnip lines as sources of natural pest control agents. Internationally, we strengthened our market-first and scientific-driven models of international development and commercialization. Implemented in sub-Saharan Africa under the Agri-Business in Sustainable Natural African Plant Products (ASNAPP) network with leadership from Rutgers University and with strong public and private sector partnerships as a catalyst for market development, this program impacted on average over 5,000 farmers in Ghana, Liberia, Senegal, and Zambia, with focus on African women. Since 2004, our programs have contributed to the introduction of new crops, the sustainable collection of indigenous African botanicals, and the development of new plant products that has led to > \$25 million (\$US) in trade, with a production volume of 10,000 metric tons from sub-Saharan Africa. NJAES research has demonstrated that novel neuroprotectants derived from the seeds of *Pycnanthus angolensis* Warb. (*P. Kombo*), commonly known as African nutmeg, are efficacious in the treatment of neurological disorders, neuropathology, cognitive memory and cognitive deterioration including, but not limited to, ischemic stroke. This research finding and associated methods for preparing and purifying these compounds is the subject of a patent application submitted in 2010.

## 4. Associated Knowledge Areas

KA Code	Knowledge Area
205	Plant Management Systems
211	Insects, Mites, and Other Arthropods Affecting Plants
215	Biological Control of Pests Affecting Plants
601	Economics of Agricultural Production and Farm Management
604	Marketing and Distribution Practices

## Outcome #4

### 1. Outcome Measures

Medium Term - Native Bee Conservation and Crop Pollination: Productive agricultural land is stabilized to meet the needs of the agricultural industry and the "open space" needs of people of NJ. Agriculture remains a relevant and viable economic sector as profits increase (through reduced costs and/or increased or new sales or revenue streams). Measurable reductions in environmental impact (clear and adequate sources of water, reduced waste, reduced soil losses, reductions in non-point source pollution, etc.) will occur through the adoption of improved and sound management practices. Overall state environmental quality will be enhanced by agriculture, such as

through the utilization and recycling of biowastes generated by the non-ag sector or the enhancement of air quality. The products of NJ agriculture will add to the nutritional quality of New Jerseyans food supply.

**2. Associated Institution Types**

- 1862 Extension
- 1862 Research

**3a. Outcome Type:**

Change in Action Outcome Measure

**3b. Quantitative Outcome**

Year	Quantitative Target	Actual
2010	{No Data Entered}	0

**3c. Qualitative Outcome or Impact Statement**

**Issue (Who cares and Why)**

Native Bee Conservation and Crop Pollination

Eighty-five percent of the world's plant species are pollinated by animals. This makes pollinator conservation an essential part of land and natural resource stewardship programs. Effective conservation of pollinators is particularly important on New Jersey given our high population density and limited remaining natural lands. Government agencies such as NRCS are legislatively obligated to restore pollinators on lands they manage yet they currently lack science-based information about how to best accomplish this task. In addition, many private landowners are interested in restoring native pollinators on their property, both to pollinate home gardens and to help reverse declines in native pollinators.

**What has been done**

NJAES researchers are developing research-based knowledge about the habitat needs of New Jersey pollinators, experimentally testing restoration protocols to better understand the habitat needs of native pollinators, including how they are affected by global change and human land use; to develop science-based protocols for natural resource management of native pollinators. Research is also being conducted to quantify the contribution of native pollinators to crop pollination as well as the environmental determinants of this pollination; for example, to identify farm management strategies associated with native bee pollination. This information is then communicated to stakeholders including agricultural growers, private landowners, and state land management agencies, through presentations, training/workshops, and outreach publications.

**Results**

Agricultural growers in NJ and nationally are more aware of the role of native pollinators in crop pollination, and are more knowledgeable about how to manage habitat for native pollinators. NRCS is incorporating information from NJAES research into their land management programs which cover thousands of acres throughout the state.

#### 4. Associated Knowledge Areas

KA Code	Knowledge Area
205	Plant Management Systems
211	Insects, Mites, and Other Arthropods Affecting Plants
215	Biological Control of Pests Affecting Plants
601	Economics of Agricultural Production and Farm Management
604	Marketing and Distribution Practices

#### Outcome #5

##### 1. Outcome Measures

Medium Term - Resistance Management for Fresh-Market and Processing Vegetable Crops Grown in New Jersey: Productive agricultural land is stabilized to meet the needs of the agricultural industry and the "open space" needs of people of NJ. Agriculture remains a relevant and viable economic sector as profits increase (through reduced costs and/or increased or new sales or revenue streams). Measurable reductions in environmental impact (clear and adequate sources of water, reduced waste, reduced soil losses, reductions in non-point source pollution, etc.) will occur through the adoption of improved and sound management practices. Overall state environmental quality will be enhanced by agriculture, such as through the utilization and recycling of biowastes generated by the non-ag sector or the enhancement of air quality. The products of NJ agriculture will add to the nutritional quality of New Jerseyans food supply.

##### 2. Associated Institution Types

- 1862 Extension
- 1862 Research

##### 3a. Outcome Type:

Change in Action Outcome Measure

##### 3b. Quantitative Outcome

Year	Quantitative Target	Actual
2010	{No Data Entered}	0

##### 3c. Qualitative Outcome or Impact Statement

###### Issue (Who cares and Why)

Resistance Management for Fresh-Market and Processing Vegetable Crops Grown in New Jersey

The future of fresh market vegetable crops is essential to viable and sustained agriculture production in New Jersey. It is essential that effective tools for managing diseases are adopted and implemented.

### **What has been done**

1,500 fungicide resistance management guides were distributed to vegetable growers, crop advisors, extension personnel and industry representatives in the mid-Atlantic and surrounding region in a coordinated effort with extension vegetable pathologists from DE, PA, VA, and MD. Additionally in 2010, a fungicide resistance management (FRAC) table was developed for tomato growers in the Northeast and made available to growers, crop advisors, extension personnel and industry representatives in 13 states via the Northeast IPM center's website. Reduce use of fungicides that are no longer adequately effective because of resistance development, and provide the tools and knowledge to allow growers in the Northeast US to develop disease control programs with an emphasis towards fungicide resistance management for important tomato diseases.

### **Results**

Annual fungicide resistance management guide has become an important IPM tool for vegetable growers. The guide helps stakeholders understand the importance of fungicide resistance management and how to mitigate its development.

## **4. Associated Knowledge Areas**

<b>KA Code</b>	<b>Knowledge Area</b>
205	Plant Management Systems
211	Insects, Mites, and Other Arthropods Affecting Plants
215	Biological Control of Pests Affecting Plants
601	Economics of Agricultural Production and Farm Management
604	Marketing and Distribution Practices

## **Outcome #6**

### **1. Outcome Measures**

Medium Term - Breeding and Germplasm Enhancement for New Jersey Cranberry and Blueberry Industries: Productive agricultural land is stabilized to meet the needs of the agricultural industry and the "open space" needs of people of NJ. Agriculture remains a relevant and viable economic sector as profits increase (through reduced costs and/or increased or new sales or revenue streams). Measurable reductions in environmental impact (clear and adequate sources of water, reduced waste, reduced soil losses, reductions in non-point source pollution, etc.) will occur through the adoption of improved and sound management practices. Overall state environmental quality will be enhanced by agriculture, such as through the utilization and recycling of biowastes generated by the non-ag sector or the enhancement of air quality. The products of NJ agriculture will add to the nutritional quality of New Jerseyans food supply.

### **2. Associated Institution Types**

- 1862 Extension
- 1862 Research

**3a. Outcome Type:**

Change in Action Outcome Measure

**3b. Quantitative Outcome**

Year	Quantitative Target	Actual
2010	{No Data Entered}	0

**3c. Qualitative Outcome or Impact Statement**

**Issue (Who cares and Why)**

Breeding and Germplasm Enhancement for New Jersey Cranberry and Blueberry Industries

Rutgers NJAES and New Jersey are renowned for the leadership given to cranberry research and development. Continued attention to this important agricultural commodity is essential to the future.

**What has been done**

NJAES Researchers have continued their investigation of blueberry and cranberry evaluation and breeding. Researchers continue their efforts to identify cranberry and blueberry cultivars with the highest levels of compounds with antifungal and antibacterial properties. These efforts will inform breeding programs with the goal of producing varieties with enhanced health benefits.

**Results**

New propagation methods developed by this project have optimized the production of healthy, disease-free, true-to-type cranberry stolons, providing for the first virus-indexed and DNA fingerprinted cranberry varieties for the cranberry grower. Over 1,200 acres of the Crimson Queen, Demoranville, and Mullica Queen varieties have now been planted in five states (MA, NJ, OR, WA, WI), and four provinces in Canada, an almost four-fold increase over last year. Fact sheets on each of the varieties have been written and are being distributed to cranberry growers. The higher yield and fruit quality of the new cranberry varieties will contribute to higher productivity in food provision. The greater productivity of these varieties will increase the efficiency of US cranberry growers, enhancing US agricultural sustainability. The development of varieties with increased disease and insect resistance will reduce requirements for pesticides, resulting in reduced environmental impact, and safer food and water supply. US patent application and a Canadian Plant Breeders Rights application was submitted for a new cranberry variety, CNJ95-20-20, with exceptional traits for the fresh fruit market. Canadian Breeders Rights Application Cert. #3742, Grant-of-Rights was obtained January 2010 for cranberry variety 'NJS98-23'.

**4. Associated Knowledge Areas**

KA Code	Knowledge Area
205	Plant Management Systems
211	Insects, Mites, and Other Arthropods Affecting Plants
215	Biological Control of Pests Affecting Plants
601	Economics of Agricultural Production and Farm Management

## 604 Marketing and Distribution Practices

**Outcome #7****1. Outcome Measures**

Medium Term - The Great Tomato Tasting: Productive agricultural land is stabilized to meet the needs of the agricultural industry and the "open space" needs of people of NJ. Agriculture remains a relevant and viable economic sector as profits increase (through reduced costs and/or increased or new sales or revenue streams). Measurable reductions in environmental impact (clear and adequate sources of water, reduced waste, reduced soil losses, reductions in non-point source pollution, etc.) will occur through the adoption of improved and sound management practices. Overall state environmental quality will be enhanced by agriculture, such as through the utilization and recycling of biowastes generated by the non-ag sector or the enhancement of air quality. The products of NJ agriculture will add to the nutritional quality of New Jerseyans food supply.

**2. Associated Institution Types**

- 1862 Extension
- 1862 Research

**3a. Outcome Type:**

Change in Action Outcome Measure

**3b. Quantitative Outcome**

Year	Quantitative Target	Actual
2010	{No Data Entered}	0

**3c. Qualitative Outcome or Impact Statement****Issue (Who cares and Why)**

The Great Tomato Tasting

A vast majority of New Jersey residents are not familiar with New Jersey agriculture and the programs of NJAES. Snyder Research and Extension Farm's Tomato Tasting event provides an opportunity to increase public awareness of the value of NJ agriculture.

**What has been done**

The Great Tomato Tasting Event is held annually at the Rutgers Snyder Research and Extension Farm. This is a four-hour open house that addresses consumer agricultural and horticultural education needs by featuring informal tastings of seasonal produce and more formal research evaluations of basil, apples, peach, and tomato varieties from experimental plots to gather adapt on consumer preference.

**Results**

Beyond tasting and learning about the many varieties of tomatoes, visitors are also taught about gardening, nutrition and the many programs Rutgers NJAES Cooperative Extension has to

offer. Tours of the research plots expose attendees to the work of Rutgers NJAES scientists who solve problems for the residents of the state.

For first time attendees:

94.1% strongly agreed or agreed they have a better understanding of what the Rutgers Snyder Research Farm, the NJ Agricultural Experiment Station, and Rutgers NJAES Cooperative Extension do for NJ agriculture and home gardeners.

75.5% strongly agreed or agreed they are now more likely to utilize programs and services of Rutgers NJAES Cooperative Extension and Master Gardener volunteers as an educational resource.

As a result of attending the Tasting, have you taken advantage of other Rutgers NJAES programs and services?

Attend workshop(s) 34.4%

Contacted a County Extension Office 62.5%

Subscribed to a newsletter 28.1%

Taken a soil test 21.9%

Joined/volunteered for a 4-H Club 6.3%

As a result of visiting the Tasting have you changed your gardening practices/landscapes to include:

Cover crops 11.4%

Deer resistant plants 48.6%

Straw or plastic mulches 35.7%

Water use / irrigation 28.6%

Added plants to attract beneficial insects 44.3%

76.0% strongly agreed or agreed that as a result of visiting the Tasting, they now buy more produce at local farm, or farmers market, or roadside stand, and that they visit a local farm, farmers market, or roadside stand more frequently.

95.7% strongly agreed or agreed that they are now more likely to favor community initiatives aimed at preserving and strengthening agriculture in NJ.

71.7% strongly agreed or agreed that they are now more likely to utilize programs and services of Rutgers NJAES Cooperative Extension and Master Gardener volunteers as an educational resource.

85.7% strongly agreed or agreed that they are now more likely to purchase 'Jersey Fresh' tomatoes, peaches, apples and other produce.

The survey responses reflect great increases in knowledge, understanding, and support for local agriculture. Nothing convinces a consumer to change their buying habits more than tasting locally grown and harvested fruits and vegetables. This event has the synergistic effect of making visitors aware of Rutgers NJAES Cooperative Extension programs and the impact those programs have on local agriculture.

#### 4. Associated Knowledge Areas

KA Code	Knowledge Area
205	Plant Management Systems
211	Insects, Mites, and Other Arthropods Affecting Plants
215	Biological Control of Pests Affecting Plants
601	Economics of Agricultural Production and Farm Management
604	Marketing and Distribution Practices

**Outcome #8**

**1. Outcome Measures**

Medium Term - AgrAbility: Productive agricultural land is stabilized to meet the needs of the agricultural industry and the "open space" needs of people of NJ. Agriculture remains a relevant and viable economic sector as profits increase (through reduced costs and/or increased or new sales or revenue streams). Measurable reductions in environmental impact (clear and adequate sources of water, reduced waste, reduced soil losses, reductions in non-point source pollution, etc.) will occur through the adoption of improved and sound management practices. Overall state environmental quality will be enhanced by agriculture, such as through the utilization and recycling of biowastes generated by the non-ag sector or the enhancement of air quality. The products of NJ agriculture will add to the nutritional quality of New Jerseyans food supply.

**2. Associated Institution Types**

- 1862 Extension
- 1862 Research

**3a. Outcome Type:**

Change in Action Outcome Measure

**3b. Quantitative Outcome**

Year	Quantitative Target	Actual
2010	{No Data Entered}	0

**3c. Qualitative Outcome or Impact Statement**

**Issue (Who cares and Why)**

AgrAbility

Farming has been and still remains the most dangerous occupation in the US and the world for that matter. Injury and death are all too common occurrences on the farm. Surveys have shown that after a farm accident everything changes except for the desire to keep farming. AgrAbility is a program designed to do just that.

**What has been done**

Agrability works with farmers on an individual basis to help farmers overcome handicaps both big and small in order for them to continue their life's desire namely farming. Educational brochures, videos, DVD's, displays, demonstrations, partnership networking, and other technologies are all used to accomplish the program's goals.

**Results**

More than 300 farmers have been made aware of AgrAbility and what it can offer to the Agricultural Community. DVD's on Arthritis and specialized Adaptive Equipment for farmers have been distributed to the farm community. Work is ongoing with individual farmer clientele on a personalized basis. Training has been offered that demonstrates equipment adaptations to make

farming possible after an accident or other handicap. Much of this equipment was developed out of need by farmers themselves after an accident has occurred. As a result of the AgrAbility farmers have been able to maintain the viability of their operations.

**4. Associated Knowledge Areas**

<b>KA Code</b>	<b>Knowledge Area</b>
205	Plant Management Systems
211	Insects, Mites, and Other Arthropods Affecting Plants
215	Biological Control of Pests Affecting Plants
601	Economics of Agricultural Production and Farm Management
604	Marketing and Distribution Practices

**Outcome #9**

**1. Outcome Measures**

Long Term - Farm Management: New Jersey's agriculture will remain a viable and important industry. New Jersey residents will recognize the importance of agriculture's contributions to societal well being (open space, quality of life) and will support the agricultural industry socially, politically and economically.

**2. Associated Institution Types**

- 1862 Extension
- 1862 Research

**3a. Outcome Type:**

Change in Condition Outcome Measure

**3b. Quantitative Outcome**

<b>Year</b>	<b>Quantitative Target</b>	<b>Actual</b>
2010	{No Data Entered}	0

**3c. Qualitative Outcome or Impact Statement**

**Issue (Who cares and Why)**  
Farm Management

The green industry in the northeastern U.S. is an important component of agricultural production with over \$2 billion in farm cash receipts, equating to 22.4% of all farm cash receipts in the northeastern U.S. It is the number one agricultural commodity in five northeastern U.S. states. Competition in the green industry has become fierce. Many factors have put downward pressure on price. These include the recent volatility of fossil fuels and general energy prices, domestic competition, off-shore production, a weakened and stressed economy, and the growth of the mass market. Nationally, the number of producers continues to decline as a direct result of

the newly defined economic risks.

### **What has been done**

NJAES Specialists have developed programs to help producers in the northeastern U.S. develop strategic programs to reduce costs and increase profits in tough economic times. A combination of workshops, meetings, field visits, a newsletter, and The Rutgers Farm Management Website have been implemented to reach the target audience.

### **Results**

Over 350 people now have access to the Excel version of the Greenhouse Cost Accounting Program. If these were only New Jersey producers, this would represent 100% of the greenhouses in New Jersey. The average greenhouse in the state is 25,000 square feet in size with annual sales of \$350,000. This means that greenhouses representing \$122.5 million in annual sales and 8.75 million square feet of production area are using the program. If by using this program they are 5% more efficient, this would represent \$6.125 million in sales and 437,500 square feet of production area. Comments from the workshop participants have all been positive, and they ask for more of this kind of information to help remain competitive. Requests for information come from New Jersey, many other states, and even other countries.

## **4. Associated Knowledge Areas**

<b>KA Code</b>	<b>Knowledge Area</b>
205	Plant Management Systems
211	Insects, Mites, and Other Arthropods Affecting Plants
215	Biological Control of Pests Affecting Plants
601	Economics of Agricultural Production and Farm Management
604	Marketing and Distribution Practices

## **Outcome #10**

### **1. Outcome Measures**

Long Term - Development and Use of Dollar Spot Tolerant Creeping Bentgrass for Golf Courses: New Jersey's agriculture will remain a viable and important industry. New Jersey residents will recognize the importance of agriculture's contributions to societal well being (open space, quality of life) and will support the agricultural industry socially, politically and economically.

### **2. Associated Institution Types**

- 1862 Extension
- 1862 Research

### **3a. Outcome Type:**

Change in Condition Outcome Measure

**3b. Quantitative Outcome**

Year	Quantitative Target	Actual
2010	{No Data Entered}	0

**3c. Qualitative Outcome or Impact Statement**

**Issue (Who cares and Why)**

Development and Use of Dollar Spot Tolerant Creeping Bentgrass for Golf Courses

Turfgrass is a valuable and rapidly expanding component of our urban and rural landscape. Turfgrass covers 12 million homes in the United States (Potter & Braman 1991) including over 60 million lawns and more than 16,000 golf courses (Emmons 2000). Golf courses are an important component of the turfgrass industry. They are a source of green space in the urban environment and offer recreation and enjoyment for approximately 36 million Americans. Golf courses also generate jobs, commerce, economic development, and tax revenues for communities throughout the country. A recent report by the World Golf Foundation stated that golf contributes \$62.2 billion worth of goods and services each year to the national economy ([www.golf2020.com](http://www.golf2020.com)). Dollar spot disease, caused by the fungus *Sclerotinia homoeocarpa*, is considered the most common disease in the US. In fact, more money is spent to control dollar spot disease than any other turfgrass disease in the US. Creeping bentgrass, the most widely utilized turfgrass on temperate golf courses, is particularly susceptible to this disease. Most turfgrass managers spray fungicides every 7 to 14 days during the growing season for control of this disease as well as others. Moreover, isolates of the pathogen are resistant to several fungicide chemistries. Because so much pesticide is applied to golf courses for control of this disease it became apparent that a more comprehensive and environmentally sound approach was required to improve disease control, reduce fungicide usage, and maintain adequate turfgrass quality. The results have impacted turfgrass managers at the state, regional, national and global level.

**What has been done**

NJAES research has focused on identifying dollar spot resistance in creeping bentgrass. I conducted numerous field studies and planted hundreds of creeping bentgrass plants in spaced-plant nurseries to develop new cultivars and understand the inheritance of dollar spot resistance in creeping bentgrass. Results have been published in professional journals, trade magazines, proceedings, abstracts, and Extension publications. Findings were also disseminated at county, state, and regional meetings. Researchers have conducted studies to elucidate the mechanisms involved in how creeping bentgrass responds to the causal agent and on the narrow-sense heritability and gene action of dollar spot resistance. County agents and turfgrass managers were informed of results via field days, and Extension Fact sheets. More than 350 golf course superintendents attended the field day held at Hort Farm II, North Brunswick, NJ in August, 2010.

**Results**

Through this research, six commercially available cultivars and five experimental selections of creeping bentgrass with dramatic improvements in resistance to this pathogen have been developed. The new cultivars developed through this effort have ranked at the top of the National Turfgrass Evaluation Program's national bentgrass test for the past six years ([www.ntep.org](http://www.ntep.org)) at multiple locations throughout the country. They are currently being used on top-tier golf courses including those hosting major golf championships like the US Open. The use of these resistant cultivars in the marketplace has helped to significantly reduce pesticides applied to the environment. A golf course in Buffalo, NY is using one of these resistant cultivars and spends

only \$5,000 per year on fungicides for the control of dollar spot whereas a typical golf course with a dollar spot susceptible cultivar could spend up to \$30,000-\$40,000 per year, a savings of more than 86%. In addition to economic savings, the environmental benefits (e.g., reduced non-target effects on other organisms) from reduced fungicide applications is recognized. Moreover, the reduced frequency of fungicide applications resulting from this program has decreased the potential for fungicide resistance.

#### 4. Associated Knowledge Areas

KA Code	Knowledge Area
205	Plant Management Systems
211	Insects, Mites, and Other Arthropods Affecting Plants
215	Biological Control of Pests Affecting Plants
601	Economics of Agricultural Production and Farm Management
604	Marketing and Distribution Practices

#### Outcome #11

##### 1. Outcome Measures

Long Term - Nuances of Marketing Ethnic Specialty Vegetables & Herbs: New Jersey's agriculture will remain a viable and important industry. New Jersey residents will recognize the importance of agriculture's contributions to societal well being (open space, quality of life) and will support the agricultural industry socially, politically and economically.

##### 2. Associated Institution Types

- 1862 Extension
- 1862 Research

##### 3a. Outcome Type:

Change in Condition Outcome Measure

##### 3b. Quantitative Outcome

Year	Quantitative Target	Actual
2010	{No Data Entered}	0

##### 3c. Qualitative Outcome or Impact Statement

###### Issue (Who cares and Why)

Nuances of Marketing Ethnic Specialty Vegetables & Herbs

Growing ethnic populations of first and second generation immigrants in the Mid-Atlantic Region and along the East Coast offer farmers marketing opportunities to provide fresh produce native to these groups' homelands. Asian and Hispanic populations are growing at rapid rates in the region, and specialty groceries and restaurants are increasing to serve ethnic foods to both

the ethnic populations and the general public. Providing the fresh produce common in these cuisines is an additional niche for fresh produce growers.

#### **What has been done**

In response to a need for East Cost farmers to remain economically viable, a U.S. Department of Agriculture, National Research Initiative study was initiated to document and quantify the current available market opportunities so that farmers may engage the market by growing crops targeted from a supplier and consumer demand perspective. Targeted Audience includes existing vegetable growers and new/beginning farmers exploring alternative markets. Local participation includes several existing vegetable growers, one new recent immigrant farmer, and several beginning farmers. All have shown positive returns on ethnic crop enterprises added to their new or existing operations.

#### **Results**

Three new farms have been established in Atlantic County producing ethnic crops. Three existing Asian farmers have expanded their operations and markets based on opportunities presented through this program. Likewise, several existing vegetable growers in and around Atlantic County have adopted new ethnic crops and expanded their markets.

#### **4. Associated Knowledge Areas**

<b>KA Code</b>	<b>Knowledge Area</b>
205	Plant Management Systems
211	Insects, Mites, and Other Arthropods Affecting Plants
215	Biological Control of Pests Affecting Plants
601	Economics of Agricultural Production and Farm Management
604	Marketing and Distribution Practices

#### **V(H). Planned Program (External Factors)**

##### **External factors which affected outcomes**

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

##### **Brief Explanation**

#### **V(I). Planned Program (Evaluation Studies and Data Collection)**

### **1. Evaluation Studies Planned**

- Before-After (before and after program)
- During (during program)
- Time series (multiple points before and after program)
- Comparisons between program participants (individuals, group, organizations) and non-participants
- Comparisons between different groups of individuals or program participants experiencing different levels of program intensity.
- Comparison between locales where the program operates and sites without program intervention

### **Evaluation Results**

See Qualitative Outcome or Impact Statements

### **Key Items of Evaluation**

**V(A). Planned Program (Summary)**

**Program # 6**

**1. Name of the Planned Program**

Sustainability of NJ Equine Industry and Its Impact on Agriculture and Open Space

**V(B). Program Knowledge Area(s)**

**1. Program Knowledge Areas and Percentage**

KA Code	Knowledge Area	%1862 Extension	%1890 Extension	%1862 Research	%1890 Research
301	Reproductive Performance of Animals	20%		20%	
302	Nutrient Utilization in Animals	20%		20%	
303	Genetic Improvement of Animals	20%		20%	
312	External Parasites and Pests of Animals	20%		20%	
315	Animal Welfare/Well-Being and Protection	20%		20%	
	<b>Total</b>	100%		100%	

**V(C). Planned Program (Inputs)**

**1. Actual amount of professional FTE/SYs expended this Program**

Year: 2010	Extension		Research	
	1862	1890	1862	1890
Plan	6.0	0.0	3.0	0.0
Actual	8.0	0.0	1.0	0.0

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

Extension		Research	
Smith-Lever 3b & 3c	1890 Extension	Hatch	Evans-Allen
101393	0	51238	0
1862 Matching	1890 Matching	1862 Matching	1890 Matching
645549	0	223426	0
1862 All Other	1890 All Other	1862 All Other	1890 All Other
26689	0	31986	0

**V(D). Planned Program (Activity)**

**1. Brief description of the Activity**

- Share the results of the 2007 Economic Impact Study
- Horse Management seminars and Equine Science Update (county and statewide)
- Public relations and promotions
- Actively engaged as outside speakers for the industry State 4-H horse program
- Perform consultations to individuals and agricultural organizations
- Maintain research-based website
- Conduct research to impact policy decisions for industry
- Conduct roundtables
- Produce research based materials
- Hold annual stakeholder meeting to Identify issues of importance
- RUBEA - advisory committee
- Facilitate the opportunity to network within the industry

**2. Brief description of the target audience**

Equine users - including, students/youth, equestrians, owners

Equine professionals: veterinarians, researchers, industry leaders, farmers, service providers, trainers, breeders, stable managers

Legislators/Government Officials/Industry Officials e.g. Racing Commission, Sport and Competition Officials (FEI, USEF)

Educators

General public

**V(E). Planned Program (Outputs)**

**1. Standard output measures**

2010	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
<b>Plan</b>	6000	40000	4000	10000
<b>Actual</b>	6525	54775	5870	3500

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

**Patent Applications Submitted**

Year: 2010  
 Plan: 1  
 Actual: 0

**Patents listed**

**3. Publications (Standard General Output Measure)**

**Number of Peer Reviewed Publications**

2010	Extension	Research	Total

<b>Plan</b>	6	20	
<b>Actual</b>	10	28	38

**V(F). State Defined Outputs**

**Output Target**

**Output #1**

**Output Measure**

- A variety of strategies will be implemented to reach target audiences. This will include and not be limited to workshops, field visits, classes, newsletters, media releases, electronic communications, and publications. In addition a trained volunteer teaching base will be developed. Quantitative reports of participation will be collected.  
Not reporting on this Output for this Annual Report

**V(G). State Defined Outcomes**

**V. State Defined Outcomes Table of Content**

O. No.	OUTCOME NAME
1	Short Term - New Jersey residents and government officials will be made aware of the importance of the equine industry. Equine enthusiasts take leadership roles to unify the industry and will acquire knowledge to support the industry's sustainability. Equine industry segments will learn the importance and benefits of speaking in one voice.
2	Medium Term - Diverse equine-related units are organized into one voice. Misperceptions by the general public re: the segments of equine industry are corrected. All uses of the horse are recognized as agricultural by local and state government officials.
3	Long Term - Equine industry is unified and is economically sustainable. Equine industry is recognized as a critical component of the economic development, of traditional agriculture, and the preservation of open space.
4	Medium Term - New Jersey 4-H Equine Programs: Diverse equine-related units are organized into one voice. Misperceptions by the general public re: the segments of equine industry are corrected. All uses of the horse are recognized as agricultural by local and state government officials.

**Outcome #1**

**1. Outcome Measures**

Short Term - New Jersey residents and government officials will be made aware of the importance of the equine industry. Equine enthusiasts take leadership roles to unify the industry and will acquire knowledge to support the industry's sustainability. Equine industry segments will learn the importance and benefits of speaking in one voice.

Not Reporting on this Outcome Measure

**Outcome #2**

**1. Outcome Measures**

Medium Term - Diverse equine-related units are organized into one voice. Misperceptions by the general public re: the segments of equine industry are corrected. All uses of the horse are recognized as agricultural by local and state government officials.

**2. Associated Institution Types**

- 1862 Extension
- 1862 Research

**3a. Outcome Type:**

Change in Action Outcome Measure

**3b. Quantitative Outcome**

Year	Quantitative Target	Actual
2010	40000	0

**3c. Qualitative Outcome or Impact Statement**

**Issue (Who cares and Why)**

Dream Riders 4-H Horse Camp Program - Youth Learn About Horse Care, Safety and Riding

Many children ages 5-14 love horses. Due to cost and availability, most of these children do not get an opportunity to see a horse up close or get to learn how to care for or ride a horse.

**What has been done**

A 4-H club called the Dream Riders which provides an opportunity for children to learn about and experience horses featured an opportunity for boys and girls in grades K-6 to discover and learn about horses through a variety of age appropriate hands-on activities. While attending this camp program, the youth were assigned to care for a horse. They learned about horse safety; how to feed a horse; clean the stall; brush and groom a horse, clean the hooves; saddle and tack a horse; mount and ride a horse utilizing English and/or Western saddles; and much more.

**Results**

One hundred percent (100%) of the participants rated the Dream Riders 4-H Horse Camp Program as "Excellent" or "Very Good" and 96% indicated that they would come again to camp. When asked "what you liked BEST about the Dream Riders 4--H Horse Camp?" 85% of the participants indicated that they liked the riding; 13% said that they loved the horses; 11% of the participants said the brushing and grooming; 9% said learning how to tack a horse; 5% said learning how to sit on a Western saddle; and 2% said learning how to ride using an English saddle. One child indicated that "the best part of the camp was spending time with the horses!"

**4. Associated Knowledge Areas**

<b>KA Code</b>	<b>Knowledge Area</b>
301	Reproductive Performance of Animals
302	Nutrient Utilization in Animals
303	Genetic Improvement of Animals
312	External Parasites and Pests of Animals
315	Animal Welfare/Well-Being and Protection

**Outcome #3**

**1. Outcome Measures**

Long Term - Equine industry is unified and is economically sustainable. Equine industry is recognized as a critical component of the economic development, of traditional agriculture, and the preservation of open space.

**2. Associated Institution Types**

- 1862 Extension
- 1862 Research

**3a. Outcome Type:**

Change in Condition Outcome Measure

**3b. Quantitative Outcome**

<b>Year</b>	<b>Quantitative Target</b>	<b>Actual</b>
2010	45000	0

**3c. Qualitative Outcome or Impact Statement**

**Issue (Who cares and Why)**

Equine Economic Impact Study of 2007-2008: Impact on Public Policy Decisions

For many years, the State of New Jersey has been engaged in a series of high profile debates on the future of horseracing in the State. These debates led several stakeholders to commission

a study to explore the economic relationships among horseracing, the larger equine industry in the state (including pleasure horses), and related agricultural industries such as forage production. The key policy question is this: If horseracing and racehorse breeding leave the state, what other components of the agricultural economy could be at risk?

#### **What has been done**

Rutgers Equine Science Center director testified before a special panel of the New Jersey state legislature in 2010.

#### **Results**

Judging by numerous references by public officials to the findings of NJAES 2007-2008 equine economic impact study, it seems likely that the study contributed to a decision by the Governor to back away from proposals to close the racetracks now operated by the Sports and Exposition Authority. Current proposals are to sell the tracks to an equine industry association so that they can continue to remain open.

#### **4. Associated Knowledge Areas**

<b>KA Code</b>	<b>Knowledge Area</b>
301	Reproductive Performance of Animals
302	Nutrient Utilization in Animals
303	Genetic Improvement of Animals
312	External Parasites and Pests of Animals
315	Animal Welfare/Well-Being and Protection

#### **Outcome #4**

##### **1. Outcome Measures**

Medium Term - New Jersey 4-H Equine Programs: Diverse equine-related units are organized into one voice. Misperceptions by the general public re: the segments of equine industry are corrected. All uses of the horse are recognized as agricultural by local and state government officials.

##### **2. Associated Institution Types**

- 1862 Extension
- 1862 Research

##### **3a. Outcome Type:**

Change in Action Outcome Measure

##### **3b. Quantitative Outcome**

<b>Year</b>	<b>Quantitative Target</b>	<b>Actual</b>
2010	{No Data Entered}	0

##### **3c. Qualitative Outcome or Impact Statement**

**Issue (Who cares and Why)**

New Jersey 4-H Equine Programs

The New Jersey 4-H Horse Project continues to be one of the largest projects in the state with over 1,600 club members in 2010. Youth grades 1-13 from almost every county in the state can and do participate in some fashion. The subject matter, life and workforce skills these youth gain from participating in this program are exceptional because there are so many different opportunities for youth to learn and so many different ways for this learning to take place.

**What has been done**

During 2009-2010, 1,698 youth participated in the New Jersey 4-H Horse Program. Nearly every county in the state has at least one 4-H Club with horse project members and most of the counties participate in county and state workshops and competitive events related to equine.

**Results**

Youth who participated in a variety of 4-H horse projects reported the following measurable impacts related to knowledge gained, life and social skills.

Model Horse Show results indicated:

78% said they learned communication

82% reported learning horse science skills

Equine Presentations evaluation results revealed:

95% learned about horses

95% improved their public speaking skills

85% learned how to respect other people's opinions and ideas

Horse Bowl evaluation results revealed:

80% learned about horses

Horse Judging evaluation results revealed:

78% said they learned about conformation and balance

Records Book results from the 2009 - 2010 year indicated youth learned the following skills:

95% to set goals for myself

88% to be proud of my accomplishments

87% how to finish something I started

87% to deal with winning and losing gracefully

73% to accept change

72% how to work with adults

**4. Associated Knowledge Areas**

<b>KA Code</b>	<b>Knowledge Area</b>
301	Reproductive Performance of Animals
302	Nutrient Utilization in Animals
303	Genetic Improvement of Animals
312	External Parasites and Pests of Animals
315	Animal Welfare/Well-Being and Protection

## **V(H). Planned Program (External Factors)**

### **External factors which affected outcomes**

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

### **Brief Explanation**

## **V(I). Planned Program (Evaluation Studies and Data Collection)**

### **1. Evaluation Studies Planned**

- Before-After (before and after program)
- During (during program)
- Time series (multiple points before and after program)
- Comparisons between program participants (individuals, group, organizations) and non-participants
- Comparisons between different groups of individuals or program participants experiencing different levels of program intensity.
- Comparison between locales where the program operates and sites without program intervention

### **Evaluation Results**

See Qualitative Outcome and Impact Statements

### **Key Items of Evaluation**

**V(A). Planned Program (Summary)****Program # 7****1. Name of the Planned Program**

Home, Garden and Environment

**V(B). Program Knowledge Area(s)****1. Program Knowledge Areas and Percentage**

KA Code	Knowledge Area	%1862 Extension	%1890 Extension	%1862 Research	%1890 Research
102	Soil, Plant, Water, Nutrient Relationships	20%		20%	
111	Conservation and Efficient Use of Water	20%		20%	
131	Alternative Uses of Land	20%		20%	
205	Plant Management Systems	20%		20%	
721	Insects and Other Pests Affecting Humans	20%		20%	
	<b>Total</b>	100%		100%	

**V(C). Planned Program (Inputs)****1. Actual amount of professional FTE/SYs expended this Program**

Year: 2010	Extension		Research	
	1862	1890	1862	1890
Plan	3.0	0.0	3.2	0.0
Actual	22.0	0.0	12.0	0.0

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

Extension		Research	
Smith-Lever 3b & 3c	1890 Extension	Hatch	Evans-Allen
473494	0	322016	0
1862 Matching	1890 Matching	1862 Matching	1890 Matching
1382076	0	241929	0
1862 All Other	1890 All Other	1862 All Other	1890 All Other
270269	0	2201908	0

**V(D). Planned Program (Activity)****1. Brief description of the Activity**

Identify critical programmatic foci/needs based on Extension and stakeholder assessment broadly defined under two areas:

- Environmentally sound gardening/lawn care
- Home horticulture - lawn, garden and grounds management
- Commercial horticulture - professional management and maintenance
- Environmentally sound household, structural pest control
- Home pest control - termites, carpenter ants,, etc.
- Human-health related pest control - mosquitoes, ticks, etc.
- A school IPM program will be developed to train end-users sound management techniques,

Develop an inventory of local (county based) and regional and statewide programs designed to meet these needs. Identify team members and their roles. Create a multi-task effort to generate and share research-based information with clientele, including research, demonstrations, educational meetings and workshops, certification programs, trainings, etc. Research on plant cultivars that exhibit increased disease and insect resistance , as well as reduced need for fertilizer and irrigation water, will lead to reduced dependence on chemical control of pests and disease, lessening the impact on the environment.

## **2. Brief description of the target audience**

Stakeholders:

- Homeowners and residential clientele
- Commercial horticulture professionals (management and maintenance)
- Commercial pest control operators
- Public health officials
- Local environmental commissions or others that have interest in these areas
- Municipalities and other governmental and non-governmental agencies, including Parks

Commission, Public Health, Mosquito Commission, schools, etc.

- Volunteers (trained via Master Gardener Program, Environmental Stewards Program), youth and others who can support and benefit from these efforts
- Underserved and underrepresented audiences

## **V(E). Planned Program (Outputs)**

### **1. Standard output measures**

<b>2010</b>	<b>Direct Contacts Adults</b>	<b>Indirect Contacts Adults</b>	<b>Direct Contacts Youth</b>	<b>Indirect Contacts Youth</b>
<b>Plan</b>	23000	7000	230	90
<b>Actual</b>	23520	14550	11336	1500

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

**Patent Applications Submitted**

Year: 2010

Plan: 0

Actual: 11

### Patents listed

Brilman, L., K. Hignight, S.A. Bonos and C. Reed Funk. 2010. United States Plant Variety Protection Certificate no. 200400289. Peregrine ryegrass. Issued Feb 10, 2010.

Brilman, L., K. Hignight, W.A. Meyer and S.A. Bonos. 2010. United States Plant Variety Protection Certificate no. 200500294. SR-4550 perennial ryegrass. Issued Feb. 10, 2010.

Floyd, D., R.F. Bara, M.M. Wilson, C.R. Funk and W.A. Meyer. 2010. 2010. United States Plant Variety Protection Certificate no. 200400007. Blazer 4 perennial ryegrass. Issued July 7, 2010.

Nelson, E., W.A. Meyer, R.F. Bara and C. Reed Funk. 2010. United States Plant Variety Protection Certificate no. 20020220. Inspire perennial ryegrass. Issued Nov. 17, 2010.

Brilman, L., R.F. Bara, W.A. Meyer and C. Reed Funk. 2010. United States Plant Variety Protection Certificate no. 200200227. SR-4420 perennial ryegrass. Issued August 31, 2010.

Fraser, M.L., C.A. Rose-Fricker, W.A. Meyer and C. Reed Funk. 2010. United States Plant Variety Protection Certificate no. 200200243. Citation Fore perennial ryegrass. Issued August 31, 2010.

Rose-Fricker, R.F. Bara, D.A. Smith and W.A. Meyer. 2010. United States Plant Variety Protection Certificate no. 20030046. Grand Slam perennial ryegrass. Issued August 31, 2010.

Meyer, W.A., K. Hignight, R.F. Bara, M. Wilson and D.A. Smith. 2010. United States Plant Variety Protection Certificate no. 200500111. Paragon GLR perennial ryegrass. Issued July 8, 2010.

Bonos, S.A., K. Hignight, R.F. Bara, M. Wilson and W.A. Meyer. 2010. United States Plant Variety Protection Certificate no. 200500142. Issued August 31, 2010.

Hignight, K., S.A. Bonos, J. Clark, E. Weibel and W.A. Meyer. 2009. United States Plant Variety Protection Certificate no. 200800125. Firenza tall fescue. Issued August 12, 2009.

Brilman, L., S.A. Bonos, W.K. Dickson and W.A. Meyer. 2010. United States Plant Variety Protection Certificate no. 200800370. SR-8650 tall fescue. Issued July 8, 2010.

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### 3. Publications (Standard General Output Measure)

#### Number of Peer Reviewed Publications

2010	Extension	Research	Total
Plan	6	0	
Actual	16	63	79

#### V(F). State Defined Outputs

##### Output Target

##### Output #1

##### Output Measure

- A variety of strategies will be implemented to reach target audiences. This will include and not be limited to workshops, field visits, classes, newsletters, media releases, electronic communications, publications. In addition a trained volunteer teaching base will be developed. Quantitative reports of participation data will be collected.  
Not reporting on this Output for this Annual Report

**V(G). State Defined Outcomes****V. State Defined Outcomes Table of Content**

O. No.	OUTCOME NAME
1	Short Term - Increased knowledge and improved decision making skills of professionals and volunteers (Master Gardeners and Environmental Stewards) working in commercial horticulture professions (management and maintenance), commercial pest control operators, public health officials, municipalities and other governmental and non-governmental agencies. Increased number of trained youth and adult volunteers, and measurable impact of their assistance on clientele. Increased number of certified pest control operators. Increased number of youth and adult clientele utilizing Extension information and service to improve their own and others knowledge and decision making skills.
2	Medium Term - Educated youth and adult clientele, both professional and residential, utilize their newly gained knowledge and skills to implement and make changes such as: Efficient and effective pest control techniques. Proper utilization of fertilizers and other soil amendments as needed based on soil testing. Proper selection of plant materials to reduce need for chemical inputs. Reduction in the damage caused by structural pests. Reduction in health related incidents and costs association with human health vectors (ticks, mosquitoes). Protect health and safety of school children. Enhance or maintain environmental quality.
3	Long Term - New Jersey's residents will reside, work and play in a healthy, safe, and sound environment -- in their homes, gardens, schools, parks and workplaces.
4	Medium Term - Invasive Species Awareness: Educated youth and adult clientele, both professional and residential, utilize their newly gained knowledge and skills to implement and make changes such as: Efficient and effective pest control techniques. Proper utilization of fertilizers and other soil amendments as needed based on soil testing. Proper selection of plant materials to reduce need for chemical inputs. Reduction in the damage caused by structural pests. Reduction in health related incidents and costs association with human health vectors (ticks, mosquitoes). Protect health and safety of school children. Enhance or maintain environmental quality.
5	Medium Term - Surveillance of Adult Mosquitoes and Mosquito-Borne Arboviruses: Educated youth and adult clientele, both professional and residential, utilize their newly gained knowledge and skills to implement and make changes such as: Efficient and effective pest control techniques. Proper utilization of fertilizers and other soil amendments as needed based on soil testing. Proper selection of plant materials to reduce need for chemical inputs. Reduction in the damage caused by structural pests. Reduction in health related incidents and costs association with human health vectors (ticks, mosquitoes). Protect health and safety of school children. Enhance or maintain environmental quality.
6	Medium Term - Aquatic Invasive Species: Water Chestnut Task Force: Educated youth and adult clientele, both professional and residential, utilize their newly gained knowledge and skills to implement and make changes such as: Efficient and effective pest control techniques. Proper utilization of fertilizers and other soil amendments as needed based on soil testing. Proper selection of plant materials to reduce need for chemical inputs. Reduction in the damage caused by structural pests. Reduction in health related incidents and costs association with human health vectors (ticks, mosquitoes). Protect health and safety of school children. Enhance or maintain environmental quality.
7	Medium Term - 4-H Environmental Ambassador Program: Educated youth and adult clientele, both professional and residential, utilize their newly gained knowledge and skills to implement and make changes such as: Efficient and effective pest control techniques. Proper utilization of fertilizers and other soil amendments as needed based on soil testing. Proper selection of plant materials to reduce need for chemical inputs. Reduction in the damage

	caused by structural pests. Reduction in health related incidents and costs association with human health vectors (ticks, mosquitoes). Protect health and safety of school children. Enhance or maintain environmental quality.
8	Medium Term - Jersey Summer Shore Safety Program: Educated youth and adult clientele, both professional and residential, utilize their newly gained knowledge and skills to implement and make changes such as: Efficient and effective pest control techniques. Proper utilization of fertilizers and other soil amendments as needed based on soil testing. Proper selection of plant materials to reduce need for chemical inputs. Reduction in the damage caused by structural pests. Reduction in health related incidents and costs association with human health vectors (ticks, mosquitoes). Protect health and safety of school children. Enhance or maintain environmental quality.
9	Medium Term - Healing Garden: Educated youth and adult clientele, both professional and residential, utilize their newly gained knowledge and skills to implement and make changes such as: Efficient and effective pest control techniques. Proper utilization of fertilizers and other soil amendments as needed based on soil testing. Proper selection of plant materials to reduce need for chemical inputs. Reduction in the damage caused by structural pests. Reduction in health related incidents and costs association with human health vectors (ticks, mosquitoes). Protect health and safety of school children. Enhance or maintain environmental quality.
10	Long Term - Rutgers Master Gardener Program: New Jersey's residents will reside, work and play in a healthy, safe, and sound environment -- in their homes, gardens, schools, parks and workplaces.
11	Long Term - Developing Integrated Urban Pest Management Strategies: New Jersey's residents will reside, work and play in a healthy, safe, and sound environment -- in their homes, gardens, schools, parks and workplaces.
12	Long Term - Rutgers Environmental Stewards: New Jersey's residents will reside, work and play in a healthy, safe, and sound environment -- in their homes, gardens, schools, parks and workplaces.

**Outcome #1**

**1. Outcome Measures**

Short Term - Increased knowledge and improved decision making skills of professionals and volunteers (Master Gardeners and Environmental Stewards) working in commercial horticulture professions (management and maintenance), commercial pest control operators, public health officials, municipalities and other governmental and non-governmental agencies. Increased number of trained youth and adult volunteers, and measurable impact of their assistance on clientele. Increased number of certified pest control operators. Increased number of youth and adult clientele utilizing Extension information and service to improve their own and others knowledge and decision making skills.

Not Reporting on this Outcome Measure

**Outcome #2**

**1. Outcome Measures**

Medium Term - Educated youth and adult clientele, both professional and residential, utilize their newly gained knowledge and skills to implement and make changes such as: Efficient and effective pest control techniques. Proper utilization of fertilizers and other soil amendments as needed based on soil testing. Proper selection of plant materials to reduce need for chemical inputs. Reduction in the damage caused by structural pests. Reduction in health related incidents and costs association with human health vectors (ticks, mosquitoes). Protect health and safety of school children. Enhance or maintain environmental quality.

**2. Associated Institution Types**

- 1862 Extension
- 1862 Research

**3a. Outcome Type:**

Change in Action Outcome Measure

**3b. Quantitative Outcome**

Year	Quantitative Target	Actual
2010	50000	0

**3c. Qualitative Outcome or Impact Statement**

**Issue (Who cares and Why)**

Farm Tire and Pesticide Clean Up

Farmers and home owners have pesticides and tires stored on their properties that present a potential environmental and health hazard to their families and communities.

**What has been done**

Identified the need and the environmental and the health hazard posed to ground water and families by the storage of unused pesticides and discarded tires. Encouraged farmers and home owners to bring pesticides and tires, at no cost, to be recycled or disposed of.

**Results**

Five hundred eighty pounds of stored, unused pesticides were disposed of or recycled in an environmentally accepted manner. Three hundred ninety tons of stored or discarded tires were disposed of or recycled in an environmentally accepted manner.

**4. Associated Knowledge Areas**

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

- 111 Conservation and Efficient Use of Water
- 131 Alternative Uses of Land
- 205 Plant Management Systems
- 721 Insects and Other Pests Affecting Humans

**Outcome #3**

**1. Outcome Measures**

Long Term - New Jersey's residents will reside, work and play in a healthy, safe, and sound environment -- in their homes, gardens, schools, parks and workplaces.

**2. Associated Institution Types**

- 1862 Extension
- 1862 Research

**3a. Outcome Type:**

Change in Condition Outcome Measure

**3b. Quantitative Outcome**

Year	Quantitative Target	Actual
2010	60000	0

**3c. Qualitative Outcome or Impact Statement**

**Issue (Who cares and Why)**

Horticultural Therapy for Developmentally Disabled Individuals

Few opportunities exist for developmentally disabled youth to receive training in meaningful venues. Their disability often imposes barriers; constant judgment and discrimination is counter-productive. Horticulture presents opportunities for personal success and vocational training for real jobs and satisfying hobbies. Successes with plants lead to other successes in our lives. Learning about food systems and environmental stewardship are tangential lessons anyone can benefit from. It is possible some of these individuals can work in NJ greenhouse and garden center industries, as well as interior plantscapes?helping to fill a serious labor shortage.

**What has been done**

Rutgers Cooperative Extension's (RCE) commitment to serve the needs of the underserved is demonstrated through special training programs. Horticultural Therapy for Developmentally Disabled Individuals RCE delivers specialized Horticultural Therapy & Training programs where participants learn about diverse horticulture and gardening topics, and work hands-on in greenhouse, activity room and outdoor garden. The Rutgers team works with teachers and staff therapists to plan lessons and appropriate activities.

**Results**

The teachers and administrators observe significant positive behavioral changes in the Middle School students involved in the RCE Horticulture Therapy program. They observe genuine interest and sustained engagement, improved following of directions and task completion while in the sessions. Students are empowered by their success in garden and greenhouse.

100% said they liked coming to the horticulture program

100% said they know how to grow plants as a result of the training

75% said they believed they could teach someone else how to grow a plant

75% said they might consider working in a plant-related career one day

These results reinforce the growing body of research demonstrating the unique effectiveness of Horticulture Therapy as a tool for healing, rehabilitation, and training disabled individuals.

#### 4. Associated Knowledge Areas

KA Code	Knowledge Area
102	Soil, Plant, Water, Nutrient Relationships
111	Conservation and Efficient Use of Water
131	Alternative Uses of Land
205	Plant Management Systems
721	Insects and Other Pests Affecting Humans

#### Outcome #4

##### 1. Outcome Measures

Medium Term - Invasive Species Awareness: Educated youth and adult clientele, both professional and residential, utilize their newly gained knowledge and skills to implement and make changes such as: Efficient and effective pest control techniques. Proper utilization of fertilizers and other soil amendments as needed based on soil testing. Proper selection of plant materials to reduce need for chemical inputs. Reduction in the damage caused by structural pests. Reduction in health related incidents and costs association with human health vectors (ticks, mosquitoes). Protect health and safety of school children. Enhance or maintain environmental quality.

##### 2. Associated Institution Types

- 1862 Extension
- 1862 Research

##### 3a. Outcome Type:

Change in Action Outcome Measure

##### 3b. Quantitative Outcome

Year	Quantitative Target	Actual
2010	{No Data Entered}	0

##### 3c. Qualitative Outcome or Impact Statement

### **Issue (Who cares and Why)**

#### **Invasive Species Awareness**

The "Final Report of the New Jersey Comparative Risk Project" in 2003 recognized invasive species as the third most serious environmental threat in New Jersey. In 2004 the governor of New Jersey created the New Jersey Invasive Species Council and charged them with developing a plan to address the invasive species problem. NJ Public lands currently have no invasive species management plans.

### **What has been done**

Research has been conducted on the establishment and maintenance of native species meadows as an alternative management strategy to conventional turf. Native species meadows are the rarest habitat in New Jersey. An active lecture program has been developed targeting master gardeners, Rutgers environmental stewards, and other audiences including farm groups, garden shows, and gardening schools. In 2011 he will be leading a multi-state team to create an "Invasive Species Community of Practice" for eXtension funded by a \$60,000 grant from eXtension.

### **Results**

Master Gardener programs have initiated volunteer projects aimed at removal of invasive species and restoration of natural plant communities on public lands. Approximately 50% of all Rutgers Environmental Steward projects involve land restoration and invasive species management. After 6 years of effort a state invasive species management plan has been submitted to the Governor of NJ for consideration. An Invasive Species Strike Team has been created and is operating under the auspices of the Upper Raritan Watershed Association.

## **4. Associated Knowledge Areas**

<b>KA Code</b>	<b>Knowledge Area</b>
102	Soil, Plant, Water, Nutrient Relationships
111	Conservation and Efficient Use of Water
131	Alternative Uses of Land
205	Plant Management Systems
721	Insects and Other Pests Affecting Humans

## **Outcome #5**

### **1. Outcome Measures**

Medium Term - Surveillance of Adult Mosquitoes and Mosquito-Borne Arboviruses: Educated youth and adult clientele, both professional and residential, utilize their newly gained knowledge and skills to implement and make changes such as: Efficient and effective pest control techniques. Proper utilization of fertilizers and other soil amendments as needed based on soil testing. Proper selection of plant materials to reduce need for chemical inputs. Reduction in the damage caused by structural pests. Reduction in health related incidents and costs associated with human health vectors (ticks, mosquitoes). Protect health and safety of school children. Enhance or maintain environmental quality.

**2. Associated Institution Types**

- 1862 Extension
- 1862 Research

**3a. Outcome Type:**

Change in Action Outcome Measure

**3b. Quantitative Outcome**

Year	Quantitative Target	Actual
2010	{No Data Entered}	0

**3c. Qualitative Outcome or Impact Statement**

**Issue (Who cares and Why)**

Surveillance of Adult Mosquitoes and Mosquito-Borne Arboviruses

The Asian tiger mosquito presents major public health and economic impacts on the residents of New Jersey and beyond.

**What has been done**

To ensure public health in the state of New Jersey, the Center for Vector Biology reported weekly surveillance results of the NJDHSS' Public Health Environmental Laboratories and the Cape May Division of Mosquito Control BSL3 Lab monitoring arboviral activities of eastern equine encephalitis virus (EEE), West Nile virus (WNV), Saint Louis Encephalitis (SLE) and La Crosse virus (LAC). In 2010, twenty-three weekly reports were compiled and disseminated to county and state agencies during the mosquito season through the Center's website: <http://vectorbio.rutgers.edu/vector.php>.

**Results**

When positive mosquito pools were found and programs informed, this change of knowledge effected a change in action that resulted in control of potentially disease-inflicting populations of mosquitoes. Data from this program was used to model the risk associated with WNV which prove to be part of the arsenal of information that county superintendents and directors used to further refine their IPM programs in the control of disease vectors.

**4. Associated Knowledge Areas**

KA Code	Knowledge Area
102	Soil, Plant, Water, Nutrient Relationships
111	Conservation and Efficient Use of Water
131	Alternative Uses of Land
205	Plant Management Systems
721	Insects and Other Pests Affecting Humans

## **Outcome #6**

### **1. Outcome Measures**

Medium Term - Aquatic Invasive Species: Water Chestnut Task Force: Educated youth and adult clientele, both professional and residential, utilize their newly gained knowledge and skills to implement and make changes such as: Efficient and effective pest control techniques. Proper utilization of fertilizers and other soil amendments as needed based on soil testing. Proper selection of plant materials to reduce need for chemical inputs. Reduction in the damage caused by structural pests. Reduction in health related incidents and costs association with human health vectors (ticks, mosquitoes). Protect health and safety of school children. Enhance or maintain environmental quality.

### **2. Associated Institution Types**

- 1862 Extension
- 1862 Research

### **3a. Outcome Type:**

Change in Action Outcome Measure

### **3b. Quantitative Outcome**

<b>Year</b>	<b>Quantitative Target</b>	<b>Actual</b>
2010	{No Data Entered}	0

### **3c. Qualitative Outcome or Impact Statement**

#### **Issue (Who cares and Why)**

Aquatic Invasive Species: Water Chestnut Task Force

Water Chestnut is a highly aggressive aquatic invasive species that has only been found in New Jersey within the past several years. There is a need for information on this species to be provided to the public and to assist in developing management measures.

#### **What has been done**

A Water Chestnut Task Force was developed with Rutgers Cooperative Extension as the lead. The Task Force has developed two Fact Sheets, a scripted presentation and a speaker's bureau, collaboration with the New Jersey Invasive Species Strike Team to provide statewide GIS mapping and an on-line reporting form to assist in tracking.

#### **Results**

Based on information from the Task Force a canoe survey of Lake Hopatcong focused on effective preventative techniques. The 2010 canoe survey led to the discovery of a small patch of water chestnut which was rapidly and completely removed, protecting the estimated \$1.3 million recreational value from what might have been considerable short and long term harm.

### **4. Associated Knowledge Areas**

<b>KA Code</b>	<b>Knowledge Area</b>
102	Soil, Plant, Water, Nutrient Relationships
111	Conservation and Efficient Use of Water
131	Alternative Uses of Land
205	Plant Management Systems
721	Insects and Other Pests Affecting Humans

**Outcome #7**

**1. Outcome Measures**

Medium Term - 4-H Environmental Ambassador Program: Educated youth and adult clientele, both professional and residential, utilize their newly gained knowledge and skills to implement and make changes such as: Efficient and effective pest control techniques. Proper utilization of fertilizers and other soil amendments as needed based on soil testing. Proper selection of plant materials to reduce need for chemical inputs. Reduction in the damage caused by structural pests. Reduction in health related incidents and costs association with human health vectors (ticks, mosquitoes). Protect health and safety of school children. Enhance or maintain environmental quality.

**2. Associated Institution Types**

- 1862 Extension
- 1862 Research

**3a. Outcome Type:**

Change in Action Outcome Measure

**3b. Quantitative Outcome**

<b>Year</b>	<b>Quantitative Target</b>	<b>Actual</b>
2010	{No Data Entered}	0

**3c. Qualitative Outcome or Impact Statement**

**Issue (Who cares and Why)**

4-H Environmental Ambassador Program

Society is faced with issues related to the disposal and management of solid waste. It is vital to address these issues and concerns effectively and efficiently while maintaining a balance among the environment, human health and economic benefits. There are very few in-depth environmental and waste management programs for youth in 5th-7th grades. Today's young people, as the future leaders and inhabitants of our earth, must be empowered to take action to address these issues and create needed changes.

**What has been done**

The 4-H Environmental Ambassador Program is a 3 day/2 night educational opportunity for youth in grades 5-7 from a three county region in the southern part of New Jersey to study waste

management and environmental conservation. Participants became environmental ambassadors in their schools and communities and are responsible for organizing and implementing environmental projects. The program brings waste management alternatives and environmental issues to life through a variety of activities that utilize experiential, inquiry-based and cooperative learning techniques. Participants learn about alternatives such as recycling, land filling, incineration, source reduction and composting. The program also emphasizes careers in the field of waste management and how everyone can have an impact on the environment by handling trash effectively.

### **Results**

Evaluation data for 2010 revealed the following results:

96% of the youth and adults increased their scores from the pre-test to post-test by an average of 37%.

73% of the program participants self-reported an increase in knowledge of waste management alternatives.

62% of the program participants self-reported an increase in knowledge of items that can be recycled.

87% of the participants indicated on the end-of-program evaluation that they learned "A Lot" about waste management and environmental conservation while attending this program.

100% of the participants indicated that they would recommend this program to other students in their school.

The most common responses to the evaluation question relating to the environmental things the participants plan to do because they attended this program were: improve recycling in home, school and community; to compost; to practice the 3 R's (reduce, reuse, recycle); to reduce littering; and to tell others about helping the environment.

### **4. Associated Knowledge Areas**

<b>KA Code</b>	<b>Knowledge Area</b>
102	Soil, Plant, Water, Nutrient Relationships
111	Conservation and Efficient Use of Water
131	Alternative Uses of Land
205	Plant Management Systems
721	Insects and Other Pests Affecting Humans

### **Outcome #8**

#### **1. Outcome Measures**

Medium Term - Jersey Summer Shore Safety Program: Educated youth and adult clientele, both professional and residential, utilize their newly gained knowledge and skills to implement and make changes such as: Efficient and effective pest control techniques. Proper utilization of fertilizers and other soil amendments as needed based on soil testing. Proper selection of plant materials to reduce need for chemical inputs. Reduction in the damage caused by structural pests. Reduction in health related incidents and costs association with human health vectors (ticks, mosquitoes). Protect health and safety of school children. Enhance or maintain environmental quality.

#### **2. Associated Institution Types**

- 1862 Extension
- 1862 Research

**3a. Outcome Type:**

Change in Action Outcome Measure

**3b. Quantitative Outcome**

Year	Quantitative Target	Actual
2010	{No Data Entered}	0

**3c. Qualitative Outcome or Impact Statement**

**Issue (Who cares and Why)**

Jersey Summer Shore Safety Program

The coastal counties of New Jersey experience severe population increases as residents flock to use coastal natural resources. This makes these areas excellent opportunities to provide environmental and recreation safety information both for the coast, and the New York, New Jersey, Pennsylvania region as a whole.

**What has been done**

An expired marine flare recycling pilot was held at the Jersey Shore Boat Expo, in conjunction with the Marine Trades Association and the New Jersey Department of Transportation IBOATNJ program. This pilot has helped raise awareness of the lack of consistent disposal options for boaters, who are required to renew flares every 42 months by the US Coast Guard.

**Results**

In 2010, forty volunteers removed 315 pounds of trash and recyclables from Ortley Beach at two separate beach cleanups. The dollar value of this volunteer labor to Ocean County is \$3026. The data on amount and types of trash collected was submitted to Clean Ocean Action for use in educational programming. Ninety two percent of respondents reported learning more about non point source pollution, and eighty eight learned ways to reduce their individual pollution load. Over 600 expired flares were collected from boaters in Monmouth, Ocean, and Middlesex counties, and even aspiring boaters were educated about the safety and environmental issues associated with flare disposal. As a result of the event's success, RCE has been invited to make the disposal event an annual part of the Jersey Shore Boat Expo.

**4. Associated Knowledge Areas**

KA Code	Knowledge Area
102	Soil, Plant, Water, Nutrient Relationships
111	Conservation and Efficient Use of Water
131	Alternative Uses of Land
205	Plant Management Systems
721	Insects and Other Pests Affecting Humans

## **Outcome #9**

### **1. Outcome Measures**

Medium Term - Healing Garden: Educated youth and adult clientele, both professional and residential, utilize their newly gained knowledge and skills to implement and make changes such as: Efficient and effective pest control techniques. Proper utilization of fertilizers and other soil amendments as needed based on soil testing. Proper selection of plant materials to reduce need for chemical inputs. Reduction in the damage caused by structural pests. Reduction in health related incidents and costs association with human health vectors (ticks, mosquitoes). Protect health and safety of school children. Enhance or maintain environmental quality.

### **2. Associated Institution Types**

- 1862 Extension
- 1862 Research

### **3a. Outcome Type:**

Change in Action Outcome Measure

### **3b. Quantitative Outcome**

<b>Year</b>	<b>Quantitative Target</b>	<b>Actual</b>
2010	{No Data Entered}	0

### **3c. Qualitative Outcome or Impact Statement**

#### **Issue (Who cares and Why)**

Healing Garden

The elderly population, especially in retirement homes, and those with Alzheimer's.

#### **What has been done**

NJAES researcher of landscape architecture has installed indoor and outdoor Japanese gardens and introduced the patients to the space to measure the reduction of stress level. Behavioral observation, medical chart reviews, video taping and heart rate monitoring were used to measure the effects.

#### **Results**

Research results revealed that even late Alzheimer patients have reduced their stress level rate while they are in the garden within 10mins. Many Alzheimer patients who normally cannot retain memory for more than 2-3 hours could retain their memory of the garden for more than 10 days. Japanese gardens can be very small and installed indoors. They can be placed at low cost. If they reduce stress this could mean lower healthcare costs, less medicine and fewer calls for medical assistance. The implications for health care costs are huge.

### **4. Associated Knowledge Areas**

<b>KA Code</b>	<b>Knowledge Area</b>
102	Soil, Plant, Water, Nutrient Relationships
111	Conservation and Efficient Use of Water
131	Alternative Uses of Land
205	Plant Management Systems
721	Insects and Other Pests Affecting Humans

**Outcome #10**

**1. Outcome Measures**

Long Term - Rutgers Master Gardener Program: New Jersey's residents will reside, work and play in a healthy, safe, and sound environment -- in their homes, gardens, schools, parks and workplaces.

**2. Associated Institution Types**

- 1862 Extension
- 1862 Research

**3a. Outcome Type:**

Change in Condition Outcome Measure

**3b. Quantitative Outcome**

<b>Year</b>	<b>Quantitative Target</b>	<b>Actual</b>
2010	{No Data Entered}	0

**3c. Qualitative Outcome or Impact Statement**

**Issue (Who cares and Why)**

Rutgers Master Gardener Program

The demand and need for home horticulture assistance and education far outreaches the resources of the faculty and staff of NJAES and Cooperative Extension could provide in a state as densely populated and diverse as New Jersey.

**What has been done**

The Rutgers Master Gardener program is an educational volunteer training program offered in New Jersey through the efforts and expertise of faculty and staff of Rutgers Cooperative Extension. The program is designed to increase environmental awareness and stewardship through increased availability of University-based horticultural information to local communities and individuals through trained volunteers known as Rutgers Master Gardeners.

**Results**

The Rutgers Master Gardener program was one of only two statewide winners of the 2010 Governor's Environmental Excellence Award, garnering the honor in the Environmental

Education/Student Activity Category. The 2010 Governor's Environmental Excellence Awards honors individuals, organizations, institutions, communities and businesses that have made significant contributions in protecting New Jersey's environment. These volunteers are well known for their desire to help others and their great interest in expanding their working knowledge of gardening, horticulture and the environment. They are members of the local community who willingly and with great dedication use this knowledge to then serve as volunteer environmental educators to fellow residents. This trained volunteer base has greatly expanded the visibility and capacity of Rutgers Cooperative Extension in fulfilling its educational mission through the distribution of horticultural information to individuals and groups all across New Jersey. Active in 18 counties throughout the state, the program has developed and enhanced many community programs related to gardening, horticulture and environmental well-being. In 2010 alone, approximately 2,400 Master Gardener volunteers gave over 168,000 hours in pursuit of horticultural and environmental education efforts all across New Jersey. According to the Independent Sector, the value of time in New Jersey equates to more than \$4.2 million in time being donated by the Rutgers Master Gardeners.

**4. Associated Knowledge Areas**

<b>KA Code</b>	<b>Knowledge Area</b>
102	Soil, Plant, Water, Nutrient Relationships
111	Conservation and Efficient Use of Water
131	Alternative Uses of Land
205	Plant Management Systems
721	Insects and Other Pests Affecting Humans

**Outcome #11**

**1. Outcome Measures**

Long Term - Developing Integrated Urban Pest Management Strategies: New Jersey's residents will reside, work and play in a healthy, safe, and sound environment -- in their homes, gardens, schools, parks and workplaces.

**2. Associated Institution Types**

- 1862 Extension
- 1862 Research

**3a. Outcome Type:**

Change in Condition Outcome Measure

**3b. Quantitative Outcome**

<b>Year</b>	<b>Quantitative Target</b>	<b>Actual</b>
2010	{No Data Entered}	0

**3c. Qualitative Outcome or Impact Statement**

### **Issue (Who cares and Why)**

#### **Developing Integrated Urban Pest Management Strategies**

The infestation of bed bugs has become a national epidemic. This public health pest has caused significant economic and health impacts for NJ residents especially among low income populations.

### **What has been done**

RCE Extension Specialist has conducted behavioral observations on bed bugs, evaluated three bed bug treatment strategies in apartments, evaluate factors affecting the effectiveness of bed bug monitors, investigated an innovative bed bug control method, surveyed 16 low-income housing agencies on bed bug infestations, bed bug control practices. Presented seminars and/or trainings on bed bug and other urban pests on a local, regional, and international level. Expertise has been shared via print mass and electronic media.

### **Results**

NJAES researchers have developed integrated management strategies including, monitoring and intercepting devices to capture and eliminate bed bugs. The bed bug training programs resulted in increased knowledge on bed bug prevention, monitoring, and control among residents, social and health workers, and pest control professionals. There is increased adoption of integrated pest management programs, reduced chemical use, and lowered risk of human pesticide exposures. Adoption of more effective and safer bed bug management programs helped reduce economic loss, reduce discomfort from bed bug bites and improve quality of life of residents, especially low-income people.

## **4. Associated Knowledge Areas**

<b>KA Code</b>	<b>Knowledge Area</b>
102	Soil, Plant, Water, Nutrient Relationships
111	Conservation and Efficient Use of Water
131	Alternative Uses of Land
205	Plant Management Systems
721	Insects and Other Pests Affecting Humans

## **Outcome #12**

### **1. Outcome Measures**

Long Term - Rutgers Environmental Stewards: New Jersey's residents will reside, work and play in a healthy, safe, and sound environment -- in their homes, gardens, schools, parks and workplaces.

### **2. Associated Institution Types**

- 1862 Extension
- 1862 Research

**3a. Outcome Type:**

Change in Condition Outcome Measure

**3b. Quantitative Outcome**

Year	Quantitative Target	Actual
2010	{No Data Entered}	0

**3c. Qualitative Outcome or Impact Statement**

**Issue (Who cares and Why)**

Rutgers Environmental Stewards

Environmental issues are among the most serious problems faced statewide and nationally. The top four environmental issues in New Jersey 1)land use change 2)indoor pollution 3)invasive species and 4)outdoor air pollution. The Final Report of the New Jersey Comparative Risk Project explicitly pointed out that a looming environmental problem for the state was the management of the tens of thousands of acres that it had worked so diligently to preserve in preceding years.

**What has been done**

Rutgers Environmental Stewards, a structured volunteer training and management program focused on the environment provides significant value-added to New Jersey. Target audience is people interested in environmental issues who wish to learn more about the underlying science and gain skills necessary for effective action in their community. Rutgers Cooperative Extension formed a partnership with Duke Farms Foundation to create a statewide Environmental Stewardship certification program. Cooperators include the NJDEP, NJ Audubon, the Association of NJ Environmental Commissions, and a rapidly expanding list of environmentally related organizations from government, academia and the non-profit sector.

**Results**

The Rutgers Environmental Stewards is a long term program that entered its sixth year in 2010. To date, 91.5% completed training, 67.5% engaged in an intern project, 40% completed an intern project and 10.2% served on an environmental commission. Impact summaries of work conducted by the 90 Rutgers Environmental Stewards who have attained certification in the program are available on-line at <http://envirostewards.rutgers.edu/CertifiedRutgersEnvironmentalStewardsImpactsandProjects.html>. Two examples of the environmental impact that our volunteers are making are, improved energy efficiency on the Raritan Valley Community College (RVCC) campus by, reviewing a previous energy audit report then providing input and guidance to help the audit receive approval from the state government. Assisted RVCC in obtaining a River-Friendly Certification, which is one of the action items from the college's environmental stewardship agreement with the EPA. These efforts reduced energy costs for RVCC (financial benefit) and carbon emissions (environmental benefit). RVCC's River-Friendly Certification will help ensure the quality of tributaries to the Raritan River that flow through its campus, benefiting both the campus and the ecology downstream. An Environmental Steward also served as Vice-Chair of the Union Township Environmental Commission she planned and implemented a pioneering effort to inventory all conservation easements held by the town and make property owners aware of the existence and nature of these easements. In the process over 200 conservation easements were

database. Her work was used as part of the town's application for Sustainable Jersey Silver Certification. This may be the first township in New Jersey to have progressed so far in the monitoring and maintenance of conservation easements.

#### 4. Associated Knowledge Areas

<b>KA Code</b>	<b>Knowledge Area</b>
102	Soil, Plant, Water, Nutrient Relationships
111	Conservation and Efficient Use of Water
131	Alternative Uses of Land
205	Plant Management Systems
721	Insects and Other Pests Affecting Humans

#### V(H). Planned Program (External Factors)

##### External factors which affected outcomes

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

##### Brief Explanation

#### V(I). Planned Program (Evaluation Studies and Data Collection)

##### 1. Evaluation Studies Planned

- Before-After (before and after program)
- During (during program)
- Time series (multiple points before and after program)
- Comparisons between program participants (individuals, group, organizations) and non-participants
- Comparisons between different groups of individuals or program participants experiencing different levels of program intensity.
- Comparison between locales where the program operates and sites without program intervention

#### Evaluation Results

See Qualitative Outcome and Impact Statements

#### Key Items of Evaluation



**V(A). Planned Program (Summary)**

**Program # 8**

**1. Name of the Planned Program**

Integrated Pest Management

**V(B). Program Knowledge Area(s)**

1. Program Knowledge Areas and Percentage

KA Code	Knowledge Area	%1862 Extension	%1890 Extension	%1862 Research	%1890 Research
216	Integrated Pest Management Systems	100%		100%	
	<b>Total</b>	100%		100%	

**V(C). Planned Program (Inputs)**

1. Actual amount of professional FTE/SYs expended this Program

Year: 2010	Extension		Research	
	1862	1890	1862	1890
Plan	25.0	0.0	13.0	0.0
Actual	18.0	0.0	1.0	0.0

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

Extension		Research	
Smith-Lever 3b & 3c	1890 Extension	Hatch	Evans-Allen
217810	0	124108	0
1862 Matching	1890 Matching	1862 Matching	1890 Matching
1327658	0	402113	0
1862 All Other	1890 All Other	1862 All Other	1890 All Other
133750	0	86446	0

**V(D). Planned Program (Activity)**

1. Brief description of the Activity

Research

- Develop new and novel techniques for pest management and pest detection

Delivery

- Provide IPM information to a wide variety of stakeholders
- Employ new methods for delivery IPM information

### Education

- Conduct IPM educational programs for stakeholders
- Conduct IPM educational training for university students
- Conduct IPM educational training for Vo-Ag and FFA students
- Conduct IPM public awareness campaign

### Extension

- Work with communities, schools, businesses to help them meet their regulatory responsibilities on pesticide application
  - Help growers develop scouting programs to identify pest populations before significant plant damage occurs.
    - Develop pest management options to be used in an integrated or rotational program. •Identify indicators to help growers anticipate pest problems.
    - Develop monitoring techniques and population damage thresholds for selected pests.
    - Provide scientifically sound advice to state regulatory bodies on pest management and pesticide issues
      - Create a multidisciplinary program comprising of faculty, staff, volunteers, industry partners and government officials
      - Investigate IPM methods to help growers produce top quality crops, limiting or reducing production costs.
      - Evaluate all pest and crop management practices into a set of commercially used methods. These include the use of: pesticides, economic/aesthetic threshold levels, resistant cultivars, optimum horticultural practices, environmental monitoring, pest scouting, and fertility monitoring and recommendations.

## **2. Brief description of the target audience**

- Municipalities
- Pesticide applicators and their employers
- Commercial pesticide applicators
- State Dept. of Environmental Protection
- Staff and students who gain valuable scientific experience
- Industry partners in agriculture and related commodities
- Consumers
- NJAES Faculty and Staff involved in pest management research/outreach
- Farmers
- Commodity groups
- New Jersey residents
- School faculty, staff and children
- NJAES researchers
- Secondary and university students
- Governmental agencies
- Environmental organizations
- Agricultural, landscape, fine turf and other related industries

**V(E). Planned Program (Outputs)**

**1. Standard output measures**

2010	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
<b>Plan</b>	450	2500	30	200
<b>Actual</b>	2545	22000	2545	1200

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

**Patent Applications Submitted**

Year: 2010  
 Plan: 0  
 Actual: 0

**Patents listed**

**3. Publications (Standard General Output Measure)**

**Number of Peer Reviewed Publications**

2010	Extension	Research	Total
<b>Plan</b>	25	2	
<b>Actual</b>	14	11	25

**V(F). State Defined Outputs**

**Output Target**

**Output #1**

**Output Measure**

- A variety of strategies will be implemented to reach target audiences. This will include and not be limited to workshops, field visits, classes, newsletters, media releases, electronic communications, publications. In addition a trained volunteer teaching base will be developed. Quantitative reports of participation will be collected

Year	Target	Actual
2010	3300	0

**V(G). State Defined Outcomes**

**V. State Defined Outcomes Table of Content**

O. No.	OUTCOME NAME
1	Short Term - Develop improved IPM delivery methods. Develop detection, monitoring and sampling methods that reliably predict pest levels. Develop novel management methods for a wide variety of pests. Develop IPM training for secondary and university students. Improve public awareness about IPM Determine the effectiveness of pheromones for mating disruption of pests. Greater understanding of entomopathogenic nematode species'effects on pests. Evaluation of the effectiveness of natural pesticides and crop management to reduce pests. Determine which types of plants attract pests to be used as a pest control method.
2	Medium Term - Research and educational programs, and public awareness campaign results in increased adoption of IPM in traditional and non-traditional systems. Research findings used to develop new projects. IPM training of students creates new IPM interns, professionals and researchers. Knowledge of various natural insecticides and their effectiveness on pests. Determining the best time and application method for IPM products. Greater understanding of pest biology and ecology. Greater understanding of entomopathogenic species biology and ecology.
3	Long Term - Protect commodities, homes and communities from pests. Increased abundance of high quality food and fiber products. Increased acreage in New Jersey grown under IPM practices. Reduced environmental problems associated with current pest management practices. A comprehensive understanding of best management practices for IPM that are economically viable and environmentally safe.
4	Long Term - Upland Fruit (Tree Fruit and Grape) Integrated Pest Management Delivery: Protect commodities, homes and communities from pests. Increased abundance of high quality food and fiber products. Increased acreage in New Jersey grown under IPM practices. Reduced environmental problems associated with current pest management practices. A comprehensive understanding of best management practices for IPM that are economically viable and environmentally safe.

**Outcome #1**

**1. Outcome Measures**

Short Term - Develop improved IPM delivery methods. Develop detection, monitoring and sampling methods that reliably predict pest levels. Develop novel management methods for a wide variety of pests. Develop IPM training for secondary and university students. Improve public awareness about IPM Determine the effectiveness of pheromones for mating disruption of pests. Greater understanding of entomopathogenic nematode species'effects on pests. Evaluation of the effectiveness of natural pesticides and crop management to reduce pests. Determine which types of plants attract pests to be used as a pest control method.

Not Reporting on this Outcome Measure

**Outcome #2**

**1. Outcome Measures**

Medium Term - Research and educational programs, and public awareness campaign results in increased adoption of IPM in traditional and non-traditional systems. Research findings used to develop new projects. IPM training of students creates new IPM interns, professionals and researchers. Knowledge of various natural insecticides and their effectiveness on pests. Determining the best time and application method for IPM products. Greater understanding of pest biology and ecology. Greater understanding of entomopathogenic species biology and ecology.

**2. Associated Institution Types**

- 1862 Extension
- 1862 Research

**3a. Outcome Type:**

Change in Action Outcome Measure

**3b. Quantitative Outcome**

<b>Year</b>	<b>Quantitative Target</b>	<b>Actual</b>
2010	2500	0

**3c. Qualitative Outcome or Impact Statement**

**Issue (Who cares and Why)**

Pesticide Safety Information Program/Integrated Pest Management Program

Pesticide Education and Safety Program (PESP): Currently in New Jersey there are 15,000+ certified applicators registered with the New Jersey Department of Environmental Protection (NJDEP) - Pesticide Control Program. Of these, approximately 3,000 are private applicators. To remain certified New Jersey law requires that private and commercial applicators accumulate at least 12 hours of recertification training divided between CORE (4) and CATEGORY (8)

classifications during a five-year period.

Integrated Pest Management Program (IPM): During FY10 the IPM programs coordinated by Rutgers Cooperative Extension encompassed production agriculture in the areas of blueberries, nurseries, greenhouses, tree fruit, and vegetables. Research conducted by faculty and staff connected to these various programs is helping to increase the adoption of IPM and at the same time reduce reliance on pesticides as the sole pest management tool being used.

#### **What has been done**

Approximately 25,000 applicators were recertified by the PESP program in 2010. This program also offered initial CORE training sessions in English and Spanish for commercial operators and applicators. Finally, this program provides training to school employees and master gardeners so they understand the proper use of pesticides and the issues surrounding their use.

#### **Results**

As a result of the PESP program, several thousand private pesticide applicators, and commercial pesticide applicators and operators were provided with basic information that allowed them to conduct their jobs in a safe manner. In addition, information and training provided by this program gave growers and other applicators the skill set necessary to successfully complete their state pesticide licensing exams. In doing so, the application of pesticide in the state is a safer operation that is being done in a manner that does not create a hazard to applicators, workers or the general public. As a result of the IPM program, benefits were seen in the areas of fruit, greenhouse, nursery and vegetable production systems. The various programs were able to document the following benefits: Pesticide use in tree fruit was reduced between 50% to 80% for Oriental fruit moth control. Growers in the vegetable IPM program received more timely information that resulted in less pesticide use, Nursery growers were better able to predict pest outbreaks and more effectively manage these outbreaks, greenhouse growers were better able to manage pests and reduce insecticide and fungicide use because of the scouting program provided by the greenhouse IPM program.

#### **4. Associated Knowledge Areas**

<b>KA Code</b>	<b>Knowledge Area</b>
216	Integrated Pest Management Systems

#### **Outcome #3**

##### **1. Outcome Measures**

Long Term - Protect commodities, homes and communities from pests. Increased abundance of high quality food and fiber products. Increased acreage in New Jersey grown under IPM practices. Reduced environmental problems associated with current pest management practices. A comprehensive understanding of best management practices for IPM that are economically viable and environmentally safe.

##### **2. Associated Institution Types**

- 1862 Extension
- 1862 Research

**3a. Outcome Type:**

Change in Condition Outcome Measure

**3b. Quantitative Outcome**

Year	Quantitative Target	Actual
2010	3000	0

**3c. Qualitative Outcome or Impact Statement**

**Issue (Who cares and Why)**

Blueberry and Cranberry Insect Pest Management - Towards the Development and Implementation of Reduced-Risk Strategies

The blueberry and cranberry industry in New Jersey suffers major yield losses due to insect pests. Growers rely heavily on insecticides to manage pest problems.

**What has been done**

The Blueberry/Cranberry Entomology Program at Rutgers University focuses on the development and implementation of cost-effective reduced-risk insect pest management practices in blueberries and cranberries and the dissemination of this information to blueberry and cranberry growers. Several methods of information transfer including annual grower meetings, field days, twilight meetings, newsletters, and electronic media are used to serve the blueberry and cranberry industry in New Jersey.

**Results**

Researchers at NJAES have developed and implemented new tools for monitoring insect pest populations in blueberries and cranberries; worked with IR-4 on the registration of new insecticides in blueberries and cranberries; evaluated, implemented, and promoted adoption of new reduced-risk strategies for insect control in blueberries and cranberries. These strategies have had a positive impact on the environment and the well being of humans and their communities.

**4. Associated Knowledge Areas**

KA Code	Knowledge Area
216	Integrated Pest Management Systems

**Outcome #4**

**1. Outcome Measures**

Long Term - Upland Fruit (Tree Fruit and Grape) Integrated Pest Management Delivery: Protect commodities, homes and communities from pests. Increased abundance of high quality food and fiber products. Increased acreage in New Jersey grown under IPM practices. Reduced environmental problems associated with current pest management practices. A comprehensive understanding of best management practices for IPM that are economically viable and

environmentally safe.

## 2. Associated Institution Types

- 1862 Extension
- 1862 Research

### 3a. Outcome Type:

Change in Condition Outcome Measure

### 3b. Quantitative Outcome

Year	Quantitative Target	Actual
2010	{No Data Entered}	0

### 3c. Qualitative Outcome or Impact Statement

#### Issue (Who cares and Why)

Upland Fruit (Tree Fruit and Grape) Integrated Pest Management Delivery

New Jersey tree fruit production is located in both southern and northern counties. Statewide in 2010, tree fruit was valued at \$21.2 million for apples and \$31.3 million for peaches. The industry in southern counties is heavily oriented towards wholesale markets and peach production, while the industry in northern counties is heavily dependent on direct markets and apple production. Retail market fruit production in northern counties is valued at approximately \$10-\$15 million.

#### What has been done

An integrated crop management (ICM) program was delivered to commercial fruit growers who produced apples, peaches, and nectarines. Growers and industry personnel were trained throughout the season and at several annual winter meetings.

#### Results

In southern counties, where the bulk of commercial peaches are produced, 44% of growers are now using mating disruption in place of calendar spraying of pesticides. 62% of growers used alternative 'reduced risk' insecticides, and 80% of growers used reduced risk fungicides. In total, program participants reduced pesticide use by 26-80% compared to standard spray schedules, depending on the practices used. Other IPM practices included grower use of degree day based pest models, reducing insecticide use by 40% compared to standard calendar spray methods. Weekly pest management recommendations to growers led to pest free fruit valued at \$52.3 million throughout the state for tree fruit and \$39 million for grapes. Laboratory tests were completed in 2010 as part of the fertility component. Over 75% of areas sampled were shown have sufficient to excessive phosphorous levels, which led to decreased phosphorous use on those sites.

## 4. Associated Knowledge Areas

**KA Code**    **Knowledge Area**  
216            Integrated Pest Management Systems

### **V(H). Planned Program (External Factors)**

#### **External factors which affected outcomes**

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

#### **Brief Explanation**

### **V(I). Planned Program (Evaluation Studies and Data Collection)**

#### **1. Evaluation Studies Planned**

- Before-After (before and after program)
- During (during program)
- Time series (multiple points before and after program)
- Comparisons between program participants (individuals, group, organizations) and non-participants
- Comparisons between different groups of individuals or program participants experiencing different levels of program intensity.
- Comparison between locales where the program operates and sites without program intervention

#### **Evaluation Results**

See Qualitative Outcome and Impact Statements

#### **Key Items of Evaluation**

**V(A). Planned Program (Summary)**

**Program # 9**

**1. Name of the Planned Program**

Aquaculture

**V(B). Program Knowledge Area(s)**

1. Program Knowledge Areas and Percentage

KA Code	Knowledge Area	%1862 Extension	%1890 Extension	%1862 Research	%1890 Research
135	Aquatic and Terrestrial Wildlife	100%		100%	
	<b>Total</b>	100%		100%	

**V(C). Planned Program (Inputs)**

1. Actual amount of professional FTE/SYs expended this Program

Year: 2010	Extension		Research	
	1862	1890	1862	1890
Plan	2.7	0.0	4.8	0.0
Actual	6.0	0.0	4.0	0.0

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

Extension		Research	
Smith-Lever 3b & 3c	1890 Extension	Hatch	Evans-Allen
30779	0	172777	0
1862 Matching	1890 Matching	1862 Matching	1890 Matching
483667	0	1022744	0
1862 All Other	1890 All Other	1862 All Other	1890 All Other
105654	0	955549	0

**V(D). Planned Program (Activity)**

1. Brief description of the Activity

- Investigate the genetic mechanisms for disease resistance and improved quality in economically important shellfish
- Create a dynamic and cooperative partnership with faculty, staff, businesses, regulatory/advisory councils and the government to research best management practices and discover effective solutions and management practices to address threats to NJ aquaculture as well as investigate opportunities to increase the quality and quantity of the aquaculture harvest.

- Collect and analyze data on how communities and businesses are affected by the aquaculture industry management practices.
- Examine the presence of unhealthy levels of contaminants in aquaculture products.
- Determine best techniques for shellfish hatcheries on- and off-shore.

**2. Brief description of the target audience**

- Aquaculture-related businesses and employees
- State Department of Environmental Protection
- State Department of Agriculture
- Industry partners who learn ways to improve or protect their harvests
- Communities who depend on aquaculture-related revenue
- NJAES faculty and staff involved in water research/outreach
- Consumers of aquaculture products, including recreational fishing

**V(E). Planned Program (Outputs)**

**1. Standard output measures**

2010	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
<b>Plan</b>	100	300	30	300
<b>Actual</b>	1500	1720	2200	680

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

**Patent Applications Submitted**

Year: 2010  
 Plan: 1  
 Actual: 0

**Patents listed**

**3. Publications (Standard General Output Measure)**

**Number of Peer Reviewed Publications**

2010	Extension	Research	Total
<b>Plan</b>	2	48	
<b>Actual</b>	13	23	36

**V(F). State Defined Outputs**

**Output Target**

**Output #1**

**Output Measure**

- A variety of strategies will be implemented to reach target audiences. This will include and not

be limited to workshops, field visits, classes, newsletters, media releases, electronic communications, publications. In addition a trained volunteer teaching base will be developed. Quantitative reports of participation will be collected.  
Not reporting on this Output for this Annual Report

**V(G). State Defined Outcomes**

**V. State Defined Outcomes Table of Content**

O. No.	OUTCOME NAME
1	Short Term - Knowledge of seasonal variations for shellfish diseases. Create census data on communities involved in aquaculture. Determine the level of pollutants in economically important fish species. Develop markers and maps of important genetic traits. Knowledge of shellfish hatchery techniques that decrease time for growth to market size.
2	Medium Term - Identify spatial and temporal relationships between patterns of shellfish diseases in NJ and environmental correlates. To develop disease-resistant strains of shellfish. Develop superior disease-resistant and larger genetic lines of shellfish. Measure the impact of communities on the aquaculture industry. Knowledge of the feasibility of off-shore shellfish farming.
3	Long Term - Clear and comprehensive understanding of community, environmental, genetic and physical regulators of aquaculture quality and quantity. A safe and secure aquaculture industry that can meet consumer demands for high-quality products and also be environment friendly and economically viable. Creation of superior aquaculture products that will be of high demand outside NJ.
4	Long Term - Community-level Aspects of Marine Fisheries in New Jersey and the Mid-Atlantic Region: Clear and comprehensive understanding of community, environmental, genetic and physical regulators of aquaculture quality and quantity. A safe and secure aquaculture industry that can meet consumer demands for high-quality products and also be environment friendly and economically viable. Creation of superior aquaculture products that will be of high demand outside NJ.
5	Long Term - Barnegat Bay Shellfish Program: Clear and comprehensive understanding of community, environmental, genetic and physical regulators of aquaculture quality and quantity. A safe and secure aquaculture industry that can meet consumer demands for high-quality products and also be environment friendly and economically viable. Creation of superior aquaculture products that will be of high demand outside NJ.
6	Long Term - Agrochemical Impacts on Human and Environmental Health: Mechanisms and Mitigation : Clear and comprehensive understanding of community, environmental, genetic and physical regulators of aquaculture quality and quantity. A safe and secure aquaculture industry that can meet consumer demands for high-quality products and also be environment friendly and economically viable. Creation of superior aquaculture products that will be of high demand outside NJ.

**Outcome #1**

**1. Outcome Measures**

Short Term - Knowledge of seasonal variations for shellfish diseases. Create census data on communities involved in aquaculture. Determine the level of pollutants in economically important fish species. Develop markers and maps of important genetic traits. Knowledge of shellfish hatchery techniques that decrease time for growth to market size.

Not Reporting on this Outcome Measure

**Outcome #2**

**1. Outcome Measures**

Medium Term - Identify spatial and temporal relationships between patterns of shellfish diseases in NJ and environmental correlates. To develop disease-resistant strains of shellfish. Develop superior disease-resistant and larger genetic lines of shellfish. Measure the impact of communities on the aquaculture industry. Knowledge of the feasibility of off-shore shellfish farming.

Not Reporting on this Outcome Measure

**Outcome #3**

**1. Outcome Measures**

Long Term - Clear and comprehensive understanding of community, environmental, genetic and physical regulators of aquaculture quality and quantity. A safe and secure aquaculture industry that can meet consumer demands for high-quality products and also be environment friendly and economically viable. Creation of superior aquaculture products that will be of high demand outside NJ.

**2. Associated Institution Types**

- 1862 Extension
- 1862 Research

**3a. Outcome Type:**

Change in Condition Outcome Measure

**3b. Quantitative Outcome**

Year	Quantitative Target	Actual
2010	400	0

**3c. Qualitative Outcome or Impact Statement**

**Issue (Who cares and Why)**

## Shellfish Genetics and Breeding for Aquaculture

Molluscan shellfish are important marine resources, supporting major aquaculture and fishery industries in the US and around the world. There are a number of problems and challenges facing the shellfish aquaculture industry, where genetics can be part of the solution. Specifically, research was conducted to: 1)develop disease-resistant and fast-growing strains by hybridization and selective breeding; 2)develop sterile and superior stocks using the triploid-tetraploid technology; 3)develop molecular tools for the genetic mapping and improvement of commercially important traits.

### What has been done

In 2010 the NJAES team participated in the international oyster genome project. The outputs were published and/or presented to the shellfish research and culture community at meetings including the annual meetings of the National Shellfisheries Association, Plant and Animal Genome Conference, and the International Conference of Genomics.

### Results

The NJAES genetics and breeding program has produced useful genetic resources such as markers, EST sequences and genetic maps for the research community. It has also produced valuable stocks for the shellfish aquaculture industry. The disease-resistant stocks and tetraploid oysters developed from our research program have been used for commercial production of oysters. Triploid oysters produced from disease-resistant tetraploids are 100% pure, grow significantly faster and have greatly improved survival under MSX than normal diploids. The disease-resistant triploid oysters provide a valuable product to the oyster culture industry. The genetic markers and maps we developed are being used to map economically important traits and manage genetic resources. They provided useful tools for oyster genetics and breeding.

## 4. Associated Knowledge Areas

KA Code	Knowledge Area
135	Aquatic and Terrestrial Wildlife

### Outcome #4

#### 1. Outcome Measures

Long Term - Community-level Aspects of Marine Fisheries in New Jersey and the Mid-Atlantic Region: Clear and comprehensive understanding of community, environmental, genetic and physical regulators of aquaculture quality and quantity. A safe and secure aquaculture industry that can meet consumer demands for high-quality products and also be environment friendly and economically viable. Creation of superior aquaculture products that will be of high demand outside NJ.

#### 2. Associated Institution Types

- 1862 Extension
- 1862 Research

**3a. Outcome Type:**

Change in Condition Outcome Measure

**3b. Quantitative Outcome**

Year	Quantitative Target	Actual
2010	{No Data Entered}	0

**3c. Qualitative Outcome or Impact Statement**

**Issue (Who cares and Why)**

Community-level Aspects of Marine Fisheries in New Jersey and the Mid-Atlantic Region

Climate change and its effects on natural and human systems, particularly the interdisciplinary fisheries community has the potential to impact community based fisheries management and communities.

**What has been done**

NJAES researchers supported by the National Science Foundation grant on climate change and the surfclam fishery and on the theme of community-based fisheries management in the broader context of comparing fisheries and fishing communities of this region with those elsewhere with respect to tensions between market-based and community-based management policies and how both market and community orientations fit into ecosystem-based management, adoption by the Department of Commerce's National Oceanic and Atmospheric Administration of a fisheries policy called "catch share" in November 2010, but implemented in 2009.

**Results**

Research on climate change and the surfclam fisheries has resulted in greater appreciation of the importance of interdisciplinary collaboration, as it is emerging through oceanographic, biological, economic, and social anthropological efforts provided continued opportunities for considering the theme of community-based fisheries management in the broader context of comparing fisheries and fishing communities of this region with those elsewhere, comparing the New Jersey surfclam fishery with fisheries of the State of Maine--through an analysis of Maine's lobster fisheries for possible certification as a sustainable fisheries; of Atlantic Canada--through analyses of Newfoundland's fisheries and fishing communities, again in comparison with those of this region; and of Pacific Mexico--through analysis of concession-based management of fisheries by local cooperatives. The themes to which this research has contributed are primarily distinctions and relationships between market-based and community-based management policies and how both market and community orientations fit into ecosystem-based management. One significant conclusion is that generalizations about the efficacy and consequences of these different forms of management must be weighed against the need to consider their embeddedness within specific political heritages and histories and social and cultural realities. Another is that community-based resource management is a major source of motivation for local stewardship.

**4. Associated Knowledge Areas**

KA Code	Knowledge Area
135	Aquatic and Terrestrial Wildlife

**Outcome #5**

**1. Outcome Measures**

Long Term - Barnegat Bay Shellfish Program: Clear and comprehensive understanding of community, environmental, genetic and physical regulators of aquaculture quality and quantity. A safe and secure aquaculture industry that can meet consumer demands for high-quality products and also be environment friendly and economically viable. Creation of superior aquaculture products that will be of high demand outside NJ.

**2. Associated Institution Types**

- 1862 Extension
- 1862 Research

**3a. Outcome Type:**

Change in Condition Outcome Measure

**3b. Quantitative Outcome**

Year	Quantitative Target	Actual
2010	{No Data Entered}	0

**3c. Qualitative Outcome or Impact Statement**

**Issue (Who cares and Why)**

Barnegat Bay Shellfish Program

Shellfish harvesting was one of the main industries on which the early economy of Ocean County, NJ was built. The loss of hard clams and oysters that occurred in Barnegat and Little Egg Harbor Bay for various reasons over the last several decades, however, not only ended a commercial activity and way of life but also removed the filtration capacity and other ecological services provided by shellfish. Restoration of shellfish beds in Barnegat and Little Egg Harbor Bays offers both an environmental benefit as well as an educational benefit. Teaching the residents of the watershed more about the ecology of the Bays helps people understand their role in protecting the water quality and restoring some of the natural resources that support a healthy environment for the estuary.

**What has been done**

RCE County Marine Extension Agent has implemented a variety of multi-disciplinary educational and outreach programs engaging schools, environmental organizations, volunteers, stakeholders and 4-H youth in the ReClam the Bay program. He has also given leadership to the Junior Shellfish Gardening Program that brings shellfish biology, water quality and environmental science learning into the classroom with direct links to the surrounding local environment.

**Results**

One million clams and 495,000 oysters were grown by volunteers for re-entry into the Barnegat Bay. A 2010 survey (n=40) of all current and past members, volunteers rated their

agreement with the following actions as a result of their participation in the program:

96% agreed or strongly agreed that they have changed their everyday practices to have less impact on the bay, its watershed, and ecology. (Agree 40.0%; Strongly Agree 55.6%).

87% agreed or strongly agreed they are more involved in environmental decision making (volunteering, voting, attending public meetings) in their community because of what they have learned and experienced in BBSRP (Agree 35.6%; Strongly Agree 51.1%).

95% agreed or strongly agreed they have reduced their individual or community pollution load to the Barnegat Bay Watershed as a result of what they have learned (Agree 57.8%; Strongly Agree 37.8%).

100% agreed or strongly agreed they have actively helped people to understand the importance of shellfish as a critical link in the ecosystem and water quality of the bay (Agree 32.6%; Strongly Agree 67.4%).

98% agreed or strongly agreed that they share the information that they have learned in the program with others to help them improve their environmental practices (Agree 30.4%; Strongly Agree 67.4%).

Over 8,200 people were reached by the ReClam the Bay volunteer cooperating under the Barnegat Bay Shellfish Restoration Program. The Junior Shellfish Gardener program reached 500 5-12th grade students in 8 schools. Six ReClam the Bay volunteers spent 46 hours with school youth through this program. Future plans include linking upland schools and bay schools through technology to share what they've learned.

#### 4. Associated Knowledge Areas

KA Code	Knowledge Area
135	Aquatic and Terrestrial Wildlife

#### Outcome #6

##### 1. Outcome Measures

Long Term - Agrochemical Impacts on Human and Environmental Health: Mechanisms and Mitigation : Clear and comprehensive understanding of community, environmental, genetic and physical regulators of aquaculture quality and quantity. A safe and secure aquaculture industry that can meet consumer demands for high-quality products and also be environment friendly and economically viable. Creation of superior aquaculture products that will be of high demand outside NJ.

##### 2. Associated Institution Types

- 1862 Extension
- 1862 Research

##### 3a. Outcome Type:

Change in Condition Outcome Measure

##### 3b. Quantitative Outcome

Year	Quantitative Target	Actual
2010	{No Data Entered}	0

### 3c. Qualitative Outcome or Impact Statement

#### Issue (Who cares and Why)

Agrochemical Impacts on Human and Environmental Health: Mechanisms and Mitigation

Aquatic fisheries in New Jersey are a multi-million dollar industry and impacts on estuarine species from contamination can reduce the stocks of both inshore and off shore species.

#### What has been done

NJAES researchers have published 14 peer reviewed articles as well as presented their work at a number of national and regional scientific meetings. They also worked with the National Park Service to evaluate what chemical contamination might impact aquatic resources within the barrier island parks. This resulted in a series of seven reports for the Northeast Coastal and Barrier Network, which was discussed with the park managers and posted on the National Park Service web site.

#### Results

The publications and meetings with managers at the state have resulted in the realization that low levels of estrogenic compounds and other pharmaceuticals can have effects on the ability of fish to reproduce successfully. This has begun discussions and pilot projects as to determine how to minimize pharmaceuticals getting into surface waters. At the state there is an increase awareness of the importance of preventing pharmaceuticals from reaching surface waters and efforts to increase proper ways of disposal. Work with the sewage authorities, state officials and USGS have resulted in additional studies designed to identify sewage streams with high levels of pharmaceuticals. There has also been a movement to develop novel treatment approaches to remove or metabolize the pharmaceuticals. The work on the pesticides has pointed out the need to consider effects on non-target species behavior when it comes to successful reproduction and predator/prey survival especially in larval stages. All of these activities are designed to improve the water quality which will translate into healthier fish and shellfish and reduce human exposure. In support of academic achievement three doctoral students graduated in the area of Environmental Toxicology.

### 4. Associated Knowledge Areas

KA Code	Knowledge Area
135	Aquatic and Terrestrial Wildlife

## **V(H). Planned Program (External Factors)**

### **External factors which affected outcomes**

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

### **Brief Explanation**

## **V(I). Planned Program (Evaluation Studies and Data Collection)**

### **1. Evaluation Studies Planned**

- Before-After (before and after program)
- During (during program)
- Time series (multiple points before and after program)
- Comparisons between program participants (individuals, group, organizations) and non-participants
- Comparisons between different groups of individuals or program participants experiencing different levels of program intensity.
- Comparison between locales where the program operates and sites without program intervention

### **Evaluation Results**

See Qualitative Outcome and Impact Statements

### **Key Items of Evaluation**

**V(A). Planned Program (Summary)**

**Program # 10**

**1. Name of the Planned Program**

Food Safety

**V(B). Program Knowledge Area(s)**

**1. Program Knowledge Areas and Percentage**

KA Code	Knowledge Area	%1862 Extension	%1890 Extension	%1862 Research	%1890 Research
102	Soil, Plant, Water, Nutrient Relationships	5%		5%	
104	Protect Soil from Harmful Effects of Natural Elements	5%		5%	
311	Animal Diseases	0%		15%	
314	Toxic Chemicals, Poisonous Plants, Naturally Occurring Toxins, and Other Hazards Affecting Animals	0%		15%	
404	Instrumentation and Control Systems	0%		10%	
501	New and Improved Food Processing Technologies	15%		15%	
502	New and Improved Food Products	10%		0%	
503	Quality Maintenance in Storing and Marketing Food Products	10%		0%	
504	Home and Commercial Food Service	20%		5%	
711	Ensure Food Products Free of Harmful Chemicals, Including Residues from Agricultural and Other Sources	10%		10%	
712	Protect Food from Contamination by Pathogenic Microorganisms, Parasites, and Naturally Occurring Toxins	10%		10%	
722	Zoonotic Diseases and Parasites Affecting Humans	0%		10%	
723	Hazards to Human Health and Safety	15%		0%	
	<b>Total</b>	100%		100%	

**V(C). Planned Program (Inputs)**

**1. Actual amount of professional FTE/SYs expended this Program**

Year: 2010	Extension		Research	
	1862	1890	1862	1890
Actual	3.0	0.0	4.0	0.0

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

Extension		Research	
Smith-Lever 3b & 3c	1890 Extension	Hatch	Evans-Allen
11479	0	232922	0
1862 Matching	1890 Matching	1862 Matching	1890 Matching
229734	0	727729	0
1862 All Other	1890 All Other	1862 All Other	1890 All Other
5692	0	349089	0

**V(D). Planned Program (Activity)**

**1. Brief description of the Activity**

- Conduct training and certificate programs for growers, producers, food workers, consumers and vendors to increase knowledge of food safety practices.
- Design strategies, tools and processes to detect and eliminate pathogens, chemical and physical contaminants during production, transportation, processing and preparation of food.
- Investigate the ecology of threats to the food supply from microbial and chemical sources
- Develop technologies for the detection of food supply contaminants

**2. Brief description of the target audience**

- Producers
- Processors
- Retail - restaurants/vendors/supermarkets
- Department of Health
- Consumers, families, youth communities
- NJAES - faculty - staff - students
- Food manufacturers
  - Schools - child care providers - food service workers

**V(E). Planned Program (Outputs)**

**1. Standard output measures**

2010	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
<b>Plan</b>	{NO DATA}	{NO DATA}	{NO DATA}	{NO DATA}
<b>Actual</b>	25000	50000	2100	15000

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

**Patent Applications Submitted**

Year: 2010  
Plan:  
Actual: 0

**Patents listed**

**3. Publications (Standard General Output Measure)**

**Number of Peer Reviewed Publications**

2010	Extension	Research	Total
Actual	12	21	33

**V(F). State Defined Outputs**

**Output Target**

**Output #1**

**Output Measure**

- A variety of strategies will be implemented to reach target audiences. This will include and not be limited to workshops, field visits, classes, newsletters, media releases, electronic communications, publications. In addition a trained volunteer teaching base will be developed. Quantitative reports of participation will be collected.  
Not reporting on this Output for this Annual Report

**V(G). State Defined Outcomes**

**V. State Defined Outcomes Table of Content**

O. No.	OUTCOME NAME
1	Short Term - Increase knowledge of viable technologies, detection prevention, intervention and control technologies and practices to ensure food safety. Increase understanding of the ecology of threats to food safety from microbial and chemical sources.
2	Medium Term - Adoption of safe food handling practices at the individual, family, community, production and supply system levels.
3	Long Term - A safe food supply resulting from reduced incidence of food-borne illnesses.
4	Medium Term - Food Defense and Industry Preparedness: Adoption of safe food handling practices at the individual, family, community, production and supply system levels.
5	Long Term - Microbial Food Safety for the Fruit and Vegetable Industry: A safe food supply resulting from reduced incidence of food-borne illnesses.

## **Outcome #1**

### **1. Outcome Measures**

Short Term - Increase knowledge of viable technologies, detection prevention, intervention and control technologies and practices to ensure food safety. Increase understanding of the ecology of threats to food safety from microbial and chemical sources.

Not Reporting on this Outcome Measure

## **Outcome #2**

### **1. Outcome Measures**

Medium Term - Adoption of safe food handling practices at the individual, family, community, production and supply system levels.

### **2. Associated Institution Types**

- 1862 Extension
- 1862 Research

### **3a. Outcome Type:**

Change in Action Outcome Measure

### **3b. Quantitative Outcome**

<b>Year</b>	<b>Quantitative Target</b>	<b>Actual</b>
2010	{No Data Entered}	0

### **3c. Qualitative Outcome or Impact Statement**

#### **Issue (Who cares and Why)**

Food Safety Cognitions of Middle Schoolers and Parents of Middle Schoolers

Little attention has been given to children and teen's understanding of safe food handling knowledge and skills, despite their interests in studying food safety and preparing food, growing food shopping and preparation responsibilities, and future roles as caregivers for infants, young children, and elderly parents. Moreover, the most common jobs held by youth are in the food service industry, ranging from cashier, to table buser, to server, to cook. Opportunities for children to learn safe food handling via observation have diminished as more mothers have taken employment outside the home and as the reliance on fully or partially pre-prepared convenience foods have increased. As a result, a large proportion of teens and adults have limited food preparation experience, have never learned basic food safety principles, and, thus, lack critical knowledge needed to proactively protect themselves and their future families. These societal changes indicate that the risk of food-borne illness arising from unsafe food handling in the home is likely to rise.

### **What has been done**

A qualitative research design involving focus groups with middle school youth, parents of middle school youth, and food safety experts was used. This study had three phases: baseline focus groups with middle school youth and baseline focus groups with parents of middle schoolers, interviews with food safety experts, and follow-up focus groups with middle schoolers.

### **Results**

The food safety cognitions of middle schoolers and parents of middle schoolers were elucidated. Recommendations for food safety education targeted to middle schoolers were created. These recommendations were used to develop a computer-based game for middle schoolers and are beginning to be used to create video snacks. Formative evaluation of the game (Kitchen Ninja) was completed (middle schoolers enjoyed the game and rated it highly).

## **4. Associated Knowledge Areas**

<b>KA Code</b>	<b>Knowledge Area</b>
102	Soil, Plant, Water, Nutrient Relationships
104	Protect Soil from Harmful Effects of Natural Elements
311	Animal Diseases
314	Toxic Chemicals, Poisonous Plants, Naturally Occurring Toxins, and Other Hazards Affecting Animals
404	Instrumentation and Control Systems
501	New and Improved Food Processing Technologies
502	New and Improved Food Products
503	Quality Maintenance in Storing and Marketing Food Products
504	Home and Commercial Food Service
711	Ensure Food Products Free of Harmful Chemicals, Including Residues from Agricultural and Other Sources
712	Protect Food from Contamination by Pathogenic Microorganisms, Parasites, and Naturally Occurring Toxins
722	Zoonotic Diseases and Parasites Affecting Humans
723	Hazards to Human Health and Safety

## **Outcome #3**

### **1. Outcome Measures**

Long Term - A safe food supply resulting from reduced incidence of food-borne illnesses.

### **2. Associated Institution Types**

- 1862 Extension
- 1862 Research

**3a. Outcome Type:**

Change in Condition Outcome Measure

**3b. Quantitative Outcome**

Year	Quantitative Target	Actual
2010	{No Data Entered}	0

**3c. Qualitative Outcome or Impact Statement**

**Issue (Who cares and Why)**

Improving Food Safety Through Predictive Models and Microbial Risk Assessment

Food manufacturers are under a variety of regulatory, economic and environmental pressures. Retaining a strong manufacturing base is an essential component for the states' economic growth.

**What has been done**

The Extension Specialist assisted the industry through short courses and telephone assistance. In addition to the assistance provided to NJ-based companies, provided technical assistance to other states and internationally. Twelve such examples included companies based nationally and in NY, CA, UT, and PA. Companies include cheese companies, an online retailer, a material science company, pet food companies, meat processing companies, and a foodservice company. Assistance included the technical evaluation of the safety and suitability of challenge study experiments for controlling Salmonella in pasteurized dairy ingredients. Evaluation of refrigeration failure and leaks and technical evaluation of clean room technology for controlling microbial risk.

**Results**

There were 7 different instances where his assistance had a specific and direct economic benefit to NJ companies. The value of product affected exceeded \$90,000. The total value of products affected exceeded \$200,000 for those reached beyond NJ. NJAES researchers have been effective in reducing the incidence of food-borne illnesses and providing a safe food supply.

**4. Associated Knowledge Areas**

KA Code	Knowledge Area
102	Soil, Plant, Water, Nutrient Relationships
104	Protect Soil from Harmful Effects of Natural Elements
311	Animal Diseases
314	Toxic Chemicals, Poisonous Plants, Naturally Occurring Toxins, and Other Hazards Affecting Animals
404	Instrumentation and Control Systems
501	New and Improved Food Processing Technologies
502	New and Improved Food Products
503	Quality Maintenance in Storing and Marketing Food Products
504	Home and Commercial Food Service

- 711 Ensure Food Products Free of Harmful Chemicals, Including Residues from Agricultural and Other Sources
- 712 Protect Food from Contamination by Pathogenic Microorganisms, Parasites, and Naturally Occurring Toxins
- 722 Zoonotic Diseases and Parasites Affecting Humans
- 723 Hazards to Human Health and Safety

**Outcome #4**

**1. Outcome Measures**

Medium Term - Food Defense and Industry Preparedness: Adoption of safe food handling practices at the individual, family, community, production and supply system levels.

**2. Associated Institution Types**

- 1862 Extension
- 1862 Research

**3a. Outcome Type:**

Change in Action Outcome Measure

**3b. Quantitative Outcome**

Year	Quantitative Target	Actual
2010	{No Data Entered}	0

**3c. Qualitative Outcome or Impact Statement**

**Issue (Who cares and Why)**

Food Defense and Industry Preparedness

Acts of nature, human error, technology failure, or deliberate efforts to destabilize the state's food system could have substantial economic and social impacts. The food system is a large segment of the NJ economy and a lifeline sector in the sense that it facilitates access to food for nearly 9 million NJ residents. It is also a lynch pin in broader regional food distribution. Industry-government partnerships are needed to ensure industry-level continuity of operation in a time of emergency.

**What has been done**

An "incident annex" was developed for the New Jersey State Emergency Operations Plan, maintained under the Office of Emergency Management. Funded by the NJ Office of Homeland Security and Preparedness in 2008, the annex was finalized in August 2010. Speaking forums have included a food industry loss prevention conference, a state infrastructure advisory committee meeting (under the NJ Domestic Security Preparedness Task Force), and regional emergency planning summits.

**Results**

The Incident Annex has been hailed as "the first of its kind in the Nation". It was submitted by the Rutgers NJAES team in February 2010 and accepted in August 2010. Functional exercise planning is underway to "test" the annex in 2011. The annex has been presented at state and regional emergency planning forums as a model for incorporating food industry continuity of operations into state-level planning. A tangible outcome to date is the marked increase in communication and networking between state homeland security/emergency management personnel and the private food sector. The ultimate beneficiaries of improved emergency planning and response related to food industry continuity will include food firms reduced economic losses associated with discontinued operations. The general public benefit from reduced food insecurity during an emergency, and state/federal governments from reduced involvement in the feeding of civilian populations during an emergency.

#### 4. Associated Knowledge Areas

<b>KA Code</b>	<b>Knowledge Area</b>
102	Soil, Plant, Water, Nutrient Relationships
104	Protect Soil from Harmful Effects of Natural Elements
311	Animal Diseases
314	Toxic Chemicals, Poisonous Plants, Naturally Occurring Toxins, and Other Hazards Affecting Animals
404	Instrumentation and Control Systems
501	New and Improved Food Processing Technologies
502	New and Improved Food Products
503	Quality Maintenance in Storing and Marketing Food Products
504	Home and Commercial Food Service
711	Ensure Food Products Free of Harmful Chemicals, Including Residues from Agricultural and Other Sources
712	Protect Food from Contamination by Pathogenic Microorganisms, Parasites, and Naturally Occurring Toxins
722	Zoonotic Diseases and Parasites Affecting Humans
723	Hazards to Human Health and Safety

#### Outcome #5

##### 1. Outcome Measures

Long Term - Microbial Food Safety for the Fruit and Vegetable Industry: A safe food supply resulting from reduced incidence of food-borne illnesses.

##### 2. Associated Institution Types

- 1862 Extension
- 1862 Research

##### 3a. Outcome Type:

Change in Condition Outcome Measure

**3b. Quantitative Outcome**

Year	Quantitative Target	Actual
2010	{No Data Entered}	0

**3c. Qualitative Outcome or Impact Statement**

**Issue (Who cares and Why)**

Microbial Food Safety for the Fruit and Vegetable Industry

The wholesale fruit and vegetable industry is under increased pressure to improve their food safety practices and to obtain a third party audit confirming they are improving their practices. This is even more important with the enactment of the Food Modernization Act.

**What has been done**

A variety of methods and techniques were utilized to train the produce industry (wholesale/retail growers and distributors) in basic food safety and wholesale growers on how to write a food safety plan and prepare for a third party audit, first level buyers train on food safety and how to prepare for third party audits.

**Results**

Ninety-eight percent of participants who filled out the evaluation indicated that they would likely or definitely recommend the training to another individual. The number of operations passing a USDA Good Agricultural Practices & Good Handling Practices Audit Verification was 57. At least ten operations passed a Primus Laboratories Audit, one passed a Safety Quality Foods Audit (SQF) and one passed a British Consorcium Audit in New Jersey. One hundred and thirty-six passed audits in Massachusetts, Maine and Vermont. Additionally growers who did not go through the audit process in 2010 indicated they are making changes to their operations based on the training sessions and research presented to be ready for 2011.

**4. Associated Knowledge Areas**

KA Code	Knowledge Area
102	Soil, Plant, Water, Nutrient Relationships
104	Protect Soil from Harmful Effects of Natural Elements
311	Animal Diseases
314	Toxic Chemicals, Poisonous Plants, Naturally Occurring Toxins, and Other Hazards Affecting Animals
404	Instrumentation and Control Systems
501	New and Improved Food Processing Technologies
502	New and Improved Food Products
503	Quality Maintenance in Storing and Marketing Food Products
504	Home and Commercial Food Service
711	Ensure Food Products Free of Harmful Chemicals, Including Residues from Agricultural and Other Sources
712	Protect Food from Contamination by Pathogenic Microorganisms, Parasites, and Naturally Occurring Toxins
722	Zoonotic Diseases and Parasites Affecting Humans

### **V(H). Planned Program (External Factors)**

#### **External factors which affected outcomes**

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

#### **Brief Explanation**

- Public education
- Partnerships with industry, government, consumers and communities
- Funding to support research and outreach education
  - State and federal food safety regulations

### **V(I). Planned Program (Evaluation Studies and Data Collection)**

#### **1. Evaluation Studies Planned**

- Retrospective (post program)
- Before-After (before and after program)
- During (during program)
- Time series (multiple points before and after program)
- Case Study
- Comparisons between program participants (individuals, group, organizations) and non-participants
- Comparisons between different groups of individuals or program participants experiencing different levels of program intensity.
- Comparison between locales where the program operates and sites without program intervention

#### **Evaluation Results**

See Qualitative Outcome and Impact Statements

#### **Key Items of Evaluation**

**V(A). Planned Program (Summary)**

**Program # 11**

**1. Name of the Planned Program**

Sustainable Energy

**V(B). Program Knowledge Area(s)**

1. Program Knowledge Areas and Percentage

KA Code	Knowledge Area	%1862 Extension	%1890 Extension	%1862 Research	%1890 Research
605	Natural Resource and Environmental Economics	100%		100%	
	<b>Total</b>	100%		100%	

**V(C). Planned Program (Inputs)**

1. Actual amount of professional FTE/SYs expended this Program

Year: 2010	Extension		Research	
	1862	1890	1862	1890
Actual	1.0	0.0	1.0	0.0

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

Extension		Research	
Smith-Lever 3b & 3c	1890 Extension	Hatch	Evans-Allen
11479	0	30398	0
1862 Matching	1890 Matching	1862 Matching	1890 Matching
392647	0	0	0
1862 All Other	1890 All Other	1862 All Other	1890 All Other
412765	0	243570	0

**V(D). Planned Program (Activity)**

1. Brief description of the Activity

- Perform experiments to investigate renewable energy production.
- Develop methodologies and scientifically sound alternatives to fossil fuels
- Educate homeowners, business owners, farmers and agri-related businesses, youth and families about conservation and efficiency practices related to energy use.

- Provide education and training to enhance bio energy related job development and careers.

**2. Brief description of the target audience**

- University faculty, staff and students
- School aged youth
- Families
- Homeowners
- Farmers
- Agri-businesses
- State agencies and organizations
- Industry partners
- Small businesses
- Entrepreneurs
  - Policy and decision makers

**V(E). Planned Program (Outputs)**

**1. Standard output measures**

2010	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
<b>Plan</b>	{NO DATA}	{NO DATA}	{NO DATA}	{NO DATA}
<b>Actual</b>	4000	20000	1500	25000

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

**Patent Applications Submitted**

Year: 2010  
 Plan:  
 Actual: 0

**Patents listed**

**3. Publications (Standard General Output Measure)**

**Number of Peer Reviewed Publications**

2010	Extension	Research	Total
<b>Actual</b>	0	4	4

**V(F). State Defined Outputs**

**Output Target**

**Output #1**

**Output Measure**

- A variety of strategies will be implemented to reach target audiences. This will include and not be limited to workshops, field visits, classes, newsletters, media releases, electronic communications, publications. In addition a trained volunteer teaching base will be developed. Quantitative reports of participation will be collected.  
Not reporting on this Output for this Annual Report

**V(G). State Defined Outcomes**

**V. State Defined Outcomes Table of Content**

O. No.	OUTCOME NAME
1	Short Term - Increase knowledge, energy efficiency technologies and conservation practices related to energy use. Explore research strategies to replace fossil fuel consumption.
2	Medium Term - Participants in direct and indirect educational methods will adopt practices to conserve energy use and reliance on fossil fuels. Business owners will create and maintain green jobs/careers as a result of bioenergy development. Newly developed plants and technologies will be adopted to enhance energy independence.
3	Long Term - Fossil fuel consumption will be replaced with biofuels. Economic development will be enhanced through an increase of jobs and careers as a result of bioenergy development. Environment quality enhanced as a result of sustainable biofuel production and utilization.

**Outcome #1**

**1. Outcome Measures**

Short Term - Increase knowledge, energy efficiency technologies and conservation practices related to energy use. Explore research strategies to replace fossil fuel consumption.

Not Reporting on this Outcome Measure

**Outcome #2**

**1. Outcome Measures**

Medium Term - Participants in direct and indirect educational methods will adopt practices to conserve energy use and reliance on fossil fuels. Business owners will create and maintain green jobs/careers as a result of bioenergy development. Newly developed plants and technologies will be adopted to enhance energy independence.

**2. Associated Institution Types**

- 1862 Extension
- 1862 Research

**3a. Outcome Type:**

Change in Action Outcome Measure

**3b. Quantitative Outcome**

Year	Quantitative Target	Actual
2010	{No Data Entered}	0

**3c. Qualitative Outcome or Impact Statement**

**Issue (Who cares and Why)**

Reducing Greenhouse Energy use by Investigating Current and Alternative Technologies

Controlled environment plant production systems (greenhouses and growth chambers) are used worldwide to produce high quality plant material (produce, floriculture, and nursery crops). Rising energy prices have made a significant impact on the profitability of many greenhouse operations. Engineering information and solutions can help growers reduce energy use and operating costs.

**What has been done**

Research was conducted at the open-roof greenhouse investigating the energy flows associated with the operation of a greenhouse floor heating system. The research results can be used by commercial greenhouse growers who are using or planning to install hydronic floor heating systems. Energy audit checklists were developed that commercial growers can use to evaluate the energy use of their operations and/or to make smart

energy decisions about retrofits and/or new construction. Recent efforts to further reduce fossil fuel requirement have focused on designing systems with heat pumps contributing to the first increment of base load heating.

**Results**

The original floor heating research has resulted in a significantly updated information to be incorporated in a revision of the Rutgers Cooperative Extension Root Zone Heating Extension Bulletin. An energy audit checklist was developed for commercial greenhouse operations. The checklist has been distributed throughout the northeast and beyond. Growers who implemented the information resulting from the research and the various presentations and publications have been able to realize energy savings between 5% and 30%.

**4. Associated Knowledge Areas**

KA Code	Knowledge Area
605	Natural Resource and Environmental Economics

**Outcome #3**

**1. Outcome Measures**

Long Term - Fossil fuel consumption will be replaced with biofuels. Economic development will be enhanced through an increase of jobs and careers as a result of bioenergy development. Environment quality enhanced as a result of sustainable biofuel production and utilization.

**2. Associated Institution Types**

- 1862 Extension
- 1862 Research

**3a. Outcome Type:**

Change in Condition Outcome Measure

**3b. Quantitative Outcome**

Year	Quantitative Target	Actual
2010	{No Data Entered}	0

**3c. Qualitative Outcome or Impact Statement**

**Issue (Who cares and Why)**

Biomass/Biofuels

Alternatives to the dependence on fossil fuels need to be investigated utilizing scientific methodologies for biomass/biofuel development.

**What has been done**

NJAES research is focused on breeding and selection of switchgrass, a perennial warm season buchgrass native to North America.

## Results

NJAES-supported research indicates that location (growing environment) significantly influence establishment, plant height, tiller number, and disease resistance in switchgrass. This will help to guide breeding and selection efforts to determine number replications that need to be evaluated, locations of breeding nurseries and selection criteria, as well as improve breeding efficiencies and hasten cultivar development. This information is important for identifying potential cultivars for use in marginal land in the Northeast. With this research we will be able to recommend cultivars with optimum performance for these conditions. Several switchgrass clones with high tiller density, anthracnose resistance, and rust resistance have been identified. These clones can be used as parents to develop new cultivars of switchgrass that are adapted to marginal lands in the Northeast US. These newly developed cultivars should have increased yields and reduced pesticide inputs while growing on marginal land.

## 4. Associated Knowledge Areas

KA Code	Knowledge Area
605	Natural Resource and Environmental Economics

## V(H). Planned Program (External Factors)

### External factors which affected outcomes

- Economy
- Public Policy changes
- Government Regulations
- Competing Public priorities
- Other (Consumption Practices)

### Brief Explanation

- State and local investment and support including funds and manpower in related research activities are essential to programs effectiveness.
- Partnerships with industry, government and communities.
- Public education and involvement of individuals, youth families and communities in conservation practices.
- Job training and career development opportunities will effect work force and economic enhancement.

## V(I). Planned Program (Evaluation Studies and Data Collection)

### 1. Evaluation Studies Planned

- Before-After (before and after program)
- During (during program)
- Time series (multiple points before and after program)
- Comparisons between program participants (individuals, group, organizations) and non-participants
- Comparisons between different groups of individuals or program participants experiencing different levels of program intensity.

- Comparison between locales where the program operates and sites without program intervention

### **Evaluation Results**

See Qualitative and Outcome Impact Statements

### **Key Items of Evaluation**