2011 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.

NJAES has an organizational commitment to diversity which transcends the work of both Cooperative Research and Cooperative Extension. It is evident as we serve the needs of an environmentally, economically, geographic and ethnically diverse state. We meet the needs of agricultural producers who farm on the urban fringe, youth who are challenged by circumstances such as poverty and risks which impede their success, families who are faced with workforce employment issue and a growing number of families who are food insecure. We strive to deliver RCE educational programs to understand underrepresented audiences and reduce any real or perceived barriers to participation.

The Rutgers Cooperative Extension Water Resources Program through its Urban Green Infrastructure Initiative has partnered with local non-profit organizations in urban municipalities to pilot community-based initiatives addressing environmental health issues through education programs and implementation of green infrastructure projects which have been identified by the communities, including efforts to reduce non-point source water pollution, addressing the impact of brownfields on community health, and reduce combined sewer overflows and flooding.

Human nutrition and health are top priorities of the recently formed New Jersey Institute for Food, Nutrition and Health (NJIFNH). Its primary focus is childhood obesity and its related adult diseases, such diabetes, heart disease, and cancer. The centers work is interdisciplinary, multi-institutional with integrated research, education and extension at its core. A true working example of the Land-Grant mission. Rutgers scientists and NJAES researchers engage in ground-breaking research that could lead to new knowledge and improve human health.

The Cooperative Extension departments of Family and Community Health Sciences and 4-H Youth Development are addressing issues related to health and obesity through the Get Moving Get Healthy Initiative.

America faces a future of intense global competition with a startling shortage of scientists. To address increased demand for science and technology, professionals, 4-H Youth Development faculty and staff are working to engage youth in science programming. Youth are learning skills and developing an interest in science and in turn changing their perception of science.

An early interest in science is being developed through the NJ 4-H Robotics program delivered through 4-H clubs, camps, school enrichment and afterschool programs. Corporate sponsors, scientists and caring adult volunteers have helped youth to experience science concepts in a fun non-threatening way.

The 4-H Summer Science Program has stimulated career interest in the STEM fields in high school youth from six urban communities who participated in a week long residential experience, where they explored science on campus, instructed by Rutgers University scientists. In addition to this experience youth participate in a Climate and Environmental Change Teen Summit. Youth have reported that they have a better understanding of science. As a follow-up to these experiences youth return to their communities to serve as mentors to younger youth and engage in science related community service projects.

NJAES researchers and extension specialists, faculty and staff are at the forefront in providing research solutions and educational programming addressing global food security and agricultural viability which is evidenced by the application of 19 patents and issuance of 32 as well as 112 referred publications.

Specialty crops both fruits and vegetables account for more than 70% of annual food crop revenues in New Jersey. NJAES researchers continue to develop peach, apricot and apple cultivars with improved disease resistance and adaptation to their growing environment.

New propagation methods developed by NJAES researchers have optimized the production of healthy disesas-free, true-to-type cranberry stolons, providing the first virus-indexed and DNA fingerprinted cranberry varieties for the cranberry grower. Growers across the United States and in Canada continue to plant four new cranberry varieties (Crimson Queen, Demoranville, Mullica Queen, and the recently released Scarlet Knight). In 2011, blueberry breeding efforts focused on the development of resistance to aphids, while breeding efforts focused on development of fruit rot resistance.

NJAES researchers also continue to evaluate the nutritional competition and natural products profile of a wide range of vegetables and herbs, including those grown domestically and new crops grown overseas. These included grapes and grape derived products (polyphenols) botanicals, spices and herbs and selected vegetables.

A patent application was filed for the development of piperedene-flavan alkaloid compounds with anti-diabetic properties derived from kinkeliba (an African herb tea).

Volunteers are the engine that drives our home horticulture and environment programs. The Master Gardeners and Environmental Stewards extend RCE program throughout the state to make a significant difference in the communities they serve. The focus is on building collaborative partnerships with

community agencies both private and public to address community development and beautification, addressing urban environmental issues as well as those relating to hunger and access to fresh produce all with the goal of improving the quality of life for New Jersey residents.

Agriculture and Resource Management, Environmental Agents work in conjunction with these core volunteers to deliver high quality programming to address stakeholder indentified needs.

The aquaculture and fisheries industries are supported by NJAES researchers, RCE faculty and staff to ensure the quality of coastal waters and the viability of the fishing industry. Efforts continue to restore oyster industry leading to several patents.

Rutgers entomology researchers ansd Extension Specialists continue their work to devepole control strategies for invasive pest species in New Jersey. Our urban entomologist has developed a highly effective bed bug attractant and an inexpensive bed bug trapping system. He has worked with low-income populations to address this issue which has major health and economic impacts.

The Center for Vector Biology supportsboth research and extension activity to control the spread of disease-bearing mosquitoes, ticks,and other vectors in New Jersey. In 2011, the Center submitted two patent applications for a chemical larvicide formulation and biodegradable larvicide dispenser proven to be highly effective in the control of mosquitoes, particularly the highly aggressive Asian Tiger mosquito.

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 (42.7%) of funding is from federal grants and contracts; 25% state appropriations; 15.8% other sources; 9.8% federal appropriations and 6.7% 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 or our diverse audiences.

Total Actual Amount of professional FTEs/SYs for this State

Year: 2011	Extension		Research	
	1862	1890	1862	1890
Plan	156.0	0.0	65.0	0.0
Actual	162.0	0.0	45.0	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 2011 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 2011 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, comodity groups, public, private and governemtns 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 research-based 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

1. Total Actual Formula dollars Allocated (prepopulated from C-REEMS)			
Extension		Research	
Smith-Lever 3b & 3c	1890 Extension	Hatch	Evans-Allen
2616209	0	3287590	0

2. Totaled Actual dollars from Planned Programs Inputs				
	Extension		Research	
	Smith-Lever 3b & 3c	1890 Extension	Hatch	Evans-Allen
Actual Formula	3485848	0	2869841	0
Actual Matching	10966719	0	11949594	0
Actual All Other	5644727	0	10548729	0
Total Actual Expended	20097294	0	25368164	0

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

V. Planned Program Table of Content

V(A). Planned Program (Summary)

Program # 1

1. Name of the Planned Program

Climate Change - 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	20%		20%	
111	Conservation and Efficient Use of Water	20%		20%	
112	Watershed Protection and Management	20%		20%	
133	Pollution Prevention and Mitigation	20%		20%	
605	Natural Resource and Environmental Economics	20%		20%	
	Total	100%		100%	

V(C). Planned Program (Inputs)

1. Actual amount of FTE/SYs expended this Program

Year: 2011	Extension		Research	
	1862	1890	1862	1890
Plan	8.0	0.0	4.0	0.0
Actual Paid Professional	10.0	0.0	4.0	0.0
Actual Volunteer	0.0	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**
213481	0	221298	0
1862 Matching	**1890 Matching**	**1862 Matching**	**1890 Matching**
702846	0	1079913	0
1862 All Other	**1890 All Other**	**1862 All Other**	**1890 All Other**
170832	0	828932	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

3. How was eXtension used?

eXtension was not used in this program

V(E). Planned Program (Outputs)

1. Standard output measures

2011	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Actual	6606	9560	3127	1986

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

Patent Applications Submitted

Year: 2011
Actual: 0

Patents listed

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

2011	Extension	Research	Total

Actual	7	33	40

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.

Year	Actual
2011	0

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 - Earth-wise Lawn and Landscape Care: 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	Medium term - New Jersey Animal Waste Management Plans: 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.
6	Medium term - Environmental Health Issues and Green Infrastructure Initiatives for Urban New Jersey: 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.
7	Long Term - Climate Change and Atmospheric Forcing of Water Quality Changes in the Mullica River-Great Bay Estuary, New Jersey: 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.
8	Long Term - Stormwater Management Across the State: 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	Actual
2011	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Environmental Impacts of Equine Operations

Animal waste from equine operations can severely threaten water quality in not properly managed. Animal waste has the potential to contribute excess nutrients, pathogens, organize matter and solids to the environment. This could lead to degradation of ground water quality and threaten human health.

What has been done
Eight pasture, manure and storm-water BMPs were designed on the Demonstration Horse Farm. The self-guided tour allows farmers, horse owners and agriculture specialists to visit the farm on their own or in their own groups and tour each BMP on the farm. Each BMP has recently had a brochure produced which can allow our clients to take home the information they learned from the self guided tour. Each BMP is also highlighted on the virtual farm tour that is published on the Equine Science Center website (esc.rutgers.edu) for those who are not able to come to the

farm itself.

The eight topic areas for learning opportunities on the BMP farm:
Compost Area
Rotational Grazing System
Biofiltration Swale
Back Paddock Drainage
Manure Storage Area
Rain Garden and Front Paddock Drainage
Whole Farm Nutrient Management Plan

Results

Participants found the information very valuable and reported a significant increase in knowledge after the meeting. One participant commented that it was ?very thought-provoking.? The attendees rated the informative value of the topics covered in the walks everywhere from a 4.2 to a 4.9 (on a scale of 1 to 5, 5 being the highest). They also ranked their change in knowledge on the topics presented from a 4.0 to a 4.9 (1 being no increase in knowledge and 5 being the greatest increase in knowledge).

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

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.

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Actual

2011 0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

North Jersey Ornamental Horticulture Conference Turf Day Program

The landscape of NJ is comprised of 890,425 acres of turf, according to a 2001 Rutgers University study of the turf industry. Turf makes up 19% of the state's total acreage. Golf Courses, commercial properties and residential neighborhoods create a demand for professional turf management services. Professional turf managers care for 39% of the turf acreage. The 2,442 service providers who maintain commercial and residential properties contribute $400 million dollars in payroll and benefits to the state?s economy. They also contribute $691 million in cash expenditures.

The NJ Legislature passed the NJ Fertilizer Law A2290 in January 2011. The law's objective is to protect our state's surface and groundwater from excess nitrogen and phosphorous loading from turf fertilizer applications. The law requires professionals who apply fertilizers to turf areas be certified. NJAES is taking the lead on providing education and certification programs.

What has been done

North Jersey Ornamental Horticulture Conference (NJOHC)Turf Day program promoted the adoption of integrated pest management practices by industry professionals. Adoption of IPM practices will reduce the amount of fertilizers and pesticides used on residential, commercial and public properties.

Results

Program evaluations (N=146) revealed that, 99% of the participants learned something they intend to apply to their turf management practices. The most important things learned were: new fertilizer regulations (100), new pesticide regulations (92), scouting for turf disease (84) and the effect of weather on turf diseases (72). Ninety-seven percent of the professionals will make more informed pest management decisions.

Of the 126 participants who indicated they had attended programs in the past, 71% have changed their pest control practices as a result of the program. Changes were described as practicing IPM, using less chemicals and improved targeting of pesticide applications.

Fifty-six percent of the professionals reported they use less pesticides. Evaluations showed that 34 professionals reduced use by 1-10%, 26 by 11-20% and 11 by 21 -30%. The evaluation had a question asking if businesses have saved money as a result of the training. Fifty-six participants indicated yes. The amounts ranged from $400 to $6,00 dollars and 10 -20%. Professionals who attended the program in previous years were asked how the information presented at prior programs affected their business or career. Respondents indicated:

119 have been able to maintain their NJ Department of Environmental Protection Pesticide Applicator License.

109 practice IPM.

79 see improved communication with their customers.

82 use the information to train employees.

53 experienced an increase in sales.

24 indicated their attendance helped them get a promotion.

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

Outcome #4

1. Outcome Measures

Medium term - Earth-wise Lawn and Landscape Care: 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	Actual
2011	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Earth-wise Lawn and Landscape Care

Improper use of fertilizers and pesticides on home lawns and landscapes can cause pollutions of lakes and groundwaters. Improper use may not only harm the environment, but may result in injury to landscape plants.

What has been done
"Earth-wise Lawn and Landscape Care". The three hour comprehensive class covers the proper selection and care of landscape plants in order to keep plants healthy and reduce the need for unnecessary pesticide and fertilizer applications. The presentation references current research on the selection, care and maintenance of landscape plant and covers applied renovation and pruning techniques that can help to maintain plant vigor. The presentation provides details on how to replace the majority of pesticide use with proven best management practices and biological or alternative control methods for insects, disease, weed pests and to

reduce unnecessary water use in landscapes.

Results

Surveys conducted after each class revealed the following:

Nitrogen Fertilizer Reduction

86% of total students committed to recycling grass clippings back to 83.4 acres. This would reduce the need for 1 pound of fertilizer application per lawn or 1 pound of actual nitrogen per 1,000 square feet for a reduction of 3,633.7 pounds of Nitrogen total.

Energy Reduction

Based on the energy needed to produce Nitogen fertilizer per pounds, this results in a savings of 122 million BTU's of energy or a reduction of equivalent #2 fuel oil diesel equivalent of 872 gallons.

Water Savings

89% of students reported that they would now irrigate in early morning and only as needed for a reduction on 86.33 acres of 1 acre inch of water per week. If we estimate one less irrigation per week at 1 inch per acre during the months of July and August then we could reduce 2,344,204 gallons per irrigation or 18,753,638 gallons for 8 applications during July and August.

Solid Waste Reduction

86% of participants committed to recycling grass clippings on 83.4 acres. Based on an average of 75 lbs of grass clippings generated by an average 5,000 square feet lawn, participants will reduce 54,494 pounds of grass clippings or 27.25 tons. This could result in a savings in landfill tipping fees of over $2,725.

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

Outcome #5

1. Outcome Measures

Medium term - New Jersey Animal Waste Management Plans: 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	Actual
2011	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
New Jersey Animal Waste Management Plans

New Jersey has a diversified livestock production system with close to 5,000 producers raising some type of livestock across the state utilizing over 100,000 acres for grazing and the direct keeping of the livestock (equine, beef, dairy, goats, sheep, swine, alpaca, turkeys, poultry, llama and other species designated as livestock). With that in mind for over twenty years a Animal Waste BMP had existed with the NJDA-RCE-DEP, that set general guidelines for animal waste (manure and bedding) management. On March 16, 2009 the criteria for Animal Waste Management was legislated under 41 N.J.R. 117 (a) as the Adopted New Rules: N.J.A.C. 2:91. The AWMP required that all livestock producers adopt legislated animal waste (manure) management guidelines over a three year prescribed time table. As part of the original planning team, Rutgers Cooperative Extension team members were designated as the delivery component of the legislation and to assist in the registering of the producers compliance.

What has been done
Rutgers Cooperative Extension Agents, Specialists and support personnel developed and delivered an educational program using a manual, promotional materials and a CD for recording the producer plans. Statewide and selective meetings have been held across the state by the training team and to date over 2,000 producers have attended the various training sessions. With the three year implementation period coming to an end on March 16, 2012, AWMP team members have been assisting individual farmers with their plans. An active web page on Rutgers/NJAES has been maintained for producer resources along with articles and related photos printed in state wide and local newspapers to inform producers of the filing deadline. Every Extension office where producers rear livestock will be registering the producer compliance with the plans completion and forwarded the declaration pages on to the NJDA for filing.

Results
All livestock producers will be required to implement the rules of the AWMP, but only those producers with 8 to 299 Animal Units (1,000 pounds of animal respectively) will have to be in compliance with the filing of the self certified plans materials. It is recommended though that all producers file a plan no matter how few animal units that they are keeping since they must be in compliance with the rule no matter how many animal units under the number required for filing. To date approximately 25% of the proposed eligible producers have filed the declaration

document to be in compliance with the AWMP. The time line for compliance is over three years for the initial period.

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

Outcome #6

1. Outcome Measures

Medium term - Environmental Health Issues and Green Infrastructure Initiatives for Urban New Jersey: 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	Actual
2011	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Environmental Health Issues and Green Infrastructure Initiatives for Urban New Jersey

Urban Green Infrastructure Initiative. Water and sewer infrastructure systems in many communities throughout New Jersey are reaching the end of their functional life and will need repair and replacement over the next decade. Opportunities exist to reduce costs for replacing this aging infrastructure using new techniques and technologies, better preparing the state for a sustainable future. Infrastructure planning and design approaches are needed that reduce demand on existing infrastructure, extend its functional life where possible, and provide cost-effective and sustainable solutions that conserve and protect water resources while improving the

quality of life of our residents.

What has been done

Rutgers Cooperative Extension (RCE) Water Resources Program has partnered with local nonprofit organizations in urban municipalities to pilot community-based initiatives addressing environmental health issues through education programs and implementation of green infrastructure projects. The program and projects focus on priority environmental issues identified by the communities, including efforts to manage vacant properties, reduce nonpoint source water pollution, reduce combined sewer overflows and flooding, addressing the impact of brown fields on community health, and upgrade aging infrastructure. The educational and job training programs being developed by RCE focus on teaching adults and youth the importance of managing stormwater runoff in urban areas. As part of the educational programs, demonstration green infrastructure projects are being constructed to capture, treat and infiltrate (where possible) stormwater runoff.

Results

Approximately thirteen (13) workshops and presentations related to urban green infrastructure were held with over 350 attendees. Eight (8) rain gardens were installed in urban environments as part of green job training and community gardening initiatives. These rain gardens capture approximately 188,000 gallons of stormwater per year. A study entitled "Community-Based Green Infrastructure for the City of Camden" was completed in November 2011. The RCE Water Resources Program staff visited each of the City's 20 unique neighborhoods to evaluate the need and opportunities for green infrastructure. In total, over 40 projects were selected, incorporating every one of the City's neighborhoods. The feasibility study highlights these projects and will serve as a valuable resource for City officials and nonprofits for implementation best management practices in the upcoming year.
Surveys of 33 homes revealed 58 percent were gardening directly in the ground, 88% had not done lead testing, and 70% did not know the health risks of gardening in lead contaminated soil. Twenty-eight (28) New Brunswick homes had their garden soil tested for lead. Sampling results and best practices for protecting themselves from lead contamination while gardening were translated to Spanish and sent to all homes five (5) yards showed significant contamination. Thus far, 3 homes have agreed to adopt lead-safe practices in their yards.

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

Outcome #7

1. Outcome Measures

Long Term - Climate Change and Atmospheric Forcing of Water Quality Changes in the Mullica River-Great Bay Estuary, New Jersey: 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

Year	Actual
2011	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Climate Change and Atmospheric Forcing of Water Quality Changes in the Mullica River-Great Bay Estuary, New Jersey

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
Extensive meteorological and water quality databases were collected during 2011 to assess the temporal and spatial trends of physicochemical conditions in the Mullica River-Great Bay Estuary with respect to meteorological forcing factors. More than 50 professors and students, research scientists, and technical staff at Rutgers University, Richard Stockton College of New Jersey, Georgian Court University, and other academic institutions have directly utilized the databases and other components of the study. Government agencies (e.g., New Jersey Department of Environmental Protection and U.S. Environmental Protection Agency), national estuary programs (e.g., Barnegat Bay Partnership), National Estuarine Research Reserve (NERR) system sites, as well as numerous recreational and commercial fishermen have used the meteorological and water quality data. These data are permanently stored on computers at the Central Data Management Office of the NERR system in Charleston, South Carolina, and also posted on the World Wide Web for use by business, industry, and the general public. Therefore, it potentially reaches tens of thousands of individuals. Elements of the project are also widely disseminated to people in Ocean County and other areas of New Jersey through education and

outreach programs of the Jacques Cousteau National Estuarine Research Reserve (JCNERR) and through activities at the Life on the Edge Exhibit in the Tuckerton Seaport. More than 10,000 people visited the seaport exhibit in 2011 and observed the datalogger exhibit that simulated data acquisition in the field. There is a wide array of other venues where information on this project is provided to many people. Included here are Lunch-and-Learn sessions, estuarine field days, green expos, senior programs, workshops, conferences, and ecological tours. An open-house day at the Rutgers University Marine Field Station in Tuckerton in September 2011 drew nearly 450 people, and the Barnegat Bay Festival in June 2011 had more than 500 visitors. Both events included displays of dataloggers.

Results

Data obtained in this project, therefore, are producing new measures useful for improving coastal zone management programs (e.g., water and air quality initiatives) and thus have the potential for forging significant positive change in coastal administrative actions. The water quality and atmospheric data collected in this project are also useful for improving the analysis and assessment of habitat conditions and habitat utilization by commercial and recreational fish species in the study area, such as summer flounder, weakfish, and striped bass. The data are also of value to ichthyologists investigating the life history and ecology of an array of fish populations in the region, with special emphasis on the role of habitat as it affects recruitment success and abundance of finfish assemblages in estuarine and near-shore ocean waters in the Jacques Cousteau National Estuarine Research Reserve. The outcome is positive, therefore, for fisheries interests in New Jersey and elsewhere.

In addition, tens of thousands of people now have access to web-based databases collected in the project and posted for general use. It is clearly evident that this project has had an impact on many people in New Jersey and other coastal states.

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

Outcome #8

1. Outcome Measures

Long Term - Stormwater Management Across the State: 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

Year	Actual
2011	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Stormwater Management Across the State

Due to the dense population and intense development within New Jersey, stakeholders face many problems with water quantity and quality issues as well as groundwater recharge. Rutgers Cooperative Research and Cooperative Extension can help stakeholders address their water resources problems through the use of research, education and extension.

As stormwater runoff flows over the land or impervious surfaces (paved streets, parking lots, and building rooftops), it accumulates debris, chemicals, sediment or other pollutants that can adversely affect water quality if the runoff is untreated. Best management practices (BMPs), such as, Stormwater Management in Your School Yard, in Your Backyard through Rain Gardens, for Corporate Landscapes, and in Your Backyard as well as through Built Rain Barrels.

What has been done

The Stormwater Management in Your School Yard program educates youth about watersheds, nonpoint source pollution. The program provided information on the sciences and engineering behind stormwater BMPS, and how students could solve water issues in their communities through the use of best management practices, such as rain gardens and rain barrels. Also, a hands-on rain garden planting on the school grounds is incorporated into the educational program. In 2011, the Stormwater Management in Your School Yard educational program was conducted at 14 school systems with over 735 youth in attendance.

The Stormwater Management in Your Backyard program provided information on the science and engineering behind stormwater BMPs and empowers landscape professionals to offer their own communities with low impact development services. Rain Garden Landscaper Training Workshops provide information on rain garden installation and maintenance and include a hands-on training where attendees install a rain garden at a community location. In 2011, nine (9) Rain Garden Landscaper Training Workshops were held with over 260 people in attendance. These Rain Garden Landscaper Training Workshops were not only conducted in New Jersey, but were also conducted in Massachusetts, Rhode Island, and Delaware.

The Stormwater Management for Corporate Landscapes program provided information on the science and engineering behind stormwater BMPs and empowers corporate employees, property managers, and landscape professionals to install and offer low impact development systems on the grounds of corporate facilities. Stormwater Management for Corporate Landscapes Training Workshops provides information on rain garden installation and maintenance and includes a hands-on training where attendees install a rain garden at their corporate facility. Between October and December 2011, one (1) Stormwater Management for Corporate Landscapes Training Workshop was held at Johnson & Johnson with over 30 people in attendance. This training workshop and hands-on rain garden installation was conducted in Titusville, New Jersey.

In addition to Johnson & Johnson, a rain garden was installed by landscape professionals at the Subaru of America, Inc. headquarters in Cherry Hill, New Jersey. The landscape professionals that installed this rain garden were alumni of the Stormwater Management in Your Backyard - Rain Garden Landscaper Training program. There are plans for the employees of Subaru of America, Inc. to participate in a Stormwater Management for Corporate Landscapes Training Workshop in 2012.
"Build a Rain Barrel" Workshops, offered as part of the Stormwater Management in Your Backyard program, provided information on rain barrel construction and maintenance and included a hands-on training where attendees built a rain barrel for installation at their home or business. In 2011, eleven (11) Build a Rain Barrel Workshops were held with over 150 people in attendance.

Results

Fourteen (14) rain gardens were installed in school yards, capturing approximately 375,000 gallons of stormwater annually.

Eleven (11) rain gardens were installed in backyards, capturing approximately 275,000 gallons of stormwater annually.

Two (2) rain gardens were installed on corporate landscapes, capturing approximately 50,000 gallons of stormwater annually.

170 rain barrels were built and installed, capturing approximately 595,000 gallons of stormwater annually.

In Camden County the program is continually under evaluation through the rain water harvesting follow-up online survey. This survey will evaluate the utilization of rain barrels for water conservation by the attendees following training. To date, of the survey responders, 75% have installed their rain barrels at home and 28% have installed additional barrels; 94% reported no difficulty installing the rain barrel; 19% have implemented additional stormwater runoff conservation practices; and 55% have adopted additional water conservation mechanisms following the training.

In Middlesex County 2011 follow up surveys of program participants indicated that 81% (n= 26) of survey respondents felt the program increased their ability to educate others about protecting the environment. 81% of survey respondents indicated they were better able to explain the importance of reducing stormwater runoff and conserving water to their communities. Seventy-seven (77) percent indicated they had more of interest in teaching others how to reduce stormwater runoff and 73% indicated they had more interest in teaching others how to save water.

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)

Evaluation Results

See Qualitative State Defined Outcomes for Evaluation Results

Key Items of Evaluation

See Qualitative State Defined Outcomes.

V(A). Planned Program (Summary)

Program # 2

1. Name of the Planned Program

Childhood Obesity - 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%	
	Total	100%		100%	

V(C). Planned Program (Inputs)

1. Actual amount of FTE/SYs expended this Program

Year: 2011	Extension		Research	
	1862	1890	1862	1890
Plan	6.0	0.0	5.0	0.0
Actual Paid Professional	24.0	0.0	5.0	0.0
Actual Volunteer	345.0	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**
693493	0	290524	0
1862 Matching	**1890 Matching**	**1862 Matching**	**1890 Matching**
1317301	0	1393359	0
1862 All Other	**1890 All Other**	**1862 All Other**	**1890 All Other**
3913889	0	1627628	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

3. How was eXtension used?

Faculty and staff utilized the Families, Food and Fitness
Financial Security for All
Diabetes
Faculty answered frequently asked questions and developed collaborative educational products.

V(E). Planned Program (Outputs)

1. Standard output measures

2011	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Actual	44863	55377	13531	2750

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

Patent Applications Submitted

Year: 2011
Actual: 1

Patents listed
PCT/US11/28347

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

2011	Extension	Research	Total
Actual	12	32	44

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	Actual
2011	0

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 - 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 - Evaluation and Characterization of Novel Botanical Extracts for the Prevention and Treatment of Metabolic Syndrome and Diabetes: 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 - Taste Genetics, Food Choice and Obesity: 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.
7	Medium Term - The Effect of Diet and Metabolic Disrupters on Brain Proteins and Peptides: A Proteomic Approach to the Regulation of Food Intake Neuropeptides: 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.
8	Medium Term - Family Economics: Small Steps to Health and Wealth: 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.
9	Medium Term - Identification and Mechanism of Antioxidative, Anti-Inflammatory and Antidiabetic Phytochemicals in Foods: 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.
10	Medium Term - Postharvest Biology of Fruits: 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.
11	Medium Term - Life in Extreme Environments: Research, Commercial Product Development and Innovative Education Initiatives: 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.

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	Actual
2011	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Get Moving Get Healthy Food & Fitness

As a national 4-H mission mandate, the 4-H Healthy Living mission engages youth and families through access and opportunities to achieve optimal physical, social, emotional well-being. In New Jersey, the Department of 4-H Youth Development has focused efforts on the physical aspect of healthy living because of the childhood overweight/obesity problem in New Jersey. The problem was illustrated in a September 2004 Childhood Weight Status report published by the New Jersey Department of Health and Senior Services which indicated that 20% of New Jersey's sixth graders are obese and another 18% are overweight. Currently, the number of overweight and obese youth in New Jersey is higher than the national average.

What has been done

The Get Moving - Get Healthy with New Jersey 4-H (GMGH) action kits, display, and curriculum were developed to address the issue by providing an interactive and fun way to learn about healthy eating and physical activity. The curriculum has three major focus areas - understanding Choose My Plate, identifying portion sizes, and learning easy ways to exercise.

Currently, the GMGH program reaches youth and their families through a variety of methods including public awareness through the display, training of adults and teens, youth education through school enrichment and after-school programs, and family fun events which involve both youth and their parents.

A key component of the implementation process was to involve teens as teachers. Since NJ developed the Get Moving - Get Healthy with NJ 4-H (GMGH) program in 2005, teens have played an instrumental part in NJ 4-H's healthy living programming. A team of teens, called the 4-H Food and Fitness Ambassadors worked with the 4-H professionals to develop the activity kits and curriculum. The teens identified the areas of focus for the project, determined the title of the project, designed the logos and artwork used for the project, and evaluated potential activities to include in the activity kits.

In December 2011, a weekend training for Food & Fitness Ambassadors was conducted. The 65 teens trained came predominately from the urban parts of state including Newark, Trenton, Patterson, and Camden. The teens have begun their outreach to the community.

Results

An important part of the Food & Fitness Ambassador training was increasing their knowledge related to healthy eating and physical activity. The Food & Fitness Ambassadors completed a pre- and post-test as part of the training. The following are results from that training. The following changes occurred.

Participants increased their ability correctly identify foods in food groups.
(Average number of foods correctly identified in each food group, with 4 being the highest number correct.)

Food Group	Pre-Test	Percent	Post-Test	Percent	Percent Change	Number	Number
Fruit	3.8	93.83.8	96	2.3			
Vegetable	3.3	82.73.6	89.5	6.8			
Meat & Bean	2.7	66.33.5	88	21.7			
Milk	3.6	90.43.9	96.5	6.1			

Grain 3.2 79.83.8 94.9 15.1

After the training, teens also showed an increase in their knowledge of portion sizes and the amount of physical activity needed each day.

Number of youth correctly answering the question:

	Pre-Test	Post-Test	Percent	Yes	Percent	Yes	Percent	Change
One cup of food is about the size of which item?	25	51.0	37	80.4	29.4			
The amount of physical activity I should get every day is?	30	58.8	48 98		39.1			

Teens Food & Fitness Ambassador will be reaching out to youth and families in their communities in 2012.

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 #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

Year	Actual
2011	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Nutrition, Health and Wellness

Overweight and obesity are serious problems in the U.S. During the past 20 years, there has been a dramatic increase in obesity in the United States and rates remain high. According to the CDC, in 2010, no state had a prevalence of obesity less than 20%. In 2011, New Jersey had an obesity rate of 31.3% (ref.: http://www.cdc.gov/obesity/data/trends). Childhood obesity has more than tripled in the last thirty years. The percentage of children aged 6?11 years in the United States who were obese increased from 7% in 1980 to nearly 20% in 2008. Similarly, the percentage of adolescents aged 12?19 years who were obese increased from 5% to 18% over the same period. In 2008, more than one third of children and adolescents were overweight or obese. These are serious health problems that must be addressed. Many of today's health problems--obesity, heart disease, diabetes, and cancer--can be reduced through good nutrition and a healthy life style.

What has been done
Get Moving Get Healthy New Jersey (GMGH-NJ) is a statewide wellness initiative, facilitated by the Family and Community Health Sciences (FCHS) and the 4-H Youth Development departments, that addresses the problems of overweight and obesity. A variety of educational strategies were implemented to reach a diverse audience of adults, youth, seniors, professionals and food service workers and others with nutrition education and physical activities to combat youth and adult obesity.

Family and Community Health Sciences Educators continued to ongoing leadership and training to Healthy Kids Coalitions which were created following a series of Children?s Health Summits held throughout the state. These coalitions have provided a framework for local networks which partner to address youth obesity and improve healthy food options and physical activity.

The new Choose MyPlate model has been used as a guide for updating the latest information about the Dietary Guidelines for Americans. Also a functional foods series of programs that speak about the history and health benefits associated with popular items such as tea, chocolate, berries, and assorted vegetables was offered. In addition, participants learn about the health benefits related to the consumption of various food products (i.e. the benefits of a diet rich in foods from various color groups) as well as the health risks associated with diets that are low in nutritive value (i.e. high fat, high sodium, and high sugar snacks and beverages). Participants are provided with take home tips, cooking demonstrations, and ideas for incorporating physical activity into daily routines that will support behavior change.

Functional Foods for Life, a series of six interactive programs offered by Family and Community Health Sciences Educators focused on the potential benefits of functional foods in a varied diet. Educators provided research-based nutrition education on these foods (tea, berries, vegetables, chocolate, coffee and mushrooms)

School wellness interventions implemented to reach youth in elementary, middle, high school. Of note is the Healthy Teen Expo, a highly interactive school based program where students

participate in healthy lifestyle activities that feature a physical activity challenge and a series of highly interactive mini-lessons, 4,715 students in Atlantic and Ocean Counties.

In Mercer County 4-5 graders participated in the elementary afterschool program Cooking is Fun which is an evidenced-based, peer-reviewed nutrition, cooking and physical activity lesson series.

Results

Evaluations of From My Pyramid to Choose MyPlate in one county reported that as a result of this program participants plan to:

74% Eat more family meals
87% Eat more fruits and vegetables
78% Make half my grains whole
76% Eat smaller portions
78% Be more physically active
59% Spend less time watching TV or sitting in front of computer/video games
72% Drink fewer sugar-sweetened beverages
87% Read nutrition fact labels more often for serving size and calorie information
59% Eat only low-fat or fat free dairy products
76% Choose water as my beverage of choice

In another county follow-up evaluations of Choose MyPlate lesson revealed that:

83% are purchasing more healthy than unhealthy food
76% are eating more fruit & vegetables
81% are eating more whole grains
79% are following the recommendations of MyPlate and 2010 Dietary Guidelines
60 % are drinking more water daily
55% are watching their portion sizes
62% eat a healthy breakfast daily

Functional Foods for Life:

Four to six weeks after the programs follow-up evaluations were sent to all participants. There were 41 follow-up evaluations returned. The outcomes showed that as a result of a Functional Foods for Life class:

85% Became more interested in nutrition and health
78% Choose water as their beverage of choice
85% Eat functional foods discussed in class (tea, chocolate, or berries) as part of a healthful diet that includes vegetables, fruits, whole grains and legumes.

A survey was conducted with 4,715 teens who participated in the ?Healthy Teens Expo? The two week follow-up survey indicated the following:

59% increased their level of physical activity
49% decreased screen (television, computer, game system, cellular phone) time
45% increased consumption of fruits and vegetables
44% decreased consumption of sugar-sweetened beverages
37% of students ate more meals with the family
33% controlled their food portion sizes
30% read nutrition fact labels for serving size and calorie information

Students in grades 4-5 who participated in the elementary after-school program Cooking is Fun reported the following:

85.7% of students reported that they will do something new or different
76.2% of students reported that they will change the way they think, act, or behave

85.7% of students reported that they plan to use or share what they learned
81% of students reported that they are more interested in the program topic

Learned:
How to eat right
I learned how to make healthy snacks

One way you plan to use this information:
I plan to use this information for my parents to make me these things I learned (sic)
I will exercise more often

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 #4

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	Actual
2011	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Atlantic County Employees Get Moving Get Healthy

Health benefits are rising quickly in the US due to the increased risk of diabetes, heart disease, high blood pressure, and other chronic disease. New Jersey Counties are challenged with managing increased health benefits for their employees. Workplace wellness programs have shown to increase the wellness knowledge of employees and encourage them to improve their healthy lifestyle. The Get Moving Get Healthy Atlantic County Workforce was designed to deliver information and strategies for employees to make positive behavior changes to impact a healthier life thereby reducing the cost of health benefits to the county.

What has been done
Get Moving Get Healthy Atlantic County Workforce was created as a means of engaging County employees in a walking program that takes existing knowledge of healthy lifestyle and physical activity and improves the retention of learning after the event. The employees wear a pedometer (provided by Atlantic County Human Resources Department) to track their daily walking steps. Walking data may be entered into the Walk NJ Point-to-Point online tracking tool at www.getmovinggethealthynj.rutgers.edu/walking_program or sent to the Principle Investigator for manual entry into the database.

The program is provided for Atlantic County employees who volunteer to participate in a project that will raise awareness of the positive impact on their healthy lifestyle. The goal is for employees to live longer, healthier lives by:
? Increasing awareness of the importance of sustaining good health with proper nutrition and physical activity
? Increasing awareness of the importance of physical activity as a component of healthy lifestyle.
? Increasing awareness of the effect of healthy eating habits, physical activity and stress reduction

Approximately 1,800 male & female employees of Atlantic County will be offered the opportunity to participate in this study. The Atlantic County Human Resources office will recruit study participants via email and announcements on the Atlantic County InfoPlease website. One hundred ninety-two county employees registered for the 12-week program.

Results
A follow-up survey taken by 83 employees (Survey Monkey used to aggregate the data). Results to date are as follows:
Increased knowledge of Body Mass Index:
53% increased knowledge of Body Mass Index
31% reported a Body mass Index of 26 or higher after the weekly focus lesson

Increased the number of steps taken per day:
80% increased their knowledge of the number of steps taken per day
4% increased their steps to the recommended 10,000 steps per day

Reported Changes:
53% improved physical condition
64% lost some body weight

46% lost some inches around the body
53% improved physical appearance
54% fit better in clothing
31% improved level of energy
24% improved sleep
56% improved diet
68% increased consumption of fruit
63% increased consumption of vegetables
19% decreased level of stress
41% increased level of exercise

Rated their level of physical condition before workplace wellness program:
9% Poor
50% Fair
31% Good
10% Very Good
0% Excellent

After the workplace wellness program:
3% Poor
17% Fair
59% Good
17% Very Good
4% Excellent

Population demographics
88% female
12% male

Age Range
6% between 20-30
12% between 31-40
42% between 41-50
31% between 51-60
15% 60

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 #5

1. Outcome Measures

Medium Term - Evaluation and Characterization of Novel Botanical Extracts for the Prevention and Treatment of Metabolic Syndrome and Diabetes: 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	Actual
2011	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Evaluation and Characterization of Novel Botanical Extracts for the Prevention and Treatment of Metabolic Syndrome and Diabetes

More than 20% of the American population harbor the risk factors defined for metabolic syndrome, a condition that is highly correlated with the development of type 2 diabetes and coronary heart disease.

What has been done
NJAES researchers have continued their studies. Despite the widespread use of botanicals for treatment and prevention of disease, including metabolic syndrome, the bioavailability of the active compounds from plant sources is generally very low and seldom considered as a significant factor related to bioactivity. However, the fate of these compounds in the GI tract prior to absorption is an important factor for the effective use of botanicals for the treatment and/or prevention of disease, either as dietary supplements or components of food. We have shown that an extract of Artemisia dracunculus (PMI-5011) decreased hyperglycemia in animal models for type 2 diabetes and improved insulin sensitivity in treated clinical subjects. We have also shown

that anthocyanin-enriched extracts from low-bush blueberries were hypoglycemic in diabetic C57Bl6J mice while a clinical study recently conducted in patients treated with blueberry puree showed improvement in insulin resistance in the test group bioaccessibility of the bioactive compounds from Artemisia and blueberry using the TNO intestinal model (TIM) of the upper GI tract of humans.

Another NJAES researcher is studying lily bulb extract which contains steroidal glycosides, phenolic compounds and insulin, which may reduce insulin resistance and delay the onset of type 2 diabetes.

Results

These studies are used to help us understand how some of the compounds that are contained in medicinal plants work in animals and people and which compounds are the most biologically active. Multiple Artemisia species are used for this work in order to determine which species will provide the greatest benefit. The studies using Saint John's Wort demonstrate a potential negative effect of the extract on metabolic syndrome which may be significant for public health considerations, and has not been previously reported. This research contributes to the value added agriculture of New Jersey and provides significant benefits to the biotechnology and pharmaceutical industries in the State by suggesting new strategies for the prevention and treatment of diabetes. In doing so, this could save in health-care expenditures for the State. In addition, the identification of novel plant based preparations for the prevention and treatment of diabetes and metabolic syndrome will be essential for the battle against this growing epidemic. A better understanding of how they work will provide consumers and researchers with information for their most effective use. These efforts contribute to value added agriculture of New Jersey, as well as provide significant benefits to the biotechnology and pharmaceutical industries in the State.

The results of the lily bulb extract research could lead to the development of L. longiflorum bulbs, or other plant parts, as a functional food or nutritional supplement that may be consumed regularly to prevent the development of metabolic syndrome and the onset of diabetes.

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 - Taste Genetics, Food Choice and Obesity: 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	Actual
2011	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Taste Genetics, Food Choice and Obesity

Obesity is a serious problem in the U.S. within NJ, the obesity rate is over 30%. Good nutrition and healthy lifestyles can impact health status and weight gain.

What has been done
NJAES researchers engaged graduate students and others in a research project to link genetic variation in bitter taste perception to food preferences, dietary habits and body weight. The long-term goals of this project are to better identify individuals, especially women, who may be at risk for excess weight gain and obesity due to dietary causes. Taste blindness to the bitterness of 6-n-propylthiouracil (PROP) is a recessive trait that is controlled, in part, by the bitter receptor gene, TAS2R38. Those with the non-taster phenotype are less responsive to a range of oral sensations (fats, alcohol, bitterness and pungency) and have increased preferences for foods with these qualities, whereas those with the taster phenotype (medium- or super-tasters) show the opposite responses. Some studies suggest that PROP non-tasters habitually consume more discretionary fats, and energy as compared to PROP tasters. This dietary pattern could contribute to greater BMI, which we have observed among middle-aged, PROP non-taster women. It is known that exposure to a variety of high-fat/energy-dense, foods increases energy intake by 14-25% and could be a precursor to weight gain.
The data derived from this project are disseminated at scientific conferences and symposia. The findings have also been described in professional publications aimed at dietitians and other nutrition educators, as well as to the general public.

Results
We previously showed in a feeding study that PROP non-taster women consumed 88% more energy from buffet lunches relative to a control lunch, whereas super-taster women consumed only 38% more energy during buffet feeding relative to control. The objective of our current study was to determine if non-taster women would consume more fat and daily energy than super-taster

women during three consecutive days of buffet feeding. Seventy-five non-diet restrained, women (26.1 +/- 0.7 yr) participated in the study (n=25/group for non-tasters, medium tasters and super-tasters, respectively). Subjects ate lunch and dinner in the laboratory for 3 consecutive days under two experimental conditions: ad-libitum, fixed-item meals (FIXED) where subjects could eat as much as they wanted from items they pre-selected from a menu, or buffet meals (BUF), where they selected from a variety of foods. A standard 300 kcal breakfast was consumed each day of the study, and there was a 4-d washout between conditions. Results showed that 1) all subjects consumed more energy during BUF than FIXED, as expected; and 2) non-tasters and medium tasters consumed more energy from dinners and snacks during BUF than super-tasters, which contributed to greater daily energy intake in these two groups. During BUF, saturated fat and cholesterol intake intakes were higher in non-tasters and medium tasters compared to super-tasters ($p<0.01$). Food group analysis showed that non-tasters consumed more servings/day of added fats and pastries, and fewer servings of fruits and vegetables compared to super-tasters ($p<0.004$). These findings suggest that non-taster and medium taster may be more vulnerable to overeating in a buffet setting, which could lead to incremental weight gain over time. These results support our previous findings of a negative association between PROP status and body weight in women and highlight the dietary patterns that contribute to this weight variation.
The data collected in the research helps us to understand the specific dietary patterns that promote obesity in young women and identify those who may be at great risk. This work also leads to the development of improved nutrition intervention that can be targeted to an individual?s genetic taste background and therefore optimally promote behavior change in that individual. These innovations are expected to improve the health, nutrition and quality of life for residents of New Jersey and the nation.

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 #7

1. Outcome Measures

Medium Term - The Effect of Diet and Metabolic Disrupters on Brain Proteins and Peptides: A Proteomic Approach to the Regulation of Food Intake Neuropeptides: 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	Actual
2011	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
The Effect of Diet and Metabolic Disrupters on Brain Proteins and Peptides

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

What has been done
NJAES researchers are investigating the regulation of food intake with respect to the long term ingestion of junk foods and aspartame, an artificial sweetener added to "diet" drinks and other foods. Aspartame is completely metabolized in the gut and absorbed as phenylalanine (50%), aspartic acid (40%), and methanol (10%). Phenylalanine is thought to play an important role in neurotransmitter regulation, aspartic acid may play a role as an excitatory neurotransmitter and methanol is converted in the body to formate, which is either excreted or may linger to produce byproducts like formaldehyde, diketopiperazine (a carcinogen), and a number of other highly toxic derivatives (Humphries et al., 2008 Direct and Indirect Cellular Effects of Aspartame on the Brain, European Journal of Clinical Nutrition. Volume 62: 451). Particularly worrisome with respect to certain body tissues, is the reported cumulative effects of formaldehyde.

Results
Our data provide evidence that long term ingestion of aspartame has a potentially detrimental effect on the kidneys and may cause an array of disorders that prevent proper renal functioning. In rats administered aspartame, there appeared to be an increase in the severity and frequency of renal fibrosis, tubular proteinosis, and interstitial nephritis. Kidneys of rats that were not administered aspartame were either normal or only showed minor abnormalities. This suggests that ingestion of aspartame for an extended period of time increases the chances for scarring, tubular proteinosis, and interstitial nephritis in the kidneys. . The heart, GI tract, testes, and prostate tissue samples generally appeared normal. The liver showed gross abnormalities in rats that were fed a "junk food diet" (cheeseburgers, french fries, donuts, etc) and did not appear to be associated with aspartame itself. The data lends us to believe that the fatty livers were caused by the constant junk food diet. This is the expected result since it has already been shown that fatty livers are symptoms of obesity. Aspartame does not seem to cause steatosis because the values in the aspartame, low-fat group were considerably lower than the values in the water, high-fat group. The study should really be repeated using a larger population of rats following the long-term ingestion of aspartame (with a no aspartame control) to insure that the degradation of the

kidneys and liver is due to the aspartame and / or the diet and not due to the age of the animal.

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 - Family Economics: Small Steps to Health and Wealth: 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	Actual
2011	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Family Economics: Small Steps to Health and Wealth

With passage of the 2010 health care law and high unemployment rates during 2011, much attention was paid to health and personal finances and relationships between both aspects of

people?s lives. Many Americans have health and personal finance ?issues.? 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. There are also many ways that health affects personal finances (e.g., the high cost of unhealthy habits (e.g., smoking) and medical expenses) and personal finances affect health (e.g., physical symptoms and poor health care associated with financial distress). A need exists to teach consumers about health finance topics (e.g., health insurance, long-term care, the financial cost of unhealthy behaviors) and behavior change strategies that can be simultaneously applied to improve health and increase wealth.

What has been done

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. Research-based program outputs during the past year include new archived monthly health and financial messages on the SSHW Web site, http://njaes.rutgers.edu/sshw/, revisions to the Small Steps to Health and Wealth workbook, and two pilot tests of the online SSHW Challenge which measures participants' performance of ten recommended practices on a daily basis, five related to health/nutrition and five related to personal finance.

Results

In 2010, Small Steps to Health and Wealth (SSHW) was named a "signature" program of NIFA-USDA and is increasingly being used by Extension personnel nationwide to integrate health and personal finance subject matter. Two competitive national online SSHW Challenges were held in 2011 as well as several regional challenges conducted by Extension personnel who are beta testing the Challenge Web site. Follow-up research using an online survey was conducted for each pilot. Survey findings indicated that the online SSHW challenge fostered several positive behavior changes with the following results reported by participants in the two challenges: Eat healthier foods (77%, 64%), Increased daily physical activity (63%, 60%), Improved spending habits (48%, 48%), Lost weight (35%, 32%), and Saved money (58%, 56%). Data about changed health and financial behaviors also continues to be collected semi-annually from persons who register their goals on the SSHW Web site. Research about the impact of teacher training also produced noteworthy findings. Fifty question pre- and post-tests were administered to educators attending Boot Camp II, a 13-hour financial education training program. The content included topics that teachers are expected to teach. In the northern and southern New Jersey training sessions, respectively, average pre-test scores were failing grades of 67.2 and 69.7 and 46% and 62% of teachers had passing scores of 70 or above. Post-test scores were B-range grades of 80.1 and 84.3, respectively, and 88% and 100% of participants passed the exam. A follow-up evaluation found incremental changes in teachers' self-assessed preparedness to teach personal finance as indicated by responses on a 10-point scale. Qualitative data also demonstrated increases in teachers' knowledge and confidence to teach personal finance. Research about the impact of social media was conducted with a grant to promote America Saves Week (ASW). Several unique social media metrics were used to measure impact (e.g., hash tags and Klout scores). At the conclusion of the project, 1,190 tweets were recorded with the unique hashtag, #eXasw, developed for this project. A link to an evaluation survey was embedded in messages prepared for feedback from the followers/friends of project participants. Almost 9 in 10 of 45 respondents found the messages very helpful (32%) or helpful (57%). Additionally, 48% visited one or more ASW Web links contained in the messages although the number that enrolled in America Saves was low. The number of followers/friends reported by 36 professional collaborators totaled 8,163 for an average of 226 apiece. As a positive sign of their growing "influence" on Twitter, Klout scores of 17 of 22 respondents who reported them increased between before and after ASW and total average Klout scores increased from 11.22 to 19.68.

This study was one of the first conducted to assess the impact of a financial education social media campaign. A major finding was that social media is effective in increasing awareness about financial topics but limited as driver of behavioral change.

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 #9

1. Outcome Measures

Medium Term - Identification and Mechanism of Antioxidative, Anti-Inflammatory and Antidiabetic Phytochemicals in Foods: 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	Actual
2011	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Identification and Mechanism of Antioxidative, Anti-Inflammatory and Antidiabetic Phytochemicals in Foods

Colorectal cancer is a major disease affecting a larger portion of the American population resulting in high mortality rates for both men and women.

What has been done

NJAES researchers performed studies on the antitumorigenic effect of tetrahydrocurcumin (THC), a major metabolite of curcumin (CUR). Previous study showed that THC is more colonic aberrant crypt foci (ACF) development in mouse colon than CUR, however, the molecular mechanisms are unclear. Researchers investigated the chemopreventive effects and underlying molecular mechanisms of dietary administration of CUR and THC in azoxymethane (AOM)-induced colon carcinogenesis in mice. These results have been published in Molecular Nutrition & Food Research.

Results

Colorectal cancer is one of the major cancer-related mortality in both man and woman in most developed countries. NJAES researchers have demonstrated for the first time the in vivo chemopreventive efficacy and molecular mechanisms of dietary tetrahydrocurcumin against carcinogen-induced colonic tumorigenesis. Tetrahydrocurcumin is the major metabolite of curcumin, the most well-known anti-cancer natural product from tumeric plant. However, curcumin is also known to undergo extensive and rapid metabolism after ingestion. Our study shows that the metabolite of curcumin is even more active than the original curcumin.

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 #10

1. Outcome Measures

Medium Term - Postharvest Biology of Fruits: 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	Actual
2011	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Postharvest Biology of Fruits

Alternative strategies for management of human and agricultural crop diseases is a high priority in research because resistance to standard chemical controls (antibiotics for humans and pesticides for crops) is increasing at an alarming rate, and cost of implementing these control procedures (both in terms of human health care and crop management) is skyrocketing.

What has been done
Fruit-rotting fungi can cause significant reductions in both pre and post-harvest fruit quality in cranberries and blueberries. We have isolated levels of anthocyanins, flavonol glycosides and proanthocyanidins over the growing season from each variety of blueberry and cranberry. We are continuing to determine the differences in the levels of these compounds in the specific varieties that we are testing. Previously, each of these flavonoid compounds was screened against different fruit-rotting fungi in the anti-fungal assays on TLC plates impregnated with the isolated compounds. We revised our methods for screening the compounds, as the compounds were not able to separate on the TLC matrix. We adapted the Kirby-Bauer disc diffusion assay to test ability of the compounds to inhibit the fungal growth. We are attempting to target the specific levels of the active compounds that confer anti-fungal activity and relate these levels to those needed for human health promotion.

Results
Plants manufacture their own natural defense compounds to help them ward off diseases and pests, giving researchers the opportunity to screen and select certain plants compounds for their disease-prevention and health-promoting properties. Cranberries and blueberries are known to contain certain compounds with antifungal and antibacterial activities (i.e. prevention of urinary tract infections). The goals of this project at Rutgers are to determine which cranberry and blueberry cultivars contain the highest levels of these compounds at various time-points in the growing season. These levels are being correlated, not only with resistance to costly damage from both pre- and post-harvest fruit-rotting fungi, but also to those levels needed for natural human health promotion. These could serve as targets levels and markers for breeding blueberries and cranberries for enhanced fungal resistance and ultimately improved health benefits and fruit quality. This could result in improved human health as a result of increased consumption of phytochemical-rich fruit. Another potential outcome is an increase in fruit quality with reduced post-harvest decay in retail store packages if cultivars with higher levels of these

phytochemicals are targeted. And it will provide updated information to growers on the most suitable fruit cultivars for postharvest quality, in combination with sensory and health benefit information. Overall results have the potential to be used for reducing pesticide applications on these crops, lowering resistance rates, and providing rich sources of fruit with high levels of active compounds for safer alternatives to health promotion in humans.

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 #11

1. Outcome Measures

Medium Term - Life in Extreme Environments: Research, Commercial Product Development and Innovative Education Initiatives: 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	Actual
2011	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Life in Extreme Environments: Research, Commercial Product Development and Innovative Education Initiatives

Initiatives are featured on Rutgers/NJAES website (http://deepseacenter.rutgers.edu/). Ongoing marine natural product discovery efforts have profound implications for the potential development of commercial pharmaceuticals for the treatment of a wide variety of cancers (our recent results on breast and cervical cell lines suggest that compounds we have recently isolated and identified may prove promising in the ongoing battle against breast cancer and cervical cancer). The continuing distribution of DVD copies of our Rutgers-produced IMAX film "Volcanoes of the Deep Sea" and viewings on a wide variety of television broadcasts worldwide should expose additional millions of individuals to our ongoing initiatives under this NJAES Project.

What has been done

Research conducted by scientists at the auspices of the Center for Deep-Sea Ecology and Biotechnology of the New Jersey Agricultural Experiment Station and the School of Environmental and Biological Sciences. Efforts over the past year focused on: (1) screening extracts of organisms from deep-sea hydrothermal vents within our extensive ultra-low frozen collections; (2) subjection of various cancer cell lines to extracts from various organisms collected at deep sea hydrothermal vents as part of our apoptosis protocol in conjunction with collaborators at the University of Medicine and Dentistry of NJ; (3) isolation and culturing a myriad of micro-organisms from a variety of extreme deep-sea habitats and screening extracts of these for bioactive compounds; (4) further fractionating and identifying the structure of bioactive compounds; and (5) synthesizing compounds for potential commercial development of pharmaceuticals, particularly those with anti-cancer activity, in conjunction with colleagues within the Department of Chemistry at Rutgers University. Our ongoing natural product development initiatives continue to focus on discovering new anti-bacterial and anti-cancer leads.

Results

During 2011, a review chapter entitled "Deep-Sea Hydrothermal Vents as a New Source of Drug Discovery" has been accepted for publication in the eBook "Studies in Natural Products Chemistry". Educational outreach efforts were focused on distribution of Blu-ray, NTSC and 8/70 formatted versions of the IMAX film "Volcanoes of the Deep Sea" to museums, science centers and zoos that have not yet featured the film at their institutions. Special showings of the film were held at the World's Fair of Clubs in Chicago Illinois and as part of the film festival during the National Science Popularization Day in Beijing, China. The film has now been shown on a wide variety of PBS and other channels, including Discovery Canada, Discovery USA, Direct TV, Comcast, Echo Star and 19 CBS affiliate stations in the US and it is estimated that the film has been viewed to date by in excess of 165 million individuals.

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)

Evaluation Results

See Qualitative Outcomes

Key Items of Evaluation

See Qualitative Outcomes

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

V(C). Planned Program (Inputs)

1. Actual amount of FTE/SYs expended this Program

Year: 2011	Extension		Research	
	1862	1890	1862	1890
Plan	0.0	0.0	3.0	0.0
Actual Paid Professional	{NO DATA ENTERED}	{NO DATA ENTERED}	{NO DATA ENTERED}	{NO DATA ENTERED}
Actual Volunteer	{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

- Conduct quality & quantity of data on statewide asthma prevalence
- Organize network for developing and assessing asthma prevention and intervention efforts
- Provide in service training on air pollutants
- Provide educational programs for consumers
- Train public health workforce and healthcare providers on the dangers of environmental hazards of the home environment
- Promote and partner to improve number of children screened for elevated blood lead
- Conduct comprehensive research studies on the composition of indoor particulate matter

2. Brief description of the target audience

- Residents/Families
- Healthcare and Child Care Providers
- Healthcare professionals
- Policymakers
- Profit/Non-Profit organizations
- Businesses
- Schools
- Faith Communities
- Home Owners
- Landlords/Tenants
- Housing Authority
- Health Agencies
- State/Local Government
- Building/Housing Inspectors
- Local Health Departments
- Resident's homes "identified as at risk"
- Environmental Association
- Media
- Agencies that collect data

3. How was eXtension used?

{No Data Entered}

V(E). Planned Program (Outputs)

1. Standard output measures

2011	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Actual	0	0	0	0

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

Patent Applications Submitted

Year: 2011

Actual: {No Data

Patents listed

{No Data Entered}

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

2011	Extension	Research	Total
Actual	0	10	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.
  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 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)

Evaluation Results

See Qualitative Outcome and Income Statements

Key Items of Evaluation

See Qualitative Outcome and Income Statements

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%		0%	
	Total	100%		0%	

V(C). Planned Program (Inputs)

1. Actual amount of FTE/SYs expended this Program

Year: 2011	Extension		Research	
	1862	1890	1862	1890
Plan	30.0	0.0	1.0	0.0
Actual Paid Professional	27.0	0.0	0.0	0.0
Actual Volunteer	2678.0	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
447797	0	0	0
1862 Matching	**1890 Matching**	**1862 Matching**	**1890 Matching**
1216263	0	0	0
1862 All Other	**1890 All Other**	**1862 All Other**	**1890 All Other**
522884	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/NIFA 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

3. How was eXtension used?

Faculty used Creating Healthy Communities CoP.

V(E). Planned Program (Outputs)

1. Standard output measures

2011	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Actual	4723	37000	48526	62900

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

Patent Applications Submitted

Year: 2011

Actual: 0

Patents listed

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

2011	Extension	Research	Total
Actual	4	0	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,and publications.In addition a trained volunteer teaching base will be developed. Quantitative reports of participation will be collected.

Year	Actual
2011	84826

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 - 4-H Mentoring 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 - 4-H Summer Science Program for Urban Underserved/Underrepresented Teens: 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 Programming (SET): 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 - 4-H Robotics: 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 - New Jersey Operation: Military Kids: 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	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.
10	Medium Term - Youth Financial Education: 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.
11	Medium Term - New Jersey 4-H Goat Project: 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.
12	Medium Term - Engaging Urban Youth in Positive Youth Development: 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.

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.

2. **Associated Institution Types**

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2011	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
New Jersey 4-H Shooting Sports

In the wake of the terrible incidents of youth perpetrated violence in the schools (and in particular students shooting students) people may question the appropriateness of the 4-H Shooting Sports Program. What 4-H does is help youth who have an interest in shooting sports and firearms (who without appropriate intervention may be at risk for inappropriate use of firearms), removes them from a high risk profile by taking their interest and turns it into an opportunity to help them develop as competent, caring and concerned citizens. 4-H provides a venue for trained adult volunteer leaders to teach the children the proper use of and respect for firearms and more importantly, respect for other people. The primary focus of 4-H Shooting Sports is youth development.

What has been done
The 4 H Shooting Sports Program is a youth development education program which uses a prevention education model that strongly emphasizes positive youth adult interaction and peer leadership. It uses skills and disciplines of safe shooting and wildlife management to assist young people and their leaders in attaining knowledge and developing essential life skills. The program can enhance family communication and quality time together. It creates an environment for a caring relationship between a young person and a positive role model, whether this is a parent, other adult, or teen volunteer. These activities provide the opportunity for immediate gratification to the youth and satisfaction and self worth to the adult/teen volunteer who acts as teacher and role model for younger 4 H youth members.
Sixteen (16) clubs were providing training and programs to youth by the end of 2011. Seven Hundred Sixty-Six (766) youth and adult were involved in shooting programs offered at day camp and weekend camp programs throughout the state, including the Becoming an Outdoor Family weekend offered at Lindley G. Cook 4-H Camp.

Results
Club members conducted 165 club level, 55 county level and 8 state level presentations. New Jersey has 65 active state certified club instructors who have volunteered over 1,579 hours to train youth in clubs, and 555 hours in other training opportunities. On average, each state certified instructor provides 26 hours of teaching to each club member. This does not include the time instructors spend in regular club meetings, prepping/working on projects and presentations,

state events or free recreational events. This year New Jersey sent two teams to the National Competition held in Kerrville, Texas. The Smallbore Rifle Team (placed 9th overall).

4. Associated Knowledge Areas

KA Code	Knowledge Area
806	Youth Development

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	Actual
2011	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
4-H Public Presentation

Public speaking is an invaluable skill that will benefit youth at school, in their careers and in personal relationships throughout their lives. The public speaking program supports positive youth development, it builds self-confidence, develops research skills while at the same time bridges the gap between formal and informal learning.

What has been done
4-H youth throughout the state have participated in county based public presentation programs. Many of which have utilized innovative techniques and workshops to engage youth and help them to develop the tools needed to create successful public presentations. Adult/youth partnerships are developed and strengthened as adult mentors work closely with youth as their

presentations are developed and delivered in a variety of venues. Youth compete at the county level for an opportunity to participate in the State 4-H Public Speaking Program held on the Rutgers University campus.

Results

A sampling of results of surveys conducted at the county and state level revealed that:
In Gloucester County:

93% are encouraged to continue giving presentations
88% learned how to research a topic
84% answered "helped me gain confidence"
84% said the experience "improved my communications skills"
84% improved their "organizational skills"
82% improved their "goal-setting skills"
75% made them "more responsible & disciplined"

The survey also asked the presenters to list the most important things they learned. The top three answers were:
How to be confident
How to be organized
To speak slowly

Response from participants in the State Public Participation Program when asked if they agreed or strongly agreed, results revealed the following:

91% gained more confidence in speaking
84% can research information on a topic
72% are better able to receive constructive feedback
69% increased their goal setting skills
84% speak clearly so others can hear
87% keep eye contact with their audience
79% listen better
91% plan to continue giving presentations

Responses from participants when asked "The most important things I learned or improved from the 4-H Public Presentations were:
Confidence in front of audience
Speaking slowly and clearly
Eye contact
Improving organization skills
Be prepared
Use of visual aids/PowerPoint
Time management
Trying is everything
My love for public speaking
It takes hard work and motivation

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	Actual
2011	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
NJ 4-H Youth Development

Youth are at risk for negative outcomes: poor health, substance abuse, school failures, crime and violence. Youth need experiences which allow them to acquire knowledge, skills and behaviors to lead to a fulfilling life.

What has been done
The Rutgers Cooperative Extension, 4-H Youth Development Program uses a learn-by-doing approach to enable youth to develop the knowledge, attitudes and skills they need to become competent, caring and contributing citizens of the world. Youth in grades k-13 use an experimental learning model where they experience, share, process, generalize and apply knowledge gained through projects, attitudes and life skills developed.

4-H citizenship programs empower young people to be well informed citizens who are actively engaged in their communities and the world. By providing them with opportunities to connect to their communities and adult leaders, youth gain a clear understanding of their role in civic affairs and are able to build their decision-making ability.

4-H promotes healthy living among youth and their families. 4-H helps youth to lead healthy and productive lives into adulthood by supporting their physical, mental and emotional health.

4-H science, engineering and technology (SET) and applied math, reach youth with hands-on

learning experiences to encourage young minds and help fill our nation?s shortage of youth leaders proficient in science, engineering and technology. Our approach is comprehensive and holistic, from agriculture to climate change to alternative energy. Youth are learning about highly relevant complex systems and issues that will ensure their contributions to their communities today and their success as global leaders tomorrow.

This mission is accomplished by using the knowledge and resources of the land grant university system, along with the involvement of caring adults.

Results

In 2011, 48,526 youth (duplicates eliminated) participated in the following ways:
9,751 youth were members of organized 4-H clubs
10,932 youth were members of 4-H special interest/short-term programs
2,887 youth participated in camping programs
25,911 youth were involved in 4-H school enrichment programs
103 youth participated in 4-H individual study programs
2,495 youth participated in School Age Child Care education programs

Volunteers are essential to the successful delivery of 4-H programs to youth. This year 2,387 adult volunteers donated, on average, 220 hours per year preparing for club meetings and teaching youth. According to the Independent Sector, the value of volunteer time in New Jersey in 2009 was $25.20/hour. This equates to more than $13.2 million in time being donated to New Jersey 4-H. There were also 291 4-H youth volunteers, teens who shared their skills with younger 4-H members and with other youth in their communities.

4-H Public Presentation programs provide youth with a skill that lasts a lifetime. Counties throughout the state have club based as well as School Enrichment Programs. Evaluation results of one program revealed the following:
Program evaluation results (% agreeing with statement):
I gained confidence - 89%
I improved my communication skills - 90%
I learned research skills - 95%
Participants' comments:
Now I know what it takes to give a presentation.
Public speaking is important.
(I learned) to be better prepared for my presentation.
Teachers' comments:
After this program I can see a difference in my student?s presentation skills.
My students looked more confident when they stood in front of the class.
What a great life skills program!

Evaluation results of the 2011 North Jersey Teen Conference (NJTC) a 3-day conference focused on leadership development, team building, service learning and building youth-adult partnerships for 4-H members, grades 8-13 from 10 counties revealed that youth:
Improved ability to work in a team - 58%
Increased leadership skills - 51%
Greater confidence - 59%
Enhanced self-esteem - 59%

Results also revealed that their plan of actions for the future:
Will do something new or different98%
Will change the way I think, act or behave81%
Plan to use or share what I learned96%

4. Associated Knowledge Areas

KA Code	Knowledge Area
806	Youth Development

Outcome #4

1. Outcome Measures

Medium Term - 4-H Mentoring 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	Actual
2011	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
4-H Mentoring Program

The NJ 4-H Mentoring Program was modified from the 'Youth and Families with Promise' Mentoring Program of Distinction out of Utah State. The 4-H Mentoring Program aimed to reach at-risk youth in the urban areas of Keansburg, Atlantic City, and Plainfield, New Jersey.

At-risk youth often have a broad range of educational, medical, emotional, substance abuse, and social needs which are not as easily met once they are involved in the court system. In addition, they lack engagement at the social and school levels, essential to establishing an independent identity, developing a positive self-concept, and meeting acceptance, approval, and competency needs (Smith and Gambone, 1992).

Preventative and rehabilitative measures, including the mentoring of at-risk youth, have been proven to significantly lower the likelihood of a youth offending. The capacity of youth to engage in high quality social relationships, to have greater academic achievement and school engagement, and have a positive view of their future is associated with effective, high quality mentoring (Rhodes, Spencer, Keller, Liang, & Noam, 2006).

What has been done

The 4-H Mentoring Program is a progressive, three-tiered approach to positive youth development, involving a traditional 4-H club environment, positive peer and adult mentors, and family bonding events. Youth are engaged in experimental learning, character development, and positive youth/adult partnerships. Mentoring clubs met, at minimum, 6 hours a month with additional club trips and Family Night Events on nights and weekends.

The 4-H Mentoring Program included the following activities in 2011:
12+ Mentor Trainings, with a focus on Leadership Development
12+ 4-H Club Meetings with One-on-One and Small Group Mentor Activities
Career Exploration Events and College Tours
Arts and Culture Exploration Events
Character Education and Adventure Activities
Climate Change Education and Experiments
Rutgers Science Saturday Programs
Service Learning Opportunities
Family Nights - Healthy Living, Game Night, Holiday Party, Multicultural Celebration

The objectives of the 4-H Mentoring Program are:
(1) to provide opportunities for social competency development for at-risk Middle School youth.
(2) to provide a positive environment enabling youth to make connections to each other, their families, positive role models, school administration, and their communities.
(3) to encourage youth to explore their future potential through college, technical, and career exploration.

The target audience for the 4-H Mentoring Program was youth in grades 4 through 8 who are considered at-risk due to a number of community disadvantage indicators. Sites varied in their methods of youth recruitment. Youth involved in the 4-H Mentoring Program at the Atlantic City and Plainfield sites were recruited through Youth Exposure (a non-profit youth development organization and major project partner) through distribution of flyers at community centers, press releases, word of mouth, and information posted on websites. Recruitment at the Keansburg site was through the afterschool program. Promotion is directed primarily toward non-4-H members.

Results

Over 120 youth and 40 High School teen and adult mentors participated in the year-long program, meeting for a minimum of 6 hours a month. Mentoring Program sites were located in the at-risk communities of Keansburg, Atlantic City and Plainfield, NJ.

An evaluation completed by parents/guardians demonstrated:

	BEFORE	AFTER	%CHANGE
My child plans ahead to get things done.	2.55	3.09	17.65%
My child is good at making and keeping friends.	3	3.45	13.16%
My child tries problem solving without fighting.	2.78	3.44	19.35%
My child does not participate in risky behavior.	3	3.45	13.16%

My child reaches goals s/he sets for her/himself.	2.82	3.45	*18.42%
My child keeps trying even if things are hard to do	2.8	3.4	17.95%
My child is a leader in a group, like a team or club	2.91	3.55	*17.95%
My child feels confident about her/himself	2.91	3.55	17.95%
My child is positive about her/his future	3	3.7	*18.92%
My child is more interested in doing well in school	3.36	3.91	13.95%
My child is more aware of opportunities outside of her/his community	3.18	3.91	*18.6%

*My child reaches goals set for her/himself (p<0.0452)
My child is a leader (p<0.04884)
My child is positive about her/his future (p<0.0494)
My child is more aware of opportunities outside her/his community (p<0.0278)

As far as qualitative remarks, High School mentors have said: 'I look forward to every Tuesday. This program is the highlight of my week,'and 'I like our club name 'High School Heroes', because I feel like, for once, I'm really making a difference in our community.' In addition, a sixth grade mentee won an essay contest and was recognized as a youth 'Mayor for a Day' of Atlantic City. A Press Release written on the event sights his involvement in the Youth Exposure/4-H Mentoring Program, and his mother credits his participation in the program for his increased leadership skills and enthusiasm for civic engagement (Press of Atlantic City, 12/14/11)

The program benefited from strong community partnerships and will continue and expand at the same sites in 2012.

4. Associated Knowledge Areas

KA Code	Knowledge Area
806	Youth Development

Outcome #5

1. Outcome Measures

Medium Term - 4-H Summer Science Program for Urban Underserved/Underrepresented Teens: 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	Actual
2011	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
4-H Summer Science Program for Urban Underserved/Underrepresented Teens

America faces a future of intense global competition with a startling shortage of scientists. To address increased demand for science and technology professionals, 4-H is working to reach young people in science programs. 4-H SET programs strive to improve work force abilities and human capacity of urban underserved/underrepresented youth.

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

In its third year, fifty-four (54) high school youth from six urban communities throughout New Jersey participated in the campus-based portion of the program, July 11-15, at the Rutgers School of Environmental and Biological Sciences. During their weeklong residential experience,

they explored science through hands-on activities in anthropology, biochemistry, biotechnology, environmental sciences, food science, GPS/GIS, green engineering, marine science, nutritional sciences, solar energy, and toxicology. Youth spent 3 hours in each of these areas participating in workshops and lab tours by faculty, staff, and graduate students.
The experience also helped prepared them to become 4-H Science Ambassadors. They also prepared and presented posters of their experience to partners, administrators, parents, and other guests. As 4-H Science Ambassadors, they returned home and worked with their local 4-H program to promote 4-H and science to other youth.

Results

The 4-H Summer Science program is designed to increase knowledge and skills while stimulating interest in STEM career paths among participants. In 2011, 54 urban underserved/underrepresented teens from Camden, Passaic, Paterson, Plainfield, Newark, New Brunswick and Trenton participated in the third annual Rutgers Summer Sciences Program. The program has enjoyed steady growth with a 23% increase in enrollment since the program?s inaugural year in 2009. Rutgers University scientists are participating in teaching youth about their science and encouraging pursuit of careers in science. A record number of 36 professors, post docs, graduate students and undergraduate science majors volunteered their time and expertise to the program. Scientists invited the participants into their labs and classrooms for 3-hour teaching sessions.

In the 2011 cohort, we asked the young people what they think about science through a series of item statements about the characteristics of science. Table 1 (n=47) shows positive shifts in young peoples 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.
Scientists are creative people

4. Associated Knowledge Areas

KA Code	Knowledge Area
806	Youth Development

Outcome #6

1. Outcome Measures

Medium Term - 4-H Science, Engineering and Technology Programming (SET): 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	Actual
2011	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
4-H Science, Engineering and Technology Programming (SET)

America faces a future of intense global competition with a startling shortage of scientists. To address increased demand for science and technology professionals, 4-H is working to reach young people in science programs. 4-H?s approach is comprehensive and holistic youth are learning about highly relevant complex systems and issues that will ensure their contributions to their communities today and their success as global leaders tomorrow.

What has been done
Lindley G. Cook 4-H Camp was home to a Science, Engineering and Technology (S.E.T.) camp engaging youth in five exciting subject areas. Campers explored the math and physics of catapults, air cannons and water-powered rockets in the Chuck-It class. The class foundation was based off the "Trebuchets" Design It! Engineering Afterschool program curriculum,explore the world of roller-coasters. Teams of campers experimented with foam tubes, marbles and other found items to create coasters using the "Balls and Tracks" Design It! Engineering Afterschool program curriculum. Some students made their coasters with electric circuits which turned lights on and off as marbles rolled down the tubes.
Explored the pond ecology of Lake Shawanni and investigated reef ecosystems with materials brought from Rutgers. Campers learned to find answers with clues the way crime scene investigators do; using the tried and true scientific approach in the CSI class. The CSI campers solved a mystery by dissecting a crime scene at camp. Highlights of this new program included fingerprinting with an Officer from the Sussex County Sheriff's office.
Explored aerodynamics, weight distribution and the physics of flight while building Estes rockets. Campers used spotting scopes, elevation charts and protractors to track the trajectories of their rockets and measure the elevation their rockets reached.

Results
Campers were surveyed online after their experience at SET camp.
The three things that they liked best about coming to 4-H SET Camp were:
I meet other kids interested in science like me 62.5%
The evening programs (Birds of Prey and Mad Scientist) 56%
I get to do hands on activities and projects 50.0%
The top four things children said they learned at camp were:

To try new things 87.5%
To work as part of a team 81.3%
That learning can be fun 81.3%
To respect and get along with all different kinds of people 75.0%

All of the campers except one indicated that they would return to SET camp next year, and all but one camper indicated they would be interested in attending the summer camp program.

According to the end of camp adult surveys, parents reported the following:
99% felt camp was valuable to very valuable for their child.
99% described their reaction to camp as loved to liked camp
99% would send their children back to camp.

4. Associated Knowledge Areas

KA Code	Knowledge Area
806	Youth Development

Outcome #7

1. Outcome Measures

Medium Term - 4-H Robotics: 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	Actual
2011	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

4-H Robotics

School test results show that a large number of youth in New Jersey are not proficient in the areas of math, science and technology. In addition, many boys and girls are afraid or apprehensive about doing science-related activities. Given these facts it is important to focus on the National 4-H Initiative of Science, Technology and Engineering by providing educational programs that provide an opportunity for youth to explore and learn about science and technology in a positive, non-threatening, hands-on and fun environment.

What has been done

The New Jersey 4-H Robotics program encourages young people to develop an early interest in science, engineering and technology. 4-H Robotics is delivered through 4-H clubs, camps, school enrichment, and after-school programs throughout the state. This project is one way that 4-H program's contribute to improving science, technology, engineering and applied math (STEM) education in New Jersey and combines non-formal education with hands-on inquiry-based learning in a youth development context.

4-H Robotics is a unique opportunity to engage volunteers and corporate employees who can offer science expertise, workforce application, and mentoring to 4-H'ers in local communities. Adult and teen volunteers advise youth members as they learn to build and program robots using LEGO NXT Mindstorms kits. In Burlington County, robotics was used to help establish clubs at the two military bases, Ft. Dix and McGuire, reaching 43 youth members. Partnering with Lockheed Martin, a LM employee delivered two presentations at Dix and two at McGuire. The interactive sessions included "What is a Robot?" and "Robotics at Work and Play".

In Cape May County, The CyberExplorers 4-H Science Club mounted an exhibit of their robotics projects in the lobby of the Cape May County Government Building in honor of National 4-H Week, October 2-8.

Cape May County's CyberExplorers are currently exploring the intersections between marine science and technology. Through blogs, videos and the Adopt A Microbe project, club members can follow online the current expedition of the JOIDES Resolution, a scientific research ship. The scientists on the JOIDES recently suffered a set-back with the unexpected loss of scientific instrumentation, called a CORK. The 4-H club leader has challenged her 4-H club members to use this real-life scenario to consider what kind of robot could be designed and deployed to retrieve the equipment lost some 5000 meters beneath the sea.

In Cumberland County the week-long (35 hours) ?Advanced Robotics? 4-H Summer Enrichment Program focused on various aspects of science, engineering & technology as it relates to robotics provided an opportunity for youth to learn about RCX and NXT programming; different types of robots; touch, light, color and rotational sensors; how robots are used; and careers in robotics, engineering and technology as well as how to design, construct, operate and/or program various types of robots.

Results

The evaluation results for the Advanced Robotics 4-H Summer Enrichment Program in Cumberland County were an end-of-program, were as follows:

100% of the participants increased their score from the pre-test to the post-test by an average of 46%.

88% of the participants rated the overall program as Excellent or Very Good

100% of the participants indicated that they plan to use or share what they learned.

100% of participants indicated on the end-of-program evaluation that they learned A Lot about robotics.

55% of participants indicated that they learned a lot about the elements and functions of NXT and 88% indicated that they have the ability to program a robot to using a rotational sensor.

77% of the participants indicated that they learned a lot with regard to how to work together, analyze and to solve problems.

66% of the program participants indicated that as a result of the program they have the ability to program a robot using a rotational sensor and a touch sensor at the same time.

100% of the participants indicated that as a result of the program they have the ability to program a robot to make forward and backward movements.

One child indicated on the end-of-program evaluation that he learned that programming has to be precise and building a robot has to be done right.

Another participant indicated that I learned many things about robotics including how to build and program robots using the NXT platform, infrared sensors and sound sensors.

4. Associated Knowledge Areas

KA Code	Knowledge Area
806	Youth Development

Outcome #8

1. Outcome Measures

Medium Term - New Jersey Operation: Military Kids: 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	Actual
2011	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
New Jersey Operation: Military Kids

Thousands of New Jersey service members have been deployed to serve in the wars in Iraq and Afghanistan. Over 18,000 New Jersey youth have a parent serving in the military. Most of

these youth have experienced a loved one?s deployment during this conflict and many have experienced multiple deployments.

Operation: Military Kids (OMK) provides support to military kids before, during, and after the deployment of a loved one. It recognizes that National Guard and Reserve youth have significantly different needs than those of active duty military families residing on or near an installation, as they are members of civilian communities.

What has been done

County 4-H agents work with youth and adults to implement the OMK program and achieve the following objectives:

Create community support networks for military youth in our own backyard when a loved one is deployed

Deliver recreational, social, and educational programs for military youth living in civilian communities

Support military kids coping with the stress of knowing their deployed loved one may be in harm's way

The OMK program offers education, social and recreational programs and camps for military children. The State OMK Team, made up of military and non-military community members and organization representatives, works to build local community support networks.

Results

As a result of this program, 5,867 youth, military servicemen and woman, members of support organizations and community leaders were reached by NJ OMK programs. Evaluations for each kind of program implemented have been gathered. Participants had the following comments regarding their experiences with NJ OMK:

"I will definitely use these activities to help my son communicate his feelings and worries with more freedom to me." - OMK Family Camp parent

"Hearing my son share his experience of his father's deployment was amazing. I never knew how he felt because he always handled it so well. I didn't know he had felt so alone." - Parent of OMK teen speaker

4. Associated Knowledge Areas

KA Code	Knowledge Area
806	Youth Development

Outcome #9

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	Actual
2011	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
Since 1951 Lindley G. cook 4-H Camp?s main goals are to provide a weeklong experiential program to all youth of New Jersey, which promotes 4-H and its curriculum. The camp has provided outdoor opportunities to 4-H and non- 4-H audiences since its? inception. In addition, the summer camp is to be used a marketing tool to promote 4-H throughout NJ and year round programming at the L.G. Cook Outdoor Education Center.

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.

Results
Camper evaluations were conducted online after the campers participated in a week of camp. Campers ranked the three following responses as what they liked best about camp:
I make new friends 71.1%
The Counselors are interesting 49.6%
The Classes at camp 43.0%
The top four things listed as to what campers learned at camp were:
To try new things 86.6%
To respect and get along with all different kinds of people 83.2%
To work as part of a team 74.8%
To feel good about myself 72.3%
Campers were also asked about their experience at camp. Results revealed they felt the

following:
98.3% safe at camp
94.0% they were treated fairly
82.1% their opinion mattered
92.3% people cared about you
92.3% they were treated with respect
82.1% they were made to feel important
All but one child responded that they would return to camp in the summer of 2012. 48.7% of the campers said they would like more information about 4-H programs in their county.

According to the end of camp adult surveys, parents were asked how valuable the experience was for their child. They rated the experience as follows:
Very Valuable 88.1%
Valuable 10.9%
Somewhat Valuable 1.0%
Not Valuable 0.0% 0
95% of the parents felt their children loved camp
4% liked camp and only one parent did not like the camp experience
99% of the parents surveyed would have their children come back to camp next year.

Parents were asked to rate the summer camp in the following areas as excellent, good, fair, poor:
Increased social development potential for your child - 72.3%, 25.7%, 1%, 1%.
Organization of Camp - 75.2%, 23.8%, 1%, 0%.
Value for Money - 75.2%, 23.8%, 1%, 0%.
Ability to offer programs children could not get elsewhere - 57.4%, 30.7%, 10.9%, 0%.
The Counselors - 85.1%, 13.9%, 1%, 0%.
The Camp Facility - 50.5%, 42.6%, 6.9%, 0%.
Online Enrollment process - 71.3%, 22.8%, 3%, 0%.
Office Staff - 74.3%, 21.8%, 2%, 0%.
Senior Staff - 79.2%, 17.8%, 0%, 0%.

The camp also serves as a recruiting tool for the 4-H program.
25% of the parents surveyed wanted to learn more about 4-H clubs in their area.
Several parents wrote notes of appreciation and positive comments on their evaluations.
This camp program is a wonderful continuation of his yearlong participation in 4H with all the right components to help him continue to develop into a well rounded young man. I so appreciate the value of all he learns and experiences while at camp. My son can be a tough customer and I feel so relieved that we found a program so incredibly well suited to him and his needs. Thank you all so much!

4. Associated Knowledge Areas

KA Code	Knowledge Area
806	Youth Development

Outcome #10

1. Outcome Measures

Medium Term - Youth Financial Education: 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	Actual
2011	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Youth Financial Education

Financial education for youth took on an increased sense of urgency and importance in New Jersey in 2010 with the requirement for personal finance instruction prior to high school graduation (effective in Fall 2010), revised curriculum standards with a greater focus on financial education, and a law mandating the pilot testing of financial education programs in eight NJ school districts. All three of these events occurred in the wake of the 2007-2009 Great Recession and financial crisis when there was strong public support to teach students skills to manage their finances in an effort to avoid future debt overextension, fear-induced investment panics, and mortgage defaults. As a result of these recent events, there has been a great demand from teachers and school administrators statewide for training (both in financial subject matter topics and creative/interactive teaching methods) to build capacity for delivering financial education. A national study released in 2009 found that many teachers lack subject matter content knowledge and confidence to teach personal finance and needed training to become successful.

What has been done
Rutgers Cooperative Extension, Extension Specialist has been instrumental in state capacity-building efforts. She has worked very closely with the NJ Coalition for Financial Education in 2011 on various financial education teacher training events (e.g., professional conference workshops, two 2-day Financial Education Boot Camp II (advanced topics) class series, and

teacher trainings). Boot Camps provided 13 hours of continuing education and included instruction on both subject matter content and interactive learning activities.

Results

Participants reported that they were better prepared to teach personal finance to New Jersey youth. On follow-up evaluations, program participants reported that they were using the information and materials that were provided at various training sessions. They also appreciated being able to network with others who taught the same topic that they did. A particularly noteworthy indication of behavior change was the difference between the pre-and post-test scores of Boot Camp participants on a 50-question personal finance exam. Increases in knowledge gained by participating teachers were substantial. In both the North and South Jersey locations, the average score on the 50-question pre-test was a failing grade and the average score on the post-test was a B. There were also increases in the number of teachers scoring 90 or above.

Northern NJ: (Basking Ridge, NJ)n=35 Pre-test n=33 Post-Test
PRE- Raw Score range: 32 to 86
Average Raw Score: 67.20
Number of teachers with grade of 70+: 16/35 (46%)
Number of teachers with grade of 90+: 0/35 (0%)
POST- Raw Score range: 40 to 98
Average Raw Score: 80.06
Number of teachers with grade of 70+: 29/33 (88%)
Number of teachers with grade of 90+: 9/33 (27%)

Southern NJ: Mays Landing, NJ) n=13 Pre-Test n=16 Post-Test
PRE- Raw Score range: 52 to 96
Average Raw Score: 69.69
Number of teachers with grade of 70+: 8/13 (62%)
Number of teachers with grade of 90+: 1/13 (7%)
POST-Raw Score range: 70 to 100
Average Raw Score: 84.25
Number of teachers with grade of 70+: 16/16 (100%)
Number of teachers with grade of 90+: 3/16 (19%)

4. Associated Knowledge Areas

KA Code	Knowledge Area
806	Youth Development

Outcome #11

1. Outcome Measures

Medium Term - New Jersey 4-H Goat Project: 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	Actual
2011	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
New Jersey 4-H Goat Project

Youth need to have opportunities to develop subject matter, life and workforce skills as well as a sense of caring and responsibility that can be acquired by participating in 4-H Animal Science Projects.

What has been done
In 2011, a County 4-H Agent served as the 4-H Department Liaison to the New Jersey 4-H Goat Project, worked with volunteers from the NJ 4-H Goat Advisory Council to plan and coordinate the NJ 4-H Goat Extravaganza (presentation contest, skill-a-thon, art show, and workshop for parents/volunteers), NJ State 4-H Goat Show, and other educational efforts including participation in the New Jersey Junior Breeder Symposium.

Results
In a statewide survey of 4-H goat project members, 38 members from eight clubs (five counties) completed a survey containing 11 items with a 1-5 Likert-type scale (1-Strongly Disagree to 5-Strongly Agree). As a result of their participation during the 2010-2011 project year, members agreed or strongly agreed that they:
95% improved teamwork skills.
92% gained knowledge of goat care and management practices.
87% gained the skills necessary to safely care for their goat(s).
84% became more responsible and disciplined.
79% have more empathy and concern for others.
76% improved communication skills.
76% improved leadership skills.
72% improved record keeping skills.
66% improved goal-setting skills.
63% increased understanding of current issues in the animal industry.
55% became more aware of career opportunities available in the animal industry.

Youth reported (in an open-ended response) the most important things they learned or gained as a result of their involvement in the 4-H goat project:
100% indicated the proper care and management of their goat(s).
16% indicated teamwork skills.
13% indicated showmanship skills.
13% indicated leadership skills.
8% indicated public speaking skills.
5% indicated friendships.

4. Associated Knowledge Areas

KA Code	Knowledge Area
806	Youth Development

Outcome #12

1. Outcome Measures

Medium Term - Engaging Urban Youth in Positive Youth Development: 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	Actual
2011	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Engaging Urban Youth in Positive Youth Development

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. Research demonstrates that culturally responsive education provides the means and opportunity to develop the basic skills youth need to become responsible family members, participants in the work force, and contributing citizens, (Community Counts, 2000, Belfield and Levin, 2007). Latino youth in New Jersey, and New Brunswick and, are at great risk due to their poverty and challenges with educational achievement. National research indicates that 29% of early adolescents do not have the opportunity to access community youth programs and that 4-H is typically less prevalent in poor neighborhoods (U.S. Department of Education, 1990), which demonstrates that there is a clear need for focused 4-H programming in poor urban neighborhoods.

What has been done

In Mercer County a 10-week Hip Hop Dance and nutrition program was delivered once a week to youth in a Trenton afterschool program. The program teaches youth about healthy living through dance and nutrition. It utilizes curriculum from Get Moving-Get Healthy, to teach youth about nutrition and physical activity.

The Niños Fuertes, Communidades Mas Fuertes (Strong Kids, Stronger Communities) program utilized the experiential learning process in all 4-H club and community based educational experiences. Youth selected from various project areas including science, technology, nutrition and fitness, leadership, citizenship, culture, and the arts. This program delivers high context, club based positive youth development programming to Latino youth in the urban, at risk communities of New Brunswick and the greater Newark area. Mirroring the multigenerational community focused structure of the Latino community, the Niños Fuertes, Communidades Mas Fuertes program develops a multifaceted, community education partnership.

In Camden and Atlantic Counties our work with urban, at-risk youth has focused on the three 4-H mission mandates of SET, citizenship and healthy living. Our Jersey Roots, Global Reach climate science teaches students about the causes, impacts and solutions of climate change through a 12-week enrichment program. The Get Moving, Get Healthy program emphasizes healthy living and healthy eating through weekly afterschool and monthly Saturday programs.

In Union County the Elizabethport 4-H Program located in one of the poorest of the poor urban communities participate fully in 4-H club activities related to science, nutrition and community service.

The Seeds of Success Youth Farmstand Project provides workforce preparation to special needs teens from the urban-aid communities of Woodbury, Paulsboro and Glassboro, Gloucester County. This program creates retail outlets that bring affordable, nutritious foods to consumers, teaches at-risk, special needs teens valuable life skills and offers economic development opportunities to local farmers and urban-aid communities.

Results

An evaluation survey administered to the youth that participated in the Trenton Hip Hop Dance program indicated that there was an increase in knowledge and skills in the following areas (with % increase):

Leadership Skills

- Leading group discussions- 41%
- Sharing new ideas with others- 24%
- Contributing to group effort- 31%
- Teamwork- 22%
- Problem Solving- 25%
- Goal Setting- 29%

Planning/ organizing information- 22%
Keeping records- 27%

In Niños Fuertes, Comunidades Mas Fuertes (Strong Kids, Stronger Communities) a variety of evaluation tools such as retrospective pre-post tests have been used to gather data about new member growth and development. Nine new clubs have been initiated and meeting at new locations around the county. Seventeen new school based clubs have been developed using 4-H club kits. The goal of the program is to assure retention of volunteers and fundraising for sustainable community development.

Elizabethport youth are positive and productive, thanks to 4-H?s nurturing, several have gone on to college, trade schools, and military service and more will follow in the future. 4-H has helped these children resist the overwhelming call of the street (gangs, crime, and the despair of poverty) and walk the narrow pathway to opportunity.

The Seeds of Success Youth Farmstand Project - Food and nutrition 8-week educational component, designed to assess changes in basic nutrition knowledge/behavior and produce identification skills was implemented.

Changes in Action or Behavior: Extensive evaluation was conducted with youth.

Statistical analysis revealed that there were significant improvements ($p<.05$) in youth's ability to apply USDA recommendations to use color as a guide to increase variety in the diet by identifying the types of fruits and vegetables that were better sources of key nutrients.

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, youth responded that, as a result of this program:

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.

Changes in Condition - Seeds to Success yielded a number of conditional changes:

Created one retail outlet and economic development in an urban-aid community (Glassboro)
Created 5.24 FTEs in one urban-aid community, resulting in improved quality of life
Enabled 8 special needs youth to acquire permanent jobs outside of the farmstands

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 which accounts for 11% of summer farmstand sales.

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)

Evaluation Results

See Qualitative Outcomes

Key Items of Evaluation

See Qualitative Outcomes

V(A). Planned Program (Summary)

Program # 5

1. Name of the Planned Program

Global Food Security and Hunger - 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	25%		25%	
211	Insects, Mites, and Other Arthropods Affecting Plants	15%		15%	
215	Biological Control of Pests Affecting Plants	30%		30%	
601	Economics of Agricultural Production and Farm Management	20%		20%	
604	Marketing and Distribution Practices	10%		10%	
	Total	100%		100%	

V(C). Planned Program (Inputs)

1. Actual amount of FTE/SYs expended this Program

Year: 2011	Extension		Research	
	1862	1890	1862	1890
Plan	65.0	0.0	36.0	0.0
Actual Paid Professional	39.0	0.0	19.0	0.0
Actual Volunteer	1872.0	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
1178890	0	1521711	0
1862 Matching	1890 Matching	1862 Matching	1890 Matching
3100584	0	4929222	0
1862 All Other	1890 All Other	1862 All Other	1890 All Other
407993	0	3166815	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.

3. How was eXtension used?

Cover Crops
High Tunnels
Organic Farming
Faculty answered ask an expert questions and developed collaborative educational products.

V(E). Planned Program (Outputs)

1. Standard output measures

2011	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Actual	74250	92120	790	1200

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

Patent Applications Submitted

Year: 2011
Actual: 19

Patents listed
PCT/US11/34966
13/232,162
13/200,085
13/200,086
13/200,081
13/200,068
201100381
201200020
201200052
201100379
201100153
2011100303
201100154
201100365
20110365
201100252
201100367
201100369
201100380

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

2011	Extension	Research	Total
Actual	24	112	136

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.

Year	Actual
2011	0

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 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 - Farm Financial Management: Annie's Project -NJ: Productive agricultural land is stabilized to meet the needs of the agricultural industry and the 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 - Introducing New Crops, Nutraceuticals and Other Value-Added Products: Productive agricultural land is stabilized to meet the needs of the agricultural industry and the 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 - Improving Sustainability, Efficiency, and Efficacy of Peach Disease Management Strategies: Biofungicides, Conventional Fungicides, and Abiotic Environmental Factors: Productive agricultural land is stabilized to meet the needs of the agricultural industry and the 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 - Development of Superior All-male Asparagus Hybrids: Productive agricultural land is stabilized to meet the needs of the agricultural industry and the 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	Long Term - Optimizing Peach Fruit Quality by Improving Harvest and Postharvest Handling: 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.
9	Long Term - Turfgrass Breeding and Evaluation: 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 - Resistance Management for Fresh-market and Processing Vegetable Crops Grown in New Jersey and the Mid-Atlantic Region: 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 - The Annual Tomato Tasting Open House Assessing Public Opinion, Knowledge, and Support of NJAES and NJ Agriculture: 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.
12	Long Term - Milk Quality: 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.
13	Long Term - Contributing to Food Security in Union County: The "Come Grow With Us" Community Gardens and Master Gardener "Sharing Garden": 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.
14	Long Term - Genetic Improvement of Woody Plants (Trees and Shrubs) for Ornamental Uses: 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.
15	Long Term - Value Added Lamb Production Model: 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.
16	Long Term - New Jersey Beef Quality Assurance Training: 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 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	Actual
2011	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Farm Financial Management, Risk Management and Crop Management

The financial management is critical to agricultural business success. Producers make major financial decisions on a regular basis, often without analyzing the full impact to their operation. Until accurate financial records are maintained, decisions regarding the financial health of an operation are uninformed at best.

There are approximately 1,260 equine operations in our target area alone which encompasses Salem, Cumberland, and Gloucester counties. On a day to day basis, equine producers are subjected to many types of risks such as financial, legal, economical, production, and marketing risks.

New Jersey is home to 10,300 farms which produce 32,000 cattle and calves, 8,000 hogs and pigs, and 8,000 cows which produce annually 140,000,000 pounds of milk. Furthermore 80,000 acres are in corn production and 94,000 acres of soybeans are grown annually. Recent changes in climate conditions have lead to some unpredictable weather that has proven quite damaging for some crops, because of the unreliable conditions it is in the farmers? best interests to cover their risks using crop insurance.

What has been done

During 2011 small group workshops and individual one-on-one meetings were conducted with agricultural producers of various commodities throughout New Jersey. Finpack, a comprehensive whole farm financial planning and analysis software program, was utilized to develop custom financial data for each individual. Agricultural producers that participate as a way to manage their finances, as well as those who participate due to a major change in their operation that could affect their bottom line, and those required to participate by their lender.

The Equine Risk Management Workshop Series designed to educate producers through the use of two guest speakers per workshop; these speakers are industry professions whose knowledge spans from subjects such as equine nutrition, farm management, and equine law. Targeted producers are reached through the use of newspapers, internet forums, fliers, farm visits, and phone calls and notified of the upcoming equine workshop series available to them to help them manage their risk.

Over 15,478 producers were educated about crop insurance through a wide variety of educational venues including fifty-two meetings, two hundred forty nine one-on-one sessions, thirteen workshops, and nineteen conferences/sessions. Additionally, four newsletters, eight postcards/flyers, nineteen brochures/instructional guides, nineteen bulletins, nineteen blogs, eight radio public service announcements and four press releases reached 267,896 producers and individuals in a timely manner, educating them about important upcoming crop insurance events and dates. Lastly, 249 individuals were reached via direct contact. Methods for reaching producers included one-on-one visits, workshops, crop insurance meetings, county boards of agriculture presentations, agricultural conventions and trade shows, grain elevator workshops, producer twilight meetings, and trade organization grower meetings.

Results

In 2011, 11 farmers of various commodities participated in Finpack workshops throughout New Jersey. Participants came from the following counties: Salem, Hunterdon, Warren, Sussex, Mercer, Middlesex to attend workshops in Hunterdon and Salem Counties that consisted of 8 full day workshops. Participants developed balance sheets, crop and/or livestock budgets, cash flow plans, long range business plans, enterprise analyses, and year-end financial analyses.

As a direct result of these workshops:
three farmers successfully secured operating loans,
four received financing to alter a segment of their farming operation,
four met requirements of the Farm Service Agency's borrower training program,
two performed enterprise analyses,
three analyzed farm profitability.

one underserved producer developed financial data to secure loans

Farm Service Agency representatives were very pleased with the results from the Finpack programs that were run for four participants who were required to complete the workshops. All four participants had received loans from FSA previously and completed the workshop favorably. The results showed that each participant utilized funds efficiently and were in prime positions to pay their loans back on time. The participants were grateful for the Finpack workshops and one participant's plans to continue participating yearly.
Participants of the workshop gained knowledge of risk management through their attendance and participation in our five risk management workshops on legal, human, financial, production, and marketing risk. Producers gained a greater knowledge of the risk management tools available to them to minimize their amount of risk. Furthermore, participants had the opportunity to improve their farms productivity by writing a business plan and by learning how to better manage their pastures which in turn lowered their feed costs. As a direct result of our workshops, 4 producers completed an animal waste management plan, 4 producers made legal changes on their farms, 3 people modified their farms business plan, 4 farm owners changed their pasture and feed management systems, 4 producers adopted water/manure best management practices, and 5 farm owners modified their farms business marketing plan.
In 2011, almost 172,000 acres of New Jersey?s farmland was insured through crop insurance with 1,633 policies sold in the state. With the recent unpredictable weather, it is imperative to not only maintain but continue to increase the crop insurance policies sold in NJ through the use of crop insurance education and outreach.

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 #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

Year	Actual
2011	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Conservation and Utilization of Plant Genetic Resources

To remain competitive in national and international markets, breeding programs must constantly provide the growers with new and improved cultivars that are adapted to local growing conditions and markets. Weather related factors, such as severe cold outbreaks in the winter and late frosts in the spring, can seriously limit yields for growers. Furthermore, the warm and humid summers in the eastern US are conducive to many fungal and bacterial diseases on peach, apricot and apple. Control of these diseases requires the timely and costly application of pesticides, thereby increasing the environmental impact of the agricultural production system on the surrounding areas.

What has been done
The major objective of the apricot (Prunus armeniaca L.) breeding program is to develop apricots with improved eating quality and broader range of adaption. This spring we made 42 apricot crosses using Central Asian germplasm, yielding 1355 seeds. An additional 49 open-pollinated seeds were stratified from a new elite selection. The focus of our peach and nectarine [Prunus persica (L.) Batsch] crosses was to develop cultivars with large, firm fruit that soften slowly, and are tolerant to bacterial spot (Xanthomonas campestris pv. pruni). Sixty-one controlled peach and nectarine crosses were made, yielding a total of 5,920 seeds. Since the crosses set so heavily that they required thinning, we cultured 2,015 immature ovules from the thinned cross fruit. Five hundred thirteen apricot and 2,633 peach seedlings were transplanted to the field in 2011.

Results
This project continues to develop peach, apricot, and apple cultivars with improved disease resistance and adaptation to their growing environment. Many new cultivars have been released commercially to the public. During this reporting period, patent applications were filed on four new peach and nectarine selections that were propagated for release in 2011. Information about these new varieties is disseminated by presentations at grower meetings, variety showcases, newspaper articles, publications in professional journals, and published patents.

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 - Farm Financial Management: Annie's Project -NJ: Productive agricultural land is stabilized to meet the needs of the agricultural industry and the 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	Actual
2011	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Farm Financial Management: Annie's Project - NJ

According to the 2007 Census of Agriculture, released in 2009, the average age of farmers in both NJ and nationwide is 57.1. Thus, a need exists to prepare farm families for later life transitions. In the next 20 years, ownership of approximately 70% of U.S. farmland is expected to change hands. Farm families differ from wage earners in that they often become emotionally attached to their primary investment: farmland. This love of land sets farm families apart from other investors but also poses unique challenges such as lack of investment diversification and the need for strategies to create a regular income stream in later life. Additionally, unlike other workers, many farmers don?t really expect to retire (i.e., stop farming) as much as to cut back work hours or reduce the scope of their operation. Thus, a need exists for information that addresses the unique financial planning concerns and mindset of farm families (e.g., succession planning). Female farm operators are a unique niche because they have increased in frequency and may not have had as much experience or business management training as male farmers.

What has been done

Annie's Project is an acclaimed national farm management training program for women farmers that began in the Midwest and spread throughout the country to 31 states in the United States. Courses were offered in three locations in New Jersey. Annie's Project New Jersey is tailored to New Jersey farmers and differs from Annie's Project in other states in three key areas: 1) Women farmers in New Jersey complete a business plan as part of the course, 2) The New Jersey program focuses on Social Media as a marketing and communications tool for farm women, and 3) the South Jersey group continued their networking after the formal classes were over. A key component of the program was networking with other women in the workshop and sharing ideas. Because over 40% of farmers in New Jersey are engaged in agritourism, we had a strong focus on marketing, and included topics on Social media as a marketing tool. In addition, we have an Annie's New Jersey Facebook page: http://www.facebook.com/#!/pages/Annies-Project-NJ/147083285347913 where Annie's participants can network with each other as well as a webpage: http://aesop.rutgers.edu/~farmmgmt/anniesproject.html.

Results

All of the participants developed some portion of a business plan, and 40% completed one. They have used these plans to add new enterprises, secure farm loans, and develop websites, Facebook pages, and point-of-purchase materials for their farms. Annie's Project has proven successful as a comprehensive educational program and support network for farm women, in helping them to learn to understand and manage the farm business. When asked to take an online survey about their progress 9 months after participating in Annie's Project 2011, 17 out of 40 women responded (42.5%).

Highlights of the results are as follows:

59% completed their mission statement component of their business plan.

53% completed their goals and objectives and their company descriptions.

47% were in the process of completing their net-worth calculation 9 months after the course was completed, and 18% had completed this task as a result of the course.

35% designed and completed a Facebook page for their farm business as a result of the course.

35% of the women plan to participate in person meetings with other participants, have phone conversations with other participants, and e-mail other participants as a result of the course, 41% were already in process of these components as a result of the course.

31% of respondents evaluated their Farm Transfer Plans, Estate Plans, Personnel Management and Farm Liability Policy as a result of the course.

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 - Introducing New Crops, Nutraceuticals and Other Value-Added Products: Productive agricultural land is stabilized to meet the needs of the agricultural industry and the 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	Actual
2011	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Introducing New Crops, Nutraceuticals and Other Value-Added Products

New Jersey is one of the most ethnically diverse states in the nation. Residents want to maintain their culture and one way to do so is through the foods prepared at home using culturally appropriate foods.

What has been done
New Crops. A survey of the ethnic greens and herb market was conducted and the leading fresh products of interest by ethnic consumers identified (volume and value). NJAES researchers then identified the top ethnic greens and herbs of Mexican, Puerto Rico, Asian Indian and Chinese origin. Seeds and/or plants were then procured and field trials established in 2011 to develop baseline production, yield and quality information. Over 15 ethnic greens and herbs were field grown and yield data collected. All plants grown-out were also dried and analyzed for nutritional composition. Most of the plants were also packaged fresh, shown to potential buyers, who informed us that we were growing the correct types and that there was strong market interest.

Natural Plant Products: Studies were conducted to evaluate the nutritional composition and natural products chemistry profile of a wide range of vegetables and herbs, including those grown domestically as well as new crops and others from overseas. The bioactivity of selected plants continued to be examined in order to identify new applications and uses of the plants and extracts as nutraceuticals or for the food, beverage, cosmetic, fragrance and dietary supplemental industries.

Results

The intended outcome of this project is to generate and distribute science-based information about production, marketability and utilization of selected ethnic greens, herbs and other new crops. This initiative will bridge the supply-demand gap, delivering practical solutions to economic problems faced by many leafy vegetable and herbs growers while contributing to the nutritional and health needs of regional consumers. The economic and health impacts of this project may be readily apparent, but there is also a positive social impact in facilitating the interaction amongst the various ethnic communities. The focus of this research is to better understand the health benefits of these new and specialty crops and plant products. Toward that end, we have taken the first steps toward the introduction of a wide range of ethnic greens and herbs for the Latino (Mexican and Puerto Rican communities), the Asian Indian and Chinese consumers. Cross over into mainstream American consumers will be a natural outgrowth that is well underway already. By growing out promising new crops, we are beginning to identify the production constraints (insect, disease issues) including the lack of good germplasm available on the US marketplace, and begin to develop production packets and information that can be used to assess the profitability of each enterprise. The development of improved and disease resistant basils and other herbs will have a real economic impact for growers and the commercial industry. The introduction of a higher value product and the recognition that some of the waste could be of use and by itself have commercial application adds value and enhances the competitiveness of the agricultural enterprise. The technical scientific advances made in this research have a positive impact on trade, increasing the competiveness of the producer, the processors and traders and provides increased income generation that supports the agricultural sector. Internationally, this work is leading to the improved health, nutrition and family/household incomes of the targeted communities with whom we work. This program which employs a market-first science drive models of development also is leading to the improvement of quality control programs, GACP of botanicals and horticultural crops.

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 #6

1. Outcome Measures

Medium Term - Improving Sustainability, Efficiency, and Efficacy of Peach Disease Management Strategies: Biofungicides, Conventional Fungicides, and Abiotic Environmental Factors: Productive agricultural land is stabilized to meet the needs of the agricultural industry and the 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	Actual
2011	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Improving Sustainability, Efficiency, and Efficacy of Peach Disease Management Strategies: Biofungicides, Conventional Fungicides, and Abiotic Environmental Factors

Peach production is a major agricultural enterprise in South Jersey. To remain competitive in today?s? market it is essential to manage diseases with effective controls.

What has been done

Three field experiments, each conducted in separate experimental peach orchards, were performed during the 2011 growing season. In one study, three different biofungicides at low and high application rates were applied as treatments to investigate their efficacy for management of peach brown rot blossom blight and fruit rot. Results for the biofungicides were compared to a standard conventional fungicide program. Percent of shoots with blossom blight canker and percent of harvested fruit with rot were the dependent variables. In two other field studies, experimental fungicides consisting of mixtures of two active ingredients having different chemistries were examined for their efficacy at controlling peach brown rot and scab.

Experimental treatments were compared to each other and the standard fungicide program. Research results of these studies were presented at the 2011 Annual Meeting of the American Phytopathological Society, Honolulu, HI and at the 87th Cumberland-Shenandoah Fruit Workers Meeting, Winchester, VA. Applied outputs of this research were reported at local and regional grower meetings, the NJAES Plant & Pest Advisory fruit newsletter, and in the NJ Commercial Tree Fruit Production Guide.

Results

Management of peach brown rot blossom blight is currently dependent on two to three applications of conventional fungicides during bloom. Biorational fungicides or biofungicides, many of which are approved for organic production, are possible alternatives to conventional products, but very little information is available on their efficacy against blossom blight. To study these materials, funding was obtained from the USDA/IR-4 Biopesticide & Organic Support Research Program. Results from the field studies indicated that the biological control agent Bacillus subtilis (Serenade MAX) and the biorational fungicide potassium bicarbonate (Kaligreen) can be substituted one-for-one with conventional fungicides during bloom. At tested application rates, Serenade MAX provided 84 to 87% control while Kaligreen yielded 74 to 80% control. Somewhat higher canker levels were observed for the biofungicide treatments relative to the standard, but most differences were not statistically significant. Integration of these biofungicides in commercial disease control programs would reduce residues of conventional fungicides in the environment and lessen worker exposure to them, while providing a mechanism for fungicide resistance management. Research investigating the efficacy of biofungicides at controlling the fruit rot phase of brown rot is ongoing. Demethylation inhibitor (DMI) fungicides have been the most important fungicides for management of peach brown rot over the last 10-15 years. However, within the last few years, DMI-resistant strains of the brown rot pathogen have been detected in a number of states, including New Jersey. Resistance development is also possible for the peach scab pathogen. One strategy to reduce the likelihood of resistance development is to apply mixtures of fungicides of different chemistries. Field studies were conducted to examine the efficacy of mixtures of DMI fungicides with the quinone outside inhibitor (QoI), succinate dehydrogenase inhibitor (SDHI), and anilinopyrimidine (AP) fungicides. Results showed good to excellent control of brown rot blossom blight, brown rot fruit rot, and scab by the experimental fungicide mixtures. Thus, when available for commercial use, peach growers should be able to easily integrate these newer fungicide pre-mixes into their disease control programs without fear of yield loss.

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 - Development of Superior All-male Asparagus Hybrids: Productive agricultural land is stabilized to meet the needs of the agricultural industry and the 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	Actual
2011	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Development of Superior All-male Asparagus Hybrids

To remain competitive in national and international markets, breeding programs must constantly provide growers with new and improved cultivars that are adapted to local growing conditions and markets.

What has been done
NJAES has been engaged in research on asparagus hybrids since 2004. The 2004 trial was concluded in 2011.

Results
In 2011 NJAES released 3 elite all-male asparagus hybrids with high yield, good spear quality, and high disease resistance, NJ1025, NJ1113, and NJ1122 to the industry. These new hybrids can improve asparagus production for the growers. It is expected that seeds of these hybrids will be available for the growers in 2012.

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

Long Term - Optimizing Peach Fruit Quality by Improving Harvest and Postharvest Handling: 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	Actual
2011	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Optimizing Peach Fruit Quality by Improving Harvest and Postharvest Handling

New Jersey ranks 4th nationally for peach production after California, South Carolina and Georgia. 100% of the peach crop is sold to the fresh market. This crop has a wholesale production value of 30-25 million.

What has been done
The development of new peach cultivars with the stony-hard gene in their parentage, like Gloria, has created tremendous untapped potential. Typically peaches produce copious ethylene as they ripen which stimulates and coordinates the ripening process. Peach fruits of cultivars with the stony-hard gene have a very limited ability to produce ethylene. Even if they have the potential to be melting-flesh peaches that soften as they ripen, stony-hard fruit don't exhibit the

typical ripening changes in flesh firmness after harvest. Melting-flesh peach fruits left on the tree after they have reached commercial maturity are typically lost. Gloria fruit retained firmness during storage whether harvested at commercial maturity or at commercial maturity plus 2 or 4 days. By characterizing the tolerance of stony-hard peaches to delayed harvest we can determine whether and for how long growers can allow peaches like Gloria to tree ripen without loss at harvest or in storage. The change in sugar content, titratable acidity, firmness, and size of stored fruit is being examined to determine storage performance of normal and delayed-harvest fruit with the stony-hard gene.

Results

The growers with Gloria peach planted can already see the effect of delayed-harvest, this has allowed them to time their harvests with more flexibility and to better match their harvests with market demand.

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 #9

1. Outcome Measures

Long Term - Turfgrass Breeding and Evaluation: 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	Actual
2011	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Turfgrass Breeding and Evaluation

Turfgrass is a valuable and rapidly expanding component of our urban and rural landscape. Turfgrass is used to stabilize soil and enhance our environment, offer recreation and enjoyment for millions of Americans as well as green space in urban environments.

What has been done
During 2011, there were 9,531 new turfgrass plots established with over 74,380 spaced plants in nurseries and over 8,000 mowed single-clone selections established. In 2011, there were 238,000 seedlings from intra and inter-specific crosses of Kentucky bluegrass screened under winter greenhouse conditions and the superior plants were planted in the field in the spring of 2011. In the winter of 2010-2011, screening was conducted on single plants of 20,000 tall fescues, 10,416 Chewings fescues, 21,024 hard fescues, 50,000 perennial ryegrasses and 10,000 bentgrasses under winter greenhouses conditions. The superior plants of all these species were put into spaced-plant nurseries. Over 393 new intra and inter-specific Kentucky bluegrasses were harvested in 2011.

Results
During 2011, there were 13 US Plant Variety Protection (PVP) applications made and 26 PVP's were issued. There were 2 new Kentucky bluegrasses, 3 new tall fescues, 2 new perennial ryegrass, 4 new strong creeping red fescues, 2 new hard fescues and 1 Chewings fescue named and increased in 2011.

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 #10

1. Outcome Measures

Long Term - Resistance Management for Fresh-market and Processing Vegetable Crops Grown in New Jersey and the Mid-Atlantic Region: 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	Actual
2011	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 and the Mid-Atlantic Region

In the mid-Atlantic region of the United States over 200,000 A of fresh-market and processing vegetable crops are grown on an annual basis. The development of fungicide resistance to important fungicide chemistries used in vegetable production has been documented in New Jersey and the mid-Atlantic region in recent years. A number of these commonly-used chemistries have a high-risk for resistance development if they are overused or used improperly. Vegetable growers in NJ, as well as, the rest of the mid-Atlantic region need more information on fungicide chemistries (i.e. modes-of-action, FRAC codes) in order to manage fungicide resistance development properly.

What has been done
Since 2007, over 12,000 fungicide resistance management guidelines have been distributed to commercial vegetable growers in the mid-Atlantic and surrounding region representing over 100,000 acres of vegetable production. The resistance management guides have become widely adopted and used by many vegetable growers to help develop effective season-long fungicide spray programs while helping to reduce the chances for fungicide resistance development in the region. Approximately 1,500 of the guides were distributed to commercial vegetable growers in 2011-12. Recommendations guides are updated annually and available on-line through the Vegetable Crops On-line Resource Center hosted by the New Jersey Agricultural Experiment Station (www.njveg.rutgers.edu).

Results
Results of a questionnaire done in 2007 and 2008 (~10% returned in each year) by growers determined that only 34% of the vegetable growers surveyed in 2007 had heard of FRAC codes. In 2008, that number increased to 69%. Only 33% of vegetable growers in 2007 knew if fungicide resistance was known in diseases of particular vegetable crops they had grown. In 2008, this number increased to 59%. In both years, over 80% of the vegetable growers responded that they followed fungicide resistance guidelines, and over 85% were willing to incorporate the use of FRAC codes and fungicide resistance management in their farm operation. In 2007 and 2008, 73% and 58%, respectively, growers stated they were willing to use the fungicide resistance management guide in everyday decision making when applying fungicides for disease control and

fungicide resistance management. In 2007 and 2008, 58% and 68% of growers stated the fungicide resistance management guide would be highly useful in their farm operation. In both years, more vegetable growers wanted the fungicide resistance management guide produced in hardcopy form than in an electronic form via the internet. Although no formal survey was done in 2011, each year that the fungicide resistance management guide is distributed more vegetable growers in the mid-Atlantic and surrounding region are educated on the importance of understanding fungicide resistance management in vegetable production.

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 - The Annual Tomato Tasting Open House Assessing Public Opinion, Knowledge, and Support of NJAES and NJ Agriculture: 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	Actual
2011	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
The Annual Tomato Tasting Open House Assessing Public Opinion, Knowledge, and Support of NJAES and NJ Agriculture

Consumers who do not come from traditional farming or 4-H backgrounds may often be unfamiliar with Rutgers NJAES programs and services.

What has been done

For the past 17 years, the Snyder Research & Extension Farm has provided a consumer outreach program with a significant emphasis on a "teaching garden" concept to address consumer agricultural and horticultural education needs, emphasizing the Rutgers NJAES "how-to" teaching strengths. In 2011, the Melda C. Snyder Teaching Garden presented several horticultural and educational displays for home gardeners, commercial growers and landscape designers. Garden beds are designed to address local needs and or gardening questions, to highlight Rutgers NJAES research and developments and or to highlight aspects of NJ agriculture. Some examples of beds include displays of blueberry varieties bred and released by NJAES, plants rated for low preference by deer, and those that attract beneficial insects to the garden. Of special note was the expansion of beds showcasing Jersey Flora lilies and the Rutgers ornamental breeding programs, utilizing Rutgers bred hollies and NJ bred daylily varieties.

Master Gardeners from several surrounding counties assisted the visiting public, answering questions in the teaching garden, and serving over 80 varieties of heirloom and hybrid tomatoes. NJAES researchers and Extension Agents hosted of basil variety tasting, apples, peaches, honey, cucumbers and peppers were also included in this Taste of Rutgers open house.

Results

First time attendees reported:

91.6% 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.

68.7% 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.

Return attendees: Attending the Tomato Tasting Open House have reported that they have taken advantage of other Rutgers NJAES programs and services:

Attend workshop(s),23.7%
Contacted a County Extension Office,47.4%
Subscribed to a newsletter,18.4%
Taken a soil test,32.4%
Joined/volunteered for a 4-H Club,2.6%

As a result of visiting the Tomato Tasting Open House respondents reported that they changed their gardening practices / landscapes to include:

Cover crops,13.5%
Deer resistant plants,44.2%
Straw or plastic mulches,28.8%
Water use / irrigation, 44.2%
Added plants to attract beneficial insects,46.2%

In regards to NJ's agricultural industry:

61.8% 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.

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 #12

1. Outcome Measures

Long Term - Milk Quality: 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	Actual
2011	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Milk Quality

The number of New Jersey dairies now totals 83 farms statewide. With the high fluid milk demand in the state, it is important that these remaining farms remain in the state and provide as much milk as possible to support the economy within the state.

What has been done
Dairy producers operate efficiently, taking advantage of all available premiums offered to them for producing a quality product. With the support of Rutgers Cooperative Extension, New Jersey dairy producers have been able to remain viable. By using cow side tests for parameters such as somatic cell count and bacterial levels, producers were able to identify and address issues before they became major problems. All New Jersey dairy producers had access to two in state analytical labs (New Jersey Department of Agriculture Lab in Trenton-official and Rutgers Cooperative Extension of Salem County lab-unofficial) to identify microorganisms responsible for

issues found on farm. Components within the milk produced were also monitored by sampling milk in-line using specialized equipment as well as in the bulk tank. Milk temperature and time for milk cool down to take place were also monitored to ensure that milk was managed in a responsible manner so that it would be of the highest quality and have to longest possible shelf life for consumers. Beyond the milk itself, the washing cycle of the milking system was monitored using a specialized piece of equipment called a LactoCorder. Cow comfort and housing conditions were also monitored using Hobo devices which logged temperature, humidity and light intensity so that housing conditions could be amended to accommodate the cows.

Results

In 2011, over 50% of New Jersey dairies participated in the milk quality program performed by Rutgers Cooperative Extension of Salem County. Case studies to reduce somatic cell count in order to gain premiums, therefore increasing profits took place on three farms, in different regions of the state. Overall, the participating farms reduced somatic cell count by 45.8% collectively and gained profits of $26,082 in milk production based on $18/cwt milk. Two of the farms that were previously paying a penalty of $0.15/cwt for having a somatic cell count >650,000 lowered their somatic cell counts to an acceptable level where a combined $21.00 per load of milk or $3,843 annually was gained on their milk checks. One producer gained a premium for producing a quality product which gained that producer $.25/cwt shipped which translated to $40.00/load or $7,320 annually. In all cases, careful inspections took place to pinpoint the cause of the inflated PIC counts and sampling also took place. In all cases, potential solutions were suggested and enacted and the PIC counts fell back to acceptable levels.

Best management practices included; the addition of fans in free stall areas with higher temperatures and humidity, the addition of sunshades in areas where light intensity was excessive, the addition of misters/sprayers in areas where cows congregate to keep them cool and the adjustment of free stall dimensions to reduce overcrowding and enhance cow comfort. With the improvement of cow housing conditions, milk production improves, leading to more milk in the bulk tank and a bigger milk check.

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 #13

1. Outcome Measures

Long Term - Contributing to Food Security in Union County: The "Come Grow With Us" Community Gardens and Master Gardener "Sharing Garden": 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	Actual
2011	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Contributing to Food Security in Union County: The "Come Grow With Us" Community Gardens and Master Gardener "Sharing Garden"

According to the NJ Anti-Hunger coalition, www.njahc.org, a USDA study of NJ food stamps recipients jumped from 414,500 in 2007-09 to 622,022 in 2010. The number of NJ households experiencing food insecurity increased from 7.7% of the population in 2004-06 to 11.5% in 2007 - 09. The Anti-Hunger coalition lists 27 food pantries in Union County as resources for families and individuals in need of food. Donations of fresh vegetables to food pantries gives families access to healthy food and allows pantries to use financial resources to purchase other perishable items such as milk and meat.

What has been done
RCE of Union County has been addressing the food security issue on two fronts: starting community gardens and providing local food pantries with produce for distribution.
The County Agricultural Agent worked with a community organization "Come Grow with Us" affiliated with the United Way of Union County, Groundworks Elizabeth and a NJ Assemblywoman to establish community vegetable gardens. The goal of the project is to provide organizations with raised beds and vegetable transplants to get community gardens started, give guidance on growing and harvesting vegetables, and teach plant and nutrition workshops.

Results
The Master Gardeners' "Sharing Garden" project has yielded 16,367 pounds of fresh produce for fifteen Union County Food Banks since it began in 2002. The retail value of the donated food is $24,606.35. In 2011, 2,019 pounds of produce was donated with a retail value $3,533.37.
Eight community vegetable gardens have been established. Sixty-four families from the Roselle Day Care Center, 100 families from the YMCA, 200 clients at Jefferson Park Ministries and 50 teen youth program members at the Elizabeth Housing Authority received 5,145 pounds of produce from the gardens since 2009. Seven families affiliated with Home First were provided with fresh vegetables through-out the summer and fall. The Dill Avenue Garden feeds families through food distribution programs at the First Baptist Church and the Linden Family Success Center. These two agencies distributed 858 pounds of produce from the Dill Ave garden. The Sonic Drive In Restaurant site provided 188 pounds of produce to multiple feeding sites in Elizabeth and one in Jersey City.

The eight community gardens harvested 2,915 pounds of produce in 2011.
49 families grew patio tomatoes in containers they received at workshops.

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 #14

1. Outcome Measures

Long Term - Genetic Improvement of Woody Plants (Trees and Shrubs) for Ornamental Uses: 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	Actual
2011	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Genetic Improvement of Woody Plants (Trees and Shrubs) for Ornamental Uses

The Nursery industry is in need of new plants for ornament purposes that are adapted to the specific climate and conditions of the U.S. These plants need to be disease and pest resistant as well as attractive and hardy to meet consumer demands and enhance our environment.

What has been done
NJAES researchers continued their work throughout 2011, hybrid Ilex seedlings that emerged

in flats containing seed sown in 2009 and 2010 were transplanted to clay pots and were subsequently transplanted to one-gallon containers later in the year. Similarly, containerized seedlings that had germinated in 2010 were transplanted to larger-size containers as needed (holly seedlings are not field planted until the spring of their third growing season). Selection for attractive leaf and new growth color, leaf gloss, leaf shape, vigor, branching habit, mite resistance, berry production (male or female plants), and other traits are made in the greenhouse before plants are moved to the field. Over 200 new hybrid holly selections were field planted in 2011 for long term evaluation. Approximately 200 hybrid seedlings of Cornus (dogwoods), from seed collected in 2010, were selected down from a population of over 350 plants, based on overall plant health and vigor, leaf characteristics and, especially, response to powdery mildew. These plants were field planted in 2011 for long-term evaluation for traits including plant vigor, resistance to plant pests and diseases, tree form, foliage color and texture, and size, shape and color of the floral bracts, as well as tolerance to drought.

Our several best green-leaf, EFB-resistant contorted hazelnut selections were propagated in 2011 and planted across several locations in central NJ for additional testing prior to being considered for release.

Results

Plant patents were awarded in 2011 for Ilex x 'Spartan' (Plant Patent # 20,804) and Cornus x KF11-1, marketed under the name Hyperion (Plant Patent # 22,219). Further, a plant patent is being prepared for a new advanced-generation inter-specific hybrid of Cornus kousa x C. florida that has yet to be named. These new cultivars (and others in the development pipeline at Rutgers) will have a positive impact on property values and quality of life where they are grown, and their resistance to their primary insect and disease pests will reduce the need for harsh pesticide sprays. The program to develop ornamental hazelnuts (Corylus spp.) is showing great progress and will continue. Since very few eastern filbert blight resistant ornamental hazelnuts are commercially available, incorporating disease resistance into the ornamental germplasm will provide for rapid development of new cultivars leading to an increase in the diversity of plant species options (including native species) available for use in the landscape. Many of these also produce edible nuts which may allow them to double as components of edible ornamental landscapes.

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 #15

1. Outcome Measures

Long Term - Value Added Lamb Production Model: 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	Actual
2011	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Value Added Lamb Production Model

New and existing small farm producers looking to diversify their farming endeavors have used the Value Added Lamb Model over the last twenty-two years. The lamb model utilizes a terminal lamb production system without the need for maintaining a year round sheep production system, while affording producers exceptional returns on their lamb production. New and existing producers on limited acreage can raise lambs very effectively and garner a high rate of return. The lamb model is a tremendous asset for meeting farm assessment needs while simultaneously adding a credible and profitable livestock production system.

What has been done
A County Agricultural Agent designed and developed a user friendly production model for producers that identifies the project rationale combined with a flex-budget, applied technologies, buyer component and related resources to successfully implement the model. In addition he implements twilight production meetings and carcass programs to assist in training participants.

Results
Producers implementing the model have been able to sell their value added lambs for more total dollars as compared to existing live auction markets. Producers using the flex-budget found in the model have been able to sell their lambs as finished processed halves or wholes and receive net returns per lamb upwards of $150. Producer surveys have noted that the startup costs to implement the model are relatively economical and that the merchandizing methods noted in the plan are easy to implement. Currently there are 15 producers using the model annually and over the term of model well over 120 producers have implemented the model to date.

The lamb model is very successful for the producers as it meets the growing need and demand for locally grown, source identified and quality assured lamb products.

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 #16

1. Outcome Measures

Long Term - New Jersey Beef Quality Assurance Training: 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	Actual
2011	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
New Jersey Beef Quality Assurance Training

All cattle producers are continually under scrutiny to produce the highest quality meats possible. This concept goes hand-in-hand with the national and international efforts to improve beef quality assurance (BQA) and ultimate consumer expectations for BQA reared beef and beef products.

What has been done
The New Jersey Beef Quality Assurance (BQA) Training has been done since 2004 and in 2010 the training materials were nationalized by the National Cattlemens Beef Association to insure consistency across the country. Prior to that the teaching materials were prepared under the Mid-Atlantic consortium of which New Jersey was one of the state players. The national program is administered by the County Agricultural Agent in conjunction with his extension program and assisted by the NJDA and the New Jersey Beef Industry Council. All New Jersey

beef and dairy producers are encouraged to participate in the program to assist them in producing the highest quality meat products for direct and indirect marketing to consumers. All bovine producers are taught the proper techniques and production practices to insure wholesome meat (beef) production. The training encompasses management issues covering feeding, handling, humane care, veterinarian medications, injection site and methods, animal husbandry practices, shipping, slaughter, processing and other pertinent attributes related to beef carcass and overall meat quality assurances.
To date 181 beef and dairy producers have completed the course and over 100 have been recertified at least once and many three times in accordance with our original re-certification program.

Results

Producers that have participated in the BQA Training are not only raising beef under high quality standards but are improving on the perception of the entire US beef industry. Nationally, in early 2012 the Beef Check-off was approved again by the industry at over an 80% level which directly supports the current national BQA Training program.

The overall BQA Training has had regional and national support and has made tremendous strides in verifying the quality assurance of the US beef industry.

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

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)

Evaluation Results

See Qualitative Outcomes

Key Items of Evaluation

See Qualitative Outcomes

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%	
	Total	100%		100%	

V(C). Planned Program (Inputs)

1. Actual amount of FTE/SYs expended this Program

Year: 2011	Extension		Research	
	1862	1890	1862	1890
Plan	6.0	0.0	3.0	0.0
Actual Paid Professional	8.0	0.0	1.0	0.0
Actual Volunteer	75.0	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
105395	0	61983	0
1862 Matching	**1890 Matching**	**1862 Matching**	**1890 Matching**
674851	0	212673	0
1862 All Other	**1890 All Other**	**1862 All Other**	**1890 All Other**
57742	0	38749	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

3. How was eXtension used?

Extension Specialists participate in the Horse Quest CoP.
Answered ask an expert questions and developed collaborative educational products.

V(E). Planned Program (Outputs)

1. Standard output measures

2011	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Actual	19550	45600	1698	4250

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

Patent Applications Submitted

Year: 2011
Actual: 0

Patents listed

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

2011	Extension	Research	Total
Actual	4	9	13

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.

Year	Actual
2011	0

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	Actual
2011	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Antioxidants Supplementation to the Young Exercising Horse

Losses of top equine athletes at Olympic Games, World Equestrian Games and Thoroughbred Triple Crown Races, have provoked public interest in the performance and welfare of competitive horses. Oxidative stress has become recognized as one of the possible harms. Oxidative stress occurs when the antioxidant defense system in the body is overwhelmed with reactive oxygen species (ROS). An increase in ROS may occur due to increased exposure to oxidants from the environment, increased production within the body from an increase in oxygen metabolism during exercise, or an imbalance in antioxidants. Useful properties of ROS include targeting of bacteria and viruses during respiratory bursts in phagocytes, and serving as special messengers within neurons. However,if ROS accumulation becomes too great it can be damaging to the DNA, protein and lipids in cells. Oxidative stress has been implicated in the pathogenesis of certain

diseases (e.g. cancer, AIDS, and Alzheimer's disease) and has been linked with the aging process and exercise.

What has been done

Extension Specialist in Equine Science has conducted research to quantify the oxidative stress or muscle oxidation in the young growing horse in training and determined how much nutrition would play a role in their stress level during exercising training.

The pilot project has been completed and assays have been validated plans are underway to continue the work with young and mature horses and measures of oxidative stress and any antioxidant intervention.

Results

Understanding how intensive exercise affects young racehorses will benefit the horse industry in many ways. Most importantly, trainers will better understand how hard to push young horses without impairing their growth. Horses will be able to obtain their maximal growth rates which will improve their performance on the track. Also, this will lead to fewer injuries on the racetrack, and fewer careers being abruptly ended for these young horses. The results of this study will enable NJ horse owners and enthusiasts to remain competitive in and preserve the industry in the state.

4. Associated Knowledge Areas

KA Code	Knowledge Area
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

Year	Actual

2011 0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

New Jersey Equine Industry-Quantifying Its' Importance

Horse racing in New Jersey has been under tremendous pressure from state government and other gaming interests to privatize and become less reliant on public funds. Horse racing makes up 75% of the economic impact of a $1.1 billion industry and equally as importantly is responsible for keeping 56,000 acres of agricultural land in production.

What has been done

The Rutgers Equine Science Center, using the facts and figures in the award winning 2007 economic impact study and supplemented by further research by the Extension Equine Specialist and her students provided state government (OLS), horse owners and breeders, lobbyists, etc. with data needed to make an impact on policy decision makers. Over 45 interviews were conducted with a variety of media sources in a 7 day period explaining the importance of horse racing in the Garden State.

Results

New Jersey horse owners and breeders, policy decision makers, national racing associations. The New Jersey horse industry leaders have stated repeatedly that if it were not for the numbers generated by Extension Equine Specialist and her team at the Equine Science Center that the industry would not have had the ammunition with which to approach the executive branch of the Governor's office. In recognition of her work, the Specialist was the recipient of the 2012 "Unsung Hero" award from the United State Harness Writers Association.

The two racetracks previously owned and managed by the State of New Jersey are now under private leadership. Thousands of jobs and agricultural acres have been saved in the short term. The Extension Equine Specialist is now working with new management to come up with economic and marketing strategies that will ensure long-term stability.

4. Associated Knowledge Areas

KA Code	Knowledge Area
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

Year	Actual
2011	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 4-H projects in the state with over 1,600 club members in 2011. Youth are involved because they love horses and want to work with these animals in some capacity. 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
The New Jersey 4-H Horse Program utilizes adult volunteers, educational workshops, events and curriculum to educate youth about a variety of topics related to the Equine Industry. Youth grades 1- 13 (one year out of high school) in every county in New Jersey have the opportunity to participate in the 4-H Horse project. In the 4-H year 2011, 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
In 2011 twenty seven youth from five New Jersey counties who participated in the New Jersey 4-H Model Horse Show, responses to an end of show evaluation follows:
100% 4-H had taught them to be a better person
95% 4-H teaches them the leadership skills they need

95% 4-H teaches them the leadership skills they need
87% 4-H taught them about ethics
86% 4-H is an excellent way to learn how to get along with others
85% 4-H gives them an excellent experience in record keeping.
85% 4-H gives them an excellent experience in record keeping.
77% 4-H was an excellent way to help improve their public speaking skills
75% 4-H gives them an excellent way to express their talents
75% 4-H gives them an excellent way to express their talents
68% 4-H is an excellent way of learning the importance of community service
50% 4-H was an excellent way to learn about horses
50% 4-H was an excellent way to learn about horses

In 2011, 109 youth from 13 counties participated in State 4-H Horse Bowl; those youth reported learning the following skills:
76% 4-H teaches them excellent leadership skills they need
68% 4-H has given them excellent values of being a better person
66% 4-H was an excellent way to learn about horses
66% 4-H is an excellent way to learn how to get along with others
64% 4-H was an excellent way to help improve their public speaking skills
63% 4-H is an excellent way to learn about how to respect others opinions
62% horse bowl has taught them excellent skills in following directions
57% 4-H is an excellent way of learning the importance of community service
56% horse bowl has taught them excellent study skills
55% 4-H taught them excellent ethics

In 2011 fifteen youth participated in the New Jersey Equine Presentation program reported that:
100% 4-H had taught them to be a better person
95% 4-H teaches them the leadership skills they need
86% 4-H is an excellent way to learn how to get along with others
85% 4-H was an excellent way to learn about horses
81% 4-H taught them about ethics
78% 4-H is an excellent way of learning the importance of community service
74% 4-H was an excellent way to help improve their public speaking skills
73% 4-H is an excellent way to learn about how to respect others opinions

302 evaluations from participants at the 2011 New Jersey 4-H Horse Show reported learning the following skills:
90% gained Horsemanship skills
60% learned that your hard work gets put to the test
60% learned sportsmanship skills
60% learned preparation and organizational skills.

4. Associated Knowledge Areas

KA Code	Knowledge Area
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)

Evaluation Results

See Qualitative Outcomes

Key Items of Evaluation

See Qualitative Outcomes

V(A). Planned Program (Summary)

Program # 7

1. Name of the Planned Program

Climate Change - 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%	
	Total	100%		100%	

V(C). Planned Program (Inputs)

1. Actual amount of FTE/SYs expended this Program

Year: 2011	Extension		Research	
	1862	1890	1862	1890
Plan	3.0	0.0	3.2	0.0
Actual Paid Professional	21.0	0.0	7.0	0.0
Actual Volunteer	1263.0	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**
477542	0	305475	0
1862 Matching	**1890 Matching**	**1862 Matching**	**1890 Matching**
1393610	0	2004489	0
1862 All Other	**1890 All Other**	**1862 All Other**	**1890 All Other**
314226	0	2841286	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-heath related pest control-bed bugs, 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 ans 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

3. How was eXtension used?

Livestock Poultry Environmental Learning Center
Animal Manure Management
Bee Health

Faculty answered ask an expert questions.

V(E). Planned Program (Outputs)

1. Standard output measures

2011	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Actual	49921	15600	12059	2240

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

Patent Applications Submitted

Year: 2011

Actual: 4

Patents listed

61/476,143
61/490,449
61/557,493

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

2011	Extension	Research	Total
Actual	2	41	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,publications. In addition a trained volunteer teaching base will be developed.Quantitative reports of participation data will be collected.

Year	Actual
2011	0

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 - Involving Youth with Improving the Environment in Union County through the 4-H Master Tree Steward 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.
5	Medium Term - Eco-Ventures at the Earth Center: 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 - 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.
7	Medium Term - Veterans' Sustainable Landscape Training 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 - Environmental Health Issues and Green Infrastructure Initiatives for Urban New Jersey: 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	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.
10	Long Term - Integrating Crop Pollination by Native Bees Into Agriculture Pollination Management and Maintaining Native Pollinators and Their Habitats: 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	Actual
2011	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Forest Stewardship

Almost one hundred and twenty thousand landowners own approximately 1.3 million acres of forestland in New Jersey, yet less than 12 percent of those owners actively manage their forestlands. Because of increasing developmental pressures and the increasing value of the state's forests for open space, water, wildlife, and quality of life as well as traditional forest products, it is more important than ever that these private lands are actively and sustainably managed.

What has been done
One field day and sixteen workshops were conducted for private woodland owners focusing on stewardship, the proposed NJ Forest Stewardship Program, vernal pools, wetland regulations, firewood production, southern pine beetle ID and control, and the Firewise Program. The second New Jersey Woodlands Stewards Program was conducted, a three-day program that graduated ten trained volunteers.

Results
Approximately 350 landowners attended the programs, which provided pertinent, readily adapted/applied management information and alternatives helped provide incentives for landowners to sustainably maintain their open space and woodlands through active forest management. With the average size of forestland ownership in New Jersey of 15 to 20 acres, some 5,250 to 7,000 acres have benefited from more knowledgeable landowners, subsequent better management, and a higher likelihood of remaining forested. If improved management activities increased timber values by ten dollars, per acre, the resulting economic benefit ranges from $52,500 to $70,000. Each of the ten volunteers that graduated from the Woodland Stewards Program is expected to spend 30 hours in 2012 promoting forestry in NJ. At the current federal volunteer rate of $21.36/hour, their efforts will be valued at $6,408.

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	Actual
2011	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
NJ Master Gardener Program Highlights

New Jersey has become increasingly urban and suburban with respect to the makeup of most communities due to population increase. This growth has lead to a disconnect between people and the land. Thus, many residents need education on basic horticulture, home pest management, and other gardening related issues. Due to the increased development, there is also a need to teach residents more environmentally sound ways to deal with landscaping problems and concerns.

What has been done
The program is designed to educate volunteers in horticulture who will then go out in to the communities to educate home owners on sound horticultural practices. The program consists of 21 educational sessions followed by a 60 hour volunteer commitment.
Some of the major objectives of the program are to:
Provide consumer horticultural education
Enhance public awareness and access to Rutgers Cooperative Extension
Provide access to fresh produce in urban areas to coordinate development of community gardens
Offer pesticide applicators re-certification credit classes

Build community partnerships and enhance multi-department program coordination
Promote integrated pest management education to public

Results

Participants are surveyed after completion of the program. 98% of those surveyed increased their knowledge, while 96% planned on completing the volunteer commitment and becoming certified Master Gardeners. Those completing the program also were surveyed about their use of pesticides and their views. After completing the program 82% said they would use less pesticides and fertilizers on their landscapes.

Master Gardeners have provided 46,979 hours of volunteer service for a value of $992,196 to the residents of Gloucester County. Projects included beautification of public parks, schools, and libraries, horticultural therapy education at nursing homes and schools, and educational presentations at public events.

In Atlantic County Master Gardeners began a partnership with the Atlantic City Housing Authority and Atlanticare in the development of a community garden for residents of one of the Hope VI communities as well as a high rise complex. In working with the Atlantic City Housing Authority, Hope VI, as well as Atlanticare we have been combining an education of growing your own food and the nutritional benefits of eating fresh produce. Atlantic City is an area with minimal opportunity to acquire fresh produce. We have also been involved with several school gardens that have partnered with the local community residents in maintaining a vegetable garden. We continue our work with the Atlantic City Ocean Aquarium and Gardner's Basin in demonstarting the types of plants for a seashore environment. We have been instrumental in helping the area become revitalized and as such has now been added to the historic registry which has made available substantial funds to continue the revitalization.

In 2011, approximately 1,000 inquiries were resolved by the volunteers on the helpline and various events . The total volunteer hours for 2011 were 5,027. 1,110.5 hours were recorded on the helpline, 2,817.5 were logged performing community outreach, and 1099 hours were recorded for community education. The master gardeners also donated 375 lbs. of food to local food banks.

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 - Involving Youth with Improving the Environment in Union County through the 4-H Master Tree Steward 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	Actual
2011	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Involving Youth with Improving the Environment in Union County through the 4-H Master Tree Steward Program

According to surveys, Union County needs more trees to make shade in order to protect against skin cancer, to help fight asthma (trees filter particulate matter out of the air), and to add beauty to the lives of county residents. Involving children in all these efforts provides them with valuable leadership skills.

What has been done
The 4-H Master Tree Steward Program is a volunteer program. 4-H trains adults in tree biology and care. Once trained, the volunteers use a specially designed curriculum with hands-on activities to teach school aged children about trees. In 2011, over 2,500 youth grade students in 80 Union County schools participated in the program.

Results
A sampling of 226 students reported that as a result of the Rutgers, 4-H Class on Tree Appreciation:

71% they were less likely to damage trees.
90% they were more likely to take better care of trees around their homes.
86% they were more likely to take better care of trees around their schools.
70% they will observe trees more closely.
69% they are more likely to plant a tree.
98% they learned that there are many different kinds of trees.
84% they were more likely to stop others from damaging trees.
78% they want to learn more about tree care and planting.
83% they will tell someone about what they learned.

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 #5

1. Outcome Measures

Medium Term - Eco-Ventures at the Earth Center: 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	Actual
2011	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Eco-Ventures at the Earth Center

Young people do have the right and the responsibility to participate in decisions affecting their environment, and are capable of making valuable contributions to their communities and society. (Schusler and Krasny, n.d.) According to the New Jersey Department of Education, students learn science best by doing science. Science is not merely a collection of facts and theories but a process, a way of thinking about and investigating the world in which we live.

What has been done
The Eco-Ventures at the Earth Center program is a one week summer environmental education program which provides an opportunity for youth to participate in outdoor, learning

experiences focusing on ecology and the environment. Youth participate in educational activities that introduce ecological concepts and current issues, and design and film public service announcements based on topics introduced during the program. Eco-Ventures included the following activities in 2011:

Habitat (Pond) Study and Group Presentations
Climate Change Experiments
Water Conservation and Rain Barrel Education
Farm Field Trip and Alternative Energy
Biodiversity
How to Build a Compost Pile
Environmentally Friendly Gardening Techniques

Results

Eco-Ventures at the Earth Center entered its 5th year in 2011. 22 youth participated in the 5 day event. This is event is limited to a small number of youth due to the space limitations of the program site. Results of pre-post evaluation surveys indicated a statistically significant increase ($p < 0.0001$) from pre to post test scores. Pre-Post test survey questions focused on the concepts introduced during the program including pond ecology, water conservation, waste management and environmentally friendly gardening techniques.

End of Program Evaluations indicated the following:

100% of participants indicated that they plan to share what they learned with others.
95% of participants rated the program as excellent.

Youth participants set personal short and long term environmental goals. These goals included:

To encourage their families to set up a compost pile.
To encourage their families to conserve water usage in their homes.
To install a rain barrel on their property

A three month follow-up survey was sent to all program participants, and had a 75% return rate.

100% of respondents indicated that they had reached or partially reached the personal goals set during the program.

90% of respondents indicated that they were able to not only make changes in their own personal practices toward the environment, but were also able to influence family or friends to lessen their impact on the environment. One youth indicated, "I have persuaded my parents to compost the dead plants from our veggie garden. Also I started a fundraiser at my school tabs for good where the classes compete to collect the most soda tabs and cans for the school to make recycled gardening utensils."

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 - 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 Condition Outcome Measure

3b. Quantitative Outcome

Year	Actual
2011	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, landfilling, 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.

Hands-on activities consisting of building a mini incinerator and landfill; constructing a compost bin; taking a trip through your trash; and habitat investigations are reinforced by tours. The youth explore a materials separation facility; landfill; composting facility; wastewater treatment plant and waste-to-energy plant. Participants apply the information they learned through role-play activities and an environmental town meeting.

College students develop workforce preparation skills and explore youth/adult partnerships by serving as group facilitators and ambassador project coaches/counselors. Serving in this capacity provides these students with an opportunity to explore their interests in working with youth and in conducting educational programs. They also develop and/or enhance their organizational and interpersonal communication skills as well as practice teaching techniques.

Results

Evaluation data for 2011 revealed the following results:

100% of the youth and adults increased their scores from the pre-test to post-test by an average of 39%.

59% of the program participants self-reported an increase in knowledge of waste management alternatives.

57% of the program participants self-reported an increase in knowledge of items that can be recycled.

63% 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.

95% of the participants rated the program as Great or Good on the end-of-program evaluation.

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 #7

1. Outcome Measures

Medium Term - Veterans' Sustainable Landscape Training 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	Actual
2011	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Veterans? Sustainable Landscape Training Program

Many veterans of recent conflicts (Desert Storm, Iraq, Afghanistan) are in need of educational or training opportunities for employment in the private sector. Complicating their situation is their need for therapies to help manage a range of health issues related to their service. The therapeutic value of horticulture, along with employment opportunities in the landscaping industry lead to a collaboration with the Department of Veterans Affairs to implement this program.

What has been done
The training program provides technical and experiential learning in horticulture, vegetable production, storm water management, water conservation and landscape maintenance, while providing an opportunity for veterans to become reacclimated to the formal educational structure of a classroom.

In October 2008 an introductory gardening workshop was offered to 16 veterans and staff at the VA hospital in East Orange, NJ. This program led to the creation of an on-site community garden. Over the course of the past three growing seasons this garden produced in excess of 6000 lbs of tomatoes, peppers, eggplant, collards, cabbage, kale and herbs. Vegetables were used by the VA culinary program, shared with landscape workers (veterans) as well as homeless veterans. One of the veterans used his new knowledge of horticulture to begin a successful lawncare company; his experience led the idea of developing a formal landscape training program.

In 2011 storm water management and water conservation were added to the curriculum. The East Orange VA Hospital generates large volumes of stormwater runoff and the administrators asked for assistance with management of that stormwater. The veterans' training included the design and installation of a rain garden on the hospital grounds. This rain garden managed stormwater runoff from a nearby parking lot, immediately improving public access to the hospital, particularly for disabled veterans, by eliminating muddy sediments from blocking the sidewalk entrance. Rain barrels were also installed to collect roof runoff, prevent flooding, and to irrigate the community gardens.

In 2011 VA staff recruited 9 individuals for the second landscape training class. The landscape maintenance training was based on the core curriculum of the Rutgers Master Gardener training program and included fifteen 3 hour lectures, and 300+ hours of a supervised landscaping internship on the grounds of the VA/East Orange. Seven of the nine students

successfully completed the training program. The VA employment counselors are working with the graduates to introduce them to employers in the landscape industry.

Results

Graduates of the program (which ended in October 2011) are now prepared for employment in the landscape industry which traditionally makes new hires in spring (March-May.) Veterans during the program had increased access to fresh vegetables (tomatoes, peppers, eggplant, collards, kale, spinach, etc.) and were able to share the harvest with their families and homeless veterans.

Strategies to capture and use water as a resource led to the discovery that the VA was paying to recycle 15 55-gallon drums per month at a cost of $10 per barrel. These drums are now being reused as rain barrels - capturing water and saving the VA hospital money by reducing tap water usage and by eliminating the cost of the disposal of the barrels. The rain barrels built and installed by the veterans captured 3,800 gallons of roof runoff, which led to reduced flooding in high traffic areas and reduced potable water demand at the facility as the captured water was used to water plants in the community gardens.

The rain garden was able to capture 16,300 gallons of runoff from a parking lot, decrease soil erosion and almost completely stop the accumulation of muddy sediments on a heavily traveled sidewalk. Now, patients with limited mobility don't have to struggle to maneuver around runoff flow and mud when it rains.

This program was recognized with an Honorable Mention in the Healthy and Sustainable Communities category of the Governor's Environmental Excellence Awards (2011).

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 #8

1. Outcome Measures

Medium Term - Environmental Health Issues and Green Infrastructure Initiatives for Urban New Jersey: 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	Actual
2011	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Environmental Health Issues and Green Infrastructure Initiatives for Urban New Jersey

Urban Green Infrastructure Initiative. Water and sewer infrastructure systems in many communities throughout New Jersey are reaching the end of their functional life and will need repair and replacement over the next decade. Opportunities exist to reduce costs for replacing this aging infrastructure using new techniques and technologies, better preparing the state for a sustainable future. Infrastructure planning and design approaches are needed that reduce demand on existing infrastructure, extend its functional life where possible, and provide cost-effective and sustainable solutions that conserve and protect water resources while improving the quality of life of our residents.

What has been done
Rutgers Cooperative Extension (RCE) Water Resources Program has partnered with local nonprofit organizations in urban municipalities to pilot community-based initiatives addressing environmental health issues through education programs and implementation of green infrastructure projects. The program and projects focus on priority environmental issues identified by the communities, including efforts to manage vacant properties, reduce nonpoint source water pollution, reduce combined sewer overflows and flooding, addressing the impact of brown fields on community health, and upgrade aging infrastructure. The educational and job training programs being developed by RCE focus on teaching adults and youth the importance of managing stormwater runoff in urban areas. As part of the educational programs, demonstration green infrastructure projects are being constructed to capture, treat and infiltrate (where possible) stormwater runoff.

Results
Approximately thirteen (13) workshops and presentations related to urban green infrastructure were held with over 350 attendees. Eight (8) rain gardens were installed in urban environments as part of green job training and community gardening initiatives. These rain gardens capture approximately 188,000 gallons of stormwater per year. A study entitled "Community-Based Green Infrastructure for the City of Camden" was completed in November 2011. The RCE Water Resources Program staff visited each of the City's 20 unique neighborhoods to evaluate the need and opportunities for green infrastructure. In total, over 40 projects were selected, incorporating every one of the City's neighborhoods. The feasibility study

highlights these projects and will serve as a valuable resource for City officials and nonprofits for implementation best management practices in the upcoming year.
Surveys of 33 homes revealed 58 percent were gardening directly in the ground, 88% had not done lead testing, and 70% did not know the health risks of gardening in lead contaminated soil. Twenty-eight (28) New Brunswick homes had their garden soil tested for lead. Sampling results and best practices for protecting themselves from lead contamination while gardening were translated to Spanish and sent to all homes Five (5) yards showed significant contamination. Thus far, 3 homes have agreed to adopt lead-safe practices in their yards.

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

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	Actual
2011	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. A six year NJDEP study concluded in March 2003 on comparative risk from environmental stressors concluded that the top four environmental issues in New Jersey were: 1) land use change, 2)

indoor pollution, 3) invasive species and 4. outdoor air pollution.

What has been done

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. An advisory council was formed to guide the Rutgers Environmental Stewards program which consisted of internal and external stakeholders. Regional instruction locations were established. As of 2011 regional classes have been conducted for seven years providing 1,080 hours of training to 339 students.

Results

The Rutgers Environmental Stewards is a long term program that entered its sixth year in 2011.

Summary data of the 339 participants indicate the percentage of those who:
Completed Training - 90.56%
Engaged in Intern Project - 42.64%
Completed Intern Project - 26.10%
On Environmental Commission - 6.72%

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.ht

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 #10

1. Outcome Measures

Long Term - Integrating Crop Pollination by Native Bees Into Agriculture Pollination Management and Maintaining Native Pollinators and Their Habitats: 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	Actual
2011	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Integrating Crop Pollination by Native Bees Into Agriculture Pollination Management and Maintaining Native Pollinators and Their Habitats

Environmental stewardship and natural resources preservation are dependent on conserving and restoring native pollinators. 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 particular the 2008 Farm Bill mandates that pollinator conservation be integrated into agricultural conservation programs, yet information on how to do this effectively is lacking. 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 research has found that wild bees contribute substantially to the pollination of New Jersey crops. Yet many growers are unaware of the contributions of wild bees and in some cases purchase honey bees unnecessarily, at considerable expense. If growers had more information about the native bees that pollinate their crops including knowledge of how to manage for and restore these bees this would contribute to making agriculture more sustainable. Research-based knowledge about the habitat needs of New Jersey pollinators, experimentally testing restoration protocols, and communicating this information to stakeholders has been the focus of the work in 2011.

A variety of delivery methods have been used including:
Rutgers 4-H Science Saturday program
Hands-on 2-hour workshop on bees and pollination for middle school students, Rutgers Gardens Exploration Camp
Workshop for Master Gardeners
New Jersey Cranberry Growers Ocean Spray Consortium
New Jersey Blueberry Growers Annual Open House

Results

Agricultural growers in NJ and nationally are more aware of the role of native pollinators in crop pollination, and 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.

The results of this research will also be used by the Xerces Society for Invertebrate Conservation and private landowners to effectively restore beneficial insects.

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

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)

Evaluation Results

See Qualitative Outcomes

Key Items of Evaluation

See Qualitative Outcomes

V(A). Planned Program (Summary)

Program # 8

1. Name of the Planned Program

Global Food Security and Hunger - 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%	
	Total	100%		100%	

V(C). Planned Program (Inputs)

1. Actual amount of FTE/SYs expended this Program

Year: 2011	Extension		Research	
	1862	1890	1862	1890
Plan	25.0	0.0	13.0	0.0
Actual Paid Professional	20.0	0.0	1.0	0.0
Actual Volunteer	90.0	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**
245877	0	64859	0
1862 Matching	**1890 Matching**	**1862 Matching**	**1890 Matching**
1414406	0	326792	0
1862 All Other	**1890 All Other**	**1862 All Other**	**1890 All Other**
126532	0	99880	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

3. How was eXtension used?

Invasive Species CoP was used by faculty.

V(E). Planned Program (Outputs)

1. Standard output measures

2011	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Actual	9374	15760	2650	2497

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

Patent Applications Submitted

Year: 2011

Actual: 0

Patents listed

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

2011	Extension	Research	Total
Actual	11	8	19

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	Actual
2011	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	Medium Term - Technologies for Distance Education: Online Pesticide Training and Recertification for Licensed Professionals: 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.
5	Medium Term - School Integrated Pest Management Training: 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.
6	Long Term - Blueberry and Cranberry Insect Pest Management - Towards the Development and Implementation of Reduced-Risk Strategies: 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.
7	Long Term - Development of Best Management Practices on Annual Bluegrass Turf: 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.
8	Long Term - IPM for Landscape Contractors: 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.
9	Long Term - Developing and Implementing Integrated Pest Management Strategies: 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

Year	Actual
2011	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): 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 our reliance on pesticides as the sole pest management tool being used.

What has been done

PESP: Approximately 25.000 applicators were recertified by this program in 2011. In addition, New Jersey initially certifies an average of 2,000 commercial applicators each year. This requires initial training in CORE and CATEGORY materials. New Jersey also registered approximately 2,500 commercial pesticide operators in 2010. Since these registrations must be renewed each year, this group of applicators requires yearly training. Training in both areas is provided by New Jersey?s PESP program. New Jersey's PESP program currently utilizes 24 different manuals to provide initial training to both private and commercial applicators. Since pesticide information and technology are constantly changing, various manuals require both major and minor revisions on a regular basis to maintain the competency level of applicators. In 2002, in lieu of distributing a monthly newsletter, an email based listserv was initiated to keep various groups informed of state and federal issues related to pesticides. This listserv currently serves approximately 550 people. 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.

County Agricultural Agents across the state also conduct Pesticide Safety Meetings. Farmers of various commodities learn about current and emerging insecticides, pesticide control and monitoring in groundwater, weed resistance and herbicides for vegetable crops, nursery, tree, fruit, turf, etc., worker protection standards and pesticide regulations, weed control for grain crops, vegetable, nursery, tree, fruit, turf, etc., and pesticide infiltration into water sources.

IPM: Work was done to develop management strategies for use against the brown marmorated stink bug in vegetables and tree fruit. In addition, the vegetable IPM program was able to impact more acreage through the use of their website that tracks weekly European corn borer and corn earworm population changes in the state. This program has been so successful that it has been linked to a similar network maintained for the Mid-Atlantic States by Pennsylvania State University. Overall, IPM adoption in the state was seen on 7,400 acres of blueberries, 508 acres of nursery stock, 10 greenhouse acres, 8,604 acres of peaches, 2,527 acres of apples, 113

acres of peaches and 27,500 acres in vegetables (carrots, cole crops, high-tunnel tomato production, pumpkins, peppers, snap beans, staked tomatoes, sweet corn, and sweet potatoes) for a total of 66,662 acres. The vegetable and fruit IPM programs faculty and staff also conducted research evaluating the impacts of the brown marmorated stink bug (BMSB) in their programs.

Results

As a result of the 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.

In One county evaluation results revealed that:
82 farmers received pesticide handling safety equipment
100% of farmers surveyed 6 months after the meeting have utilized safety equipment
5 producers changed record-keeping policies to coincide with NJDEP regulations
8 producers made appropriate changes to reduce herbicide resistance in weeds on their operation
2 producer began posting re-entry interval signs to comply with worker protection standards
3 producers plan to utilize drip irrigation to make more efficient use of pesticides
6 producers plan to utilize filter strips and/or swales to reduce pesticide runoff
Overall, 47% of participants made changes to their operations as a result of attending the meeting

IPM: As a result of this 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. The impact of BMSB in tree fruit and peppers was also documented. Work with the BSMB working group resulted in a USDA NIFA Northeast Regional IPM grant to study further BMSB's impact in peppers.

4. Associated Knowledge Areas

KA Code	Knowledge Area
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	Actual
2011	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Upland Fruit (Tree Fruit and Grape) Integrated Pest Management (IPM) Delivery

New Jersey tree fruit production is located in both southern and northern counties. Statewide in 2011, tree fruit was valued at over $15 million for apples and just over $35 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 approx. $10-12 million.
New Jersey fruit growers produce commodities that are susceptible to more than two dozen arthropod and disease pests. The brown marmorated stink bug (BMSB) caused serious agricultural problems in 2010, causing an average of 58% damage in infested peach and apple orchards and up to 70% damage in some pepper fields. The insect has caused a two-to-three fold increase in pest control costs for growers. Management of this pest complex can cost producers up to $500 or more per acre. Some large NJ growers may spend up to $350,000 for pesticides alone.

What has been done
An integrated crop management (ICM) program was delivered to commercial fruit growers who produced apples, peaches, nectarines, and grapes. The program reached both primary and secondary participants. Secondary participants attend extension update meetings, and receive other IPM/ICM information through personal visits, fax broadcasts, articles, newsletters and the Internet. Primary participants are those growers who access all the above information and participate in a field scouting program.
Organized grower meeting contact reached a total of 359 farmers, while on-farm consultations totaled 1,064 visits. 29 weekly articles were written in a statewide newsletter, with a total circulation of 178 subscribers in NJ and 9 other states. Acreage impacted by primary participants totaled 75% of all state tree fruit acreage. Over 95% of total state tree fruit acreage was impacted by the program. IPM information reached over 90% of NJ grape growers.
NJAES researchers are collaborating with other scientists to study better management and monitoring methods as well as potential biological control agents.

Results

The program demonstrated reduced risk methods that included the use of mating disruption and ground cover management as tools to replace insecticide use for Oriental fruit moth, tarnished plant bug and stink bugs and two species of peach tree borers. Degree-day pest phenology models were updated, and proper use was advised to growers. Pesticide use records were collected at the end of the season to measure the program impact on pesticide use. Demonstrations were conducted on commercial farms to encourage use of alternative practices. Alternative practices include use of mating disruption and reduced risk pesticides. Thirteen (13) growers used mating disruption for Oriental fruit moth and codling moth. Since each grower who uses mating disruption in peaches eliminates 5-7 insecticide applications, about one third of IPM participants reduced insecticide use by 12 lb/acre. This is a 40% increase over 2007. 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. 75% 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 $50 million throughout the state for tree fruit and $39 million for grapes.

Laboratory tests where completed in 2011 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.

To address the critical need to combat the Brown Marmorated Stink Bug the IR-4 Project supplied data that was used to support an emergency use approval of a previously unregistered use of dinolefuran, which showed efficacy on peaches and other stone fruit.

4. Associated Knowledge Areas

KA Code	Knowledge Area
216	Integrated Pest Management Systems

Outcome #4

1. Outcome Measures

Medium Term - Technologies for Distance Education: Online Pesticide Training and Recertification for Licensed Professionals: 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

Year	Actual
2011	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Technologies for Distance Education: Online Pesticide Training and Recertification for Licensed Professionals

There is an overwhelming need to provide quality research-based information to help resolve critical issues facing agriculture, urban and rural communities, and the environment. Distance education efforts utilizing enhanced communication linkages reach existing and under-served clientele groups by facilitating distribution of research-based findings, educational opportunities, and regulatory updates. Issues such as capacity building, career development, and environmental justice must be addressed through interactive capabilities to inform a potentially unlimited general audience, while also providing specific educational opportunities for agricultural producers and licensed clientele groups.

Modern life has constrained available time audiences can afford to attend traditional seminars, workshops, and other outreach programs. At the same time, licensed professional pesticide applicators require new, efficient and timely delivery systems to provide easy access to educational information and regulatory updates leading to a more successful licensing and re-certification procedure.

What has been done

A Cooperative Extension team of faculty and staff developed a web site, www.recert.rutgers.edu, dedicated to training and providing licensure recertification credits on the proper use and storage of pesticides and the selection, use and storage of personal protective equipment. In so doing, this site provides 2 (two) CORE license recertification credits for commercial growers and applicators in NJ.
Two separate modules are currently available for viewing and provide CORE (general pesticide safety) recertification credits for NJDEP licensed applicators and additionally for licensed applicators in NY, PA, and MD.

Results

2011 activity for online CORE recertification credits through www.recert.Rutgers.edu totaled 75 commercial applicators attaining 127 CORE credits, for a program total of 473 online commercial applicators since the site launched in 2002.

Pre- and post-evaluative questionnaires and online survey results reveal:
85 % indicate a high level of satisfaction with the website design and content.
90 % strongly agreed the convenience of taking an online course was important to them.
80 % stated that the website provides a necessary learning experience in addition to the recertification credit.

Users were most knowledgeable in utilizing materials to neutralize spills (97% correct) and locking storage facilities (94% correct) before completing the web site.

Users most improved their knowledge in pesticide storage and inventory regulations (a 30% increase in evaluative survey scores) and signage regulations regarding language (a 22% increase in evaluative survey scores) after viewing the website.

4. Associated Knowledge Areas

KA Code	Knowledge Area
216	Integrated Pest Management Systems

Outcome #5

1. Outcome Measures

Medium Term - School Integrated Pest Management Training: 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

Year	Actual
2011	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
School Integrated Pest Management Training

New Jersey's "School IPM Act" was enacted on December 12, 2002. This requires schools to receive training and practice IPM on school grounds to limit unnecessary pesticide use on the interior and exterior of school grounds. School IPM training is conducted throughout the state in cooperation with the NJ Environmental Federation and the NJ Department of Environmental Protection and Rutgers Cooperative Extension.

What has been done

Six classes were conducted in 2011, providing training to 420 people including school administrators and school IPM directors and practitioners.

Results

As a result of the School IPM training in 2011, over 240 schools covering over 2,000 acres have adopted IPM practices and an IPM plan for the interior and exterior of school grounds. If we estimate that unnecessary pesticides have been reduced by approximately 50% on over 2,000 acres of school grounds then we could reduce over 8,000 lbs of active ingredient throughout our educational programs based on below average use from an Ohio State publication.

4. Associated Knowledge Areas

KA Code	Knowledge Area
216	Integrated Pest Management Systems

Outcome #6

1. Outcome Measures

Long Term - Blueberry and Cranberry Insect Pest Management - Towards the Development and Implementation of Reduced-Risk Strategies: 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	Actual
2011	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

New Jersey cranberry and blueberry growers experience low yield and crop losses as a result

of insect and fungal pathogens. Research is needed to develop tools and best management practices to address infestation concerns for both crops.

What has been done

The Blueberry/Cranberry Entomology Program at Rutgers University directed by Cooperative Extension Specialist Blueberry/Cranberry Entomology 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. Newsletter articles (33) were published throughout the growing season to provide information on pest management and to update findings on new pesticides. Educational sessions (4) were regularly offered in Atlantic and Burlington Counties. These sessions provided an overview of research progress and future work. More informal twilight meetings (4) were held during the growing season to provide seasonally-relevant pest management information. Summer sessions (2) directed to the community (local schools and senior institutions) were also conducted regularly during the growing season. The research program also delivered presentations at meetings to the scientific community.

Results

NJAES researchers 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. 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. The Blueberry/Cranberry Entomology Program delivered practical and effective strategies to blueberry and cranberry growers for the control of insect pests. These strategies are reduced-risk and thus expected to impact positively the environment and the well being of humans and their communities. Presentations were delivered to more than 100 New Jersey blueberry and cranberry growers on the use of new insect pest management practices.

Results of County Agricultural Agents programming to growers resulted in the following:

Growers participated in IPM programs, and maintained high fruit quality while minimizing pesticide use. In 2011, this included 41 growers who grew 49,860 acres of blueberries or about 66% of the state acreage, and about 75% of the state production.

Growers managed pests with the use of intensive monitoring, GIS based data collection and pesticide use record keeping, and trapping methods for key pests like blueberry maggot. Growers managing blueberry maggot under IPM methods reduced insecticide use on average from 6 applications to 1-2 applications, or over 66%.

Using the results from a previous USDA/RAMP project, growers following this program had between 45% and 58% lower amounts of insecticide active ingredient applied than those grown using grower standard programs, with even greater reductions in the total amount of insecticide residue detected on leaves and fruit at harvest. Overall, growers who practiced IPM at high levels, used from 6-8 lb ai of pesticide per acre, while growers treating on a pure calendar schedule, used up to 34 lb ai per acre.

Growers minimized on farm pest management costs. Some growers spent as much as $240/A for pesticides while the average IPM participant spent $132/A. The average grower using IPM practices saved about $100/A.

New pest management practices such as mating disruption and whole farm GIS based monitoring were used. Small plot research/demonstration trials for Oriental beetle mating

disruption showed that Oriental beetle could be managed with mating disruption in place of soil applied insecticide. Based on our research and demonstration work, a registration package is currently being submitted to EPA for registration and commercial use in the near future.

Fertility monitoring leads to recommendations of lower fertilizer use. During 2011, 381 samples were taken for combined monitoring of plant fertility and nematode levels. Soil and plant fertility tests demonstrated that about 75% of fields sampled had sufficient to high levels of soil phosphorous.

In 2011, the first spotted wing drosophila were found in the northeast through this program, leading to quick reactive programming for management of this pest.

4. Associated Knowledge Areas

KA Code	Knowledge Area
216	Integrated Pest Management Systems

Outcome #7

1. Outcome Measures

Long Term - Development of Best Management Practices on Annual Bluegrass Turf: 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	Actual
2011	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Development of Best Management Practices on Annual Bluegrass Turf

Turfgrass is a valuable and rapidly expanding component of our urban and rural landscape. Turfgrass is used to stabilize soil and produce a playing surface on more than 17,000 golf

courses in the US. Golf courses are an important component of the turfgrass industry providing a source of green space in the urban environment and offering 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).

What has been done

Due to the increasing severity of anthracnose on golf courses in North America, studies were initiated at nine universities (CA, CT, MD, MI, NC, NJ, NY, PA and ON [Guelph, Canada]), including Rutgers as part of a multistate turf regional research project (NE-1025). The goal of the anthracnose portion of this project was to develop and disseminate a set of best management practices (BMPs) to golf course superintendents that would result in successful control of anthracnose in a sustainable manner, while reducing pesticide inputs and maintaining acceptable turfgrass quality.

Results

Results of the initial stakeholder survey in 2006 (representing the first two years of the project and including input from 347 golf course superintendents from 30 states and Canada) indicated that 72% of respondents had sustained damage from anthracnose on their putting greens; 67% reported moderate to severe levels of anthracnose. A large segment of the respondents (41%) spent between $20,000 and $60,000 annually to manage anthracnose, while 8% indicated that annual costs to manage anthracnose was in excess of $60,000. A follow-up survey of 631 golf course superintendents from 48 states and Canada was concluded in 2011 to identify more detailed outcomes/impacts from this six year (2005-11) project. Superintendents from 66% of courses surveyed reported anthracnose to be a problem on their greens (a 6% decrease from 2006). Similar to the first survey, 59% of the respondents reported being better able to control anthracnose after learning about our BMPs.

Implementation of our BMPs by practitioners has resulted in improved management practices that are sustainable, cost-effective, and have provided improved control of anthracnose often with reduced pesticide inputs. This multi-state research project has also improved the exchange of information about anthracnose between turfgrass scientists throughout North America, and has greatly enhanced our understanding of the general biology and ecology of this disease on golf course putting greens.

4. Associated Knowledge Areas

KA Code	Knowledge Area
216	Integrated Pest Management Systems

Outcome #8

1. Outcome Measures

Long Term - IPM for Landscape Contractors: 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	Actual
2011	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
IPM for Landscape Contractors

In suburbanized counties there has been too much reliance on chemical pesticides in lawn care and landscape maintenance. Each landscape contractor can represent 25-75 residential and commercial properties, which amounts to 12-50 acres of landscape. The result has been many tons of chemicals, often applied unnecessarily or at the wrong time (when target pests are not present). A consequence of this is the compromised quality of air, water and soil; plus clear threats to human health, household pets and beneficial organisms (pollinators, beneficial predators).

What has been done
The yearly North Jersey Ornamental Horticulture Conference (NJOHC) which is tailored to meet the needs of landscape, tree and turf professionals. The 3-day conference has a full day devoted to each of the 3 themes: Turf, Tree, Landscape. Over 600 professionals are trained yearly in this series. The focus is on using IPM tactics to minimize chemical inputs while maximizing natural systems and plant resistance.

Results
Evaluation results of the North Jersey Ornamental Horticulture Conference revealed that:
of 133 respondents, 130 believed they had learned something new which they can apply to their landscape management practices.
of 133 respondents 127 believe they will make more informed pest management decisions as a result of the training.
of 103 repeat attendees, 74 had reduced the amount of chemical pesticides applied. They also reported greater use of IPM tactics.
Additionally, 94 report maintaining NJDEP pesticide applicators license; 71 report the training has helped them train their employees; 71 report they have improved communication with clients; 88 report practicing IPM techniques.

4. Associated Knowledge Areas

KA Code	Knowledge Area
216	Integrated Pest Management Systems

Outcome #9

1. Outcome Measures

Long Term - Developing and Implementing Integrated Pest Management Strategies: 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	Actual
2011	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Developing and Implementing Integrated Pest Management Strategies

Bed bug infestations continue to be a significant public health concern throughout the U.S. They cause discomfort, anxiety, economic loss, and lawsuits. There is an urgent need for educating the public, studying the bed bug biology and behavior, and developing and implementing effective bed bug control programs. Cockroaches are common indoor pests that contaminate food, cause allergic reactions, and cause economic loss to residents and property owners. Residents often use non-effective and risky methods to control cockroaches. More effective management strategies need to be demonstrated to increase effectiveness and reduce risks associated with pesticide applications.

What has been done
Cooperative Extension Specialist in Urban Entomology has researched bed bug behavior and management, the objectives were to: 1) evaluate the cost and effectiveness of different bed bug management strategies; 2) study bed bug behavior; 3) develop a more affordable and effective bed bug monitoring tool; and 4) demonstrating a building-wide bed bug management program. Experiments were conducted in the laboratory and in low-income apartment buildings. Residents

were educated on integrated pest management. Building staff were demonstrated bed bug monitoring and non-chemical control methods.
The Specialist screened for effective bed bug lures and developed an affordable bed bug trap; compared three bed bug treatment strategies in apartments; evaluated 3 different cockroach gel bait products in apartments for managing German cockroaches; collaborated with companies in evaluating new products for managing urban pests; presented 18 seminars or trainings on bed bugs and other urban pests to the following groups or conferences. National Pest Management Association Eastern conference, New Jersey Pest Management Association Spring Meeting, Probation officers of New Jersey, Public Housing Authority staff, Health officers in Morris County, National Association of Housing and Redevelopment Officials provided information to media including: The Star Ledger newspaper, My 9/Fox 5 News. New Jersey Monthly magazine, 1010 WINS Radio, News 12 New Jersey. Submitted a patent application for a new bed bug lure and monitor. Produced two bed bug videos.
Extension Specialist developed a bed bug attractant and an inexpensive bed bug trapping system. The lure was the first that showing attractiveness to bed bugs. In field studies, the attractant increased trap catches by 2.8 times. The trapping device was 3.8 times more effective than competitive product in the market. The monitoring system was 2.4 times more effective than the most effective commercial bed bug monitor. The bed bug trapping system developed by our research team represents at least 60% savings than the commercial competitive product. Our bed bug educational programs provided hands-on experience to approximately 2,000 educators, professionals, health officers in New Jersey and beyond. In turn, the trained educators, professionals, and officers educated many more people about bed bugs, cockroaches, and insecticide use in urban environment. The educational 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 also helped reduce economic loss, reduce discomfort from bed bug bites, and improve the quality of life of residents.

Results

A provisional patent was filed. This patent introduces a new cost-effective bed bug monitoring system which is cheaper, more effective than commercial trapping technology. The technology is at least two times more effective, and only costs about 10% of the similar type of commercial monitors. Homeowners and property managers can use this technology, which will save them hundreds of dollars and more importantly, detect bed bugs more effectively. Several companies expressed interests in licensing the technology and are in negotiation with the Office of Technology Commercialization.

Specialist is demonstrating a building-wide bed bug management program in collaboration with Purdue University. The program resulted >80% reduction in the number of infestations and lowered number of bed bugs in infested units over a 12 months period.

He also demonstrated a cockroach management program in an apartment building. The study resulted in approximately 95% cockroach reduction based on trap catches after one month.

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)

Evaluation Results

See Qualitative Outcomes

Key Items of Evaluation

See Qualitative Outcomes

V(A). Planned Program (Summary)

Program # 9

1. Name of the Planned Program

Global Food Security and Hunger - 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%	
	Total	100%		100%	

V(C). Planned Program (Inputs)

1. Actual amount of FTE/SYs expended this Program

Year: 2011	Extension		Research	
	1862	1890	1862	1890
Plan	3.0	0.0	4.8	0.0
Actual Paid Professional	5.0	0.0	4.0	0.0
Actual Volunteer	0.0	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
39294	0	161071	0
1862 Matching	**1890 Matching**	**1862 Matching**	**1890 Matching**
411869	0	871012	0
1862 All Other	**1890 All Other**	**1862 All Other**	**1890 All Other**
115548	0	903125	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

3. How was eXtension used?

eXtension was not used in this program

V(E). Planned Program (Outputs)

1. Standard output measures

2011	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Actual	10692	3570	2375	1100

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

Patent Applications Submitted

Year: 2011

Actual: 0

Patents listed

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

2011	Extension	Research	Total
Actual	5	22	27

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	Actual
2011	0

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	Medium Term - Seafood at its Best: 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.
5	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.
6	Long Term - Barnegat Bay Shellfish Restoration 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.
7	Long Term - Climate Change and Atmospheric Forcing of Water Quality Changes in the Mullica River-Great Bay Estuary, New Jersey: 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.

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2011	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Sustainable Fisheries: Black Sea Bass Tagging Project

Black sea bass are an important target of commercial and recreational fisheries in NJ. Because the population is heavily fished and currently close to the overfishing limit, the regulations have become very strict. These strict regulations limit fishing opportunities and have an adverse economic impact on charter boat operators, commercial fishermen, and the businesses that support them.

This species is a protogynous hermaphrodite, i.e., they change sex from female to male. Size limits in the fishery mean that fishing mortality falls disproportionately on male fish. Effective fishery management requires that we understand the effect of this male biased fishing mortality on the population. Without this understanding, it is likely that management for this species will be suboptimal - potentially leading to overfishing and/or reduced fishing opportunities.

Management of New Jersey?s fisheries is a challenging task, made more difficult by limited understanding of their biology. Of particular note is the investigation of the reproductive biology of the black sea bass, a highly sought after species with a unique lifestyle. They are protogynous hermaphrodites. Most black sea bass begin life as females and some later become males.

What has been done

The Extension Specialist's research involved outputs from 2011: Tagging of nearly 100 black sea bass off the coast of New Jersey in order to understand factors that influence their population size. This field research involved 20 days of collaborative field research with over 50 volunteer and professional fishermen. Fishermen were trained in research methods and biology of black

sea bass. More than 100 of these tagged fish have been recaptured by fishermen and reported to us. The project website (http://marine.rutgers.edu/~ojensen/RBSB.html) and articles in fishermen?s magazines (The Fishermen, Commercial Fishing News) and newspapers (The Asbury Park Press) have been used to extend outreach to other fishermen and the general public. Laboratory analysis of over 300 fish and invertebrate samples for stable isotopes and fatty acids (chemical markers of food webs). Samples are from Mexico and Mongolia and are used to improve understanding of food webs and fisheries. Field Collections of fish and invertebrate samples from Mongolia and field measurements of environmental conditions; including training of 5 U.S. and 2 Mongolian students. The U.S. students were from universities in New Jersey, New York, Tennessee, Minnesota, and Arizona. Preliminary results have been disseminated via public presentations. research presentations by the PI and 4 scientific meetings, participation in 6 scientific workshops, and 5 public talks. An additional 4 scientific talks and public outreach project (involving 10 high school students for 8 weeks) related to this Hatch project were conducted by the PI?s graduate students. Development of the first global fishery stock assessment database, in collaboration with colleagues at Dalhousie University in Canada, and release to the public on October 1, 2011: http://ramlegacy.marinebiodiversity.ca/ram-legacy-stock-assessment-database. This database has been the basis of 9 peer-reviewed publications to date, including papers in Science and Nature. Results are being disseminated to fishermen via public talks to fishing organizations and the general public (Fish Hawks and Hooks & Anchors fishing clubs in New Jersey).

Results

Increased knowledge of black sea bass reproductive biology improves management of this important species. Black sea bass are considered to be a data poor species by the National Marine Fisheries Service. This project has already led to increases in knowledge about the biology of this species, including the important observation that sex change (from female to male) does not occur during the summer spawning season. It most likely occurs over the winter between spawning seasons. This means that sex change cannot replace male fish that are caught during the spawning season, thus increasing the chances that size limits in the fishery can lead to skewed sex ratios in the population. Additional data on weight vs. length, and sex ratio vs. length has been provided to scientists working on the stock assessment for this species. 2) Over 50 New Jersey fishermen and more than a dozen students learn field research and safe catch and release techniques. These fishermen include volunteers and professionals (mates and captains on commercial and recreational fishing boats) who participated in our 20 black sea bass tagging trips. Fishermen learned about: (1) tagging techniques and the information that scientific tagging programs can provide; (2) how to handle fish in order to maximize survival of fish that are released back into the water; (3) fish reproductive biology and its influence on stock assessment and fishery management. 3) U.S. and Mongolian students learn ecological research methods in Mongolia. Five U.S. and two Mongolian students participated in a field research and training trip to Mongolia in July 2011. The students designed and conducted independent research projects related to the effects of climate change on aquatic ecosystems. Mongolia represents a unique environment for studying the effects of climate change as the remote lakes and rivers have few other confounding human impacts. Each of the U.S. high school student participants also conducted outreach projects. Combined, these outreach projects introduced more than two dozen U.S. high school students to this research.

4. Associated Knowledge Areas

KA Code	Knowledge Area
135	Aquatic and Terrestrial Wildlife

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.

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2011	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
National Animal Genome Research Project (NRSP-8): Aquaculture Genomics (Oysters)

New Jersey's aquaculture resources are finite and can sustain on fixed harvests, while the demand for quality fish and seafood continues to climb. Threats from disease and environmental contaminants and conditions provide additional challenges to producers to meet the demand for quality aquaculture products. In particular, shellfish resources along much of the Atlantic Coast have been devastated by diseases.

What has been done
NJAES researchers participated in the USDA National Research Animal Genome Project (NRSP-8). The national project is designed to coordinate research efforts in animal genomics and facilitate exchanges of ideas and data. Our group conducts research on genomics of molluscs under projects funded by NOAA Sea Grant, USDA, NSF and Rutgers University. NJAES conducted the following research in collaboration with colleagues in 2011: 1) we identified and mapped disease resistance genes and makers, and used them to model disease resistance in eastern oyster populations; 2) we worked on the development of SNP marker and a cytogenetic map for the Pacific oyster; 3) we worked on assembly and annotation of the Pacific oyster genome; and 4) we attended the annual meeting of NRSP-8 held in San Diego, January 2011. The outputs have been disseminated to the research community through workshops, meeting presentations and publications.

Results

14 loci for Dermo disease resistance were indentified, which improved our understanding of genetics of Dermo resistance. A preliminary cytogenetic map has been developed for the Pacific oyster, which is the first for this species. This map will provide physical anchors of the genetic and sequence maps of this species. We have assembled and annotated the Pacific oyster genome, which will provide a valuable resource for the scientific community.

4. Associated Knowledge Areas

KA Code	Knowledge Area
135	Aquatic and Terrestrial Wildlife

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	Actual
2011	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Broodstock Management, Genetics and Breeding Programs for Molluscan Shellfish

New Jersey's aquaculture resources are finite and can sustain on fixed harvests while the demand for quality fish and seafood continues to climb. Threats from disease and environmental contaminants and conditions provide additional challenges to producers to meet the demand for quality aquaculture products. In particular, shellfish resources along much of the Atlantic Coast have been devastated by diseases.

What has been done
This is a USDA multi-state project (WERA-099) aimed at promoting exchange and

coordination among researchers involved in molluscan genetics, breeding and broodstock management. Molluscan aquaculture is a significant industry in the U.S. Genetic improvement of cultured molluscan stocks is needed to support continued development of molluscan aquaculture. Research in our lab focuses on the genetics and breeding of cultured molluscs. During past five years, NJAES conducted the following research related to this multi-state project: 1) selective breeding of disease-resistant eastern oysters; 2) production and breeding of tetraploid eastern oyster lines using disease resistant stocks; 3) survey of genetic resources of Crassostrea oysters from Asia; 3) production of inbred and pedigreed families for genetic analyses; 4) development of genetic markers and resources for oysters and other economically important molluscan species; and 5) participation in the international oyster genome project aimed at whole genome sequencing of Pacific oyster.

Results

The disease-resistant diploid and tetraploid oysters developed from NJAES research program have been transferred to the aquaculture industry for commercial production. Rutgers stocks have shown strong resistance to MSX. Because of the recent outbreak of MSX disease in Maine, there is considerable interest in using our Rutgers disease-resistant oysters. Rutgers disease-resistant stocks have and will continue to benefit oyster farmers in northeastern states. Tetraploid oysters developed from our research program have been used for commercial production of triploids in the US and worldwide. Triploid oysters produced from tetraploids are 100% pure and grow significantly faster than normal diploids. Triploid eastern oysters can yield up to 192% more than diploids, which is a significant benefit for oyster farming. Triploid oysters have become an important product of the oyster culture industry. ESTs and genetic markers as well as genetic maps have been developed for several species of cultured molluscs. They provide valuable resources for genetic studies and breeding. We also identified disease-resistance genes and QTLs in oysters, which will help us in further development of disease-resistance oysters. Rutgers is also a key partner in the international oyster genome project. Our Rutgers researcher received a Chaire d'Excellence award from the University of Caen, where he leads a team of scientists from U.S., France, and China engaged in studying oysters' adaptation to their environment.

4. Associated Knowledge Areas

KA Code	Knowledge Area
135	Aquatic and Terrestrial Wildlife

Outcome #4

1. Outcome Measures

Medium Term - Seafood at its Best: 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.

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2011	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Seafood at its Best

An increase in the consumption of fish and seafood is good for the NJ industry as well as consumer health.

What has been done
Family and Community Health Sciences Educators have taught consumer classes on the importance and health benefits of seafood in the diet. Through these classes participants learned to:
Define seafood, identify where seafood comes from, and describe consumer consumption patterns and future supply.
Select seafood products, determine how much to buy, and properly handle, cook and store seafood.
Describe the health benefits of seafood and seafood serving recommendations.
Describe possible health risks from eating seafood and steps to minimize those risks and inspection programs to protect public health.
Eat 2 (3 ounce) fish portions each week as recommended by the American Heart Association.

Results
Post program evaluation revealed that participants:
100% could list 3 benefits of consuming fish for health.
88% could explain why women of childbearing age and those who are pregnant need to modify their consumption of certain fish.
100% could describe the impact of reduced fish consumption on adults/youth and the net public health impact of this reduced consumption.
100% could describe how to prepare and eat fish with safety in mind
89% will eat 2 (3 ounce) fish portions each week as recommended by the American Heart Association.

Responses when asked the following:
How would you rate your knowledge about seafood and health? 75% said "High"
How would you rate your ability to shop for and prepare seafood at home? 65% said "High"

How much new information did you learn about seafood in this series? 90% said "A lot"
Do you plan to prepare seafood at home? 95% "Yes"

Increases consumer consumption of seafood is not only beneficial to the industry, it has health benefits, which can reduce obesity and other diet related diseases.

4. Associated Knowledge Areas

KA Code	Knowledge Area
135	Aquatic and Terrestrial Wildlife

Outcome #5

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	Actual
2011	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

New Jersey's aquaculture resources are finite and can sustain on fixed harvests while the demand for quality fish and seafood continues to climb. Threats from disease and environmental contaminants and conditions provide additional challenges to producers to meet the demand for quality aquaculture products. In particular, shellfish resources along much of the Atlantic Coast have been devastated by diseases.

What has been done

NJAES scientists research on this initiative resulted in research activities, including surveys, interviews, and analyses of primary and secondary data, mentoring graduate students and post-doctoral associates. Products included sets of data, some in the form of community profiles; taped and transcribed interviews uploaded to a public web-site of the National Marine Fisheries Service; a web-site that combines mapping with interviews (not yet public); networks and collaborations; and students with advanced degrees. A major output was a set of "community profiles" created for major marine fishing ports of the Mid-Atlantic region of the Atlantic seaboard (New York to northern North Carolina). These were disseminated to the Mid-Atlantic Fisheries Management Council and to the Northeast Fisheries Science Center of the National Marine Fisheries Service (NOAA, Dept. of Commerce), where they were used in the fishery management plan process, as required by law. Another significant output was research on cooperative research programs in the fisheries, including the training of a graduate student. This work combined with other outputs of the project enhanced our engagement in a network and collaboration with European researchers and institutions through the International Council for Exploration of the Seas (ICES), which led to further comparative research activities. The earlier phase of the project also led to successful research proposals to the National Science Foundation and to the New Jersey Sea Grant College Program.

One research activity that followed was an interview-based study of cumulative impacts of regulatory change on New Jersey fishers and fishing communities. Another was a very large, multi-disciplinary and multi-institutional study of climate change, Atlantic surfclams, and the surfclam industry, including the creation of innovative models. Another was collaboration with the Mid-Atlantic Fisheries Management Council in creating a new method for obtaining information pertinent to fisheries management by directly involving representatives of the fisheries in creating performance reviews. In all cases, a major form of dissemination was the presentation of research results in talks given at professional meetings, as documented in the annual reports to 2010, as well as nine in 2011, not previously documented. Publications from the research were also major ways the work was disseminated. Added to the publications documented in prior years were four major publications in 2011. Specialized dissemination included development of web-sites, presentations to fishery management councils and to teachers, and participation in a pod-cast to reach the public.

Results

The major outcomes and impacts of the project were primarily changes in knowledge that were significant enough to be included in a publication or on a national web-site. The project resulted in seven book chapters and nine refereed journal articles. It also contributed sixteen interviews to the national web-site Voices of the Fisheries, hosted by the National Marine Fisheries Service (NOAA). It resulted in one pod-cast, featured on the COSEE-NOW web-site for marine environmental educators. Among the key messages of the publications that resulted from the project was the importance of bringing human dimensions-- that include social and economic variables pertaining not just to individuals and firms but also to communities-- into the frameworks of fisheries and marine ecosystem management. The publications also provided insight into causes of different outcomes in fisheries management and cooperative research ventures, using intensive ethnography and text analyses for individual as well as comparative case studies. Publications furthered understanding of major socio-economic processes, particularly the process of enclosure, or progressive limitations on access, in some cases to full privatization, and in more recent work the intersection of property rights, community, and environmental change.

The project contributed to change in knowledge and actions also through its role in helping the PI work with the regional fisheries management council to improve the decision-making process by developing a method for the contribution of fishermen's experience-based knowledge and expertise to the process, working with advisory panels to create pilot performance reports in 2011. Moreover, the project's early contribution of Community Profiles facilitated the creation of social and regulatory impact analyses for fishery management plans developed by regional fishery

management councils, in order to fulfill legislative mandates for management of fisheries in federal waters.

4. Associated Knowledge Areas

KA Code	Knowledge Area
135	Aquatic and Terrestrial Wildlife

Outcome #6

1. Outcome Measures

Long Term - Barnegat Bay Shellfish Restoration 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	Actual
2011	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Barnegat Bay Shellfish Restoration Program

New Jersey's aquaculture resources are finite and can sustain on fixed harvests while the demand for quality fish and seafood continues to climb. Threats from disease and environmental contaminants and conditions provide additional challenges to producers to meet the demand for quality aquaculture products. In particular, shellfish resources along much of the Atlantic Coast have been devastated by diseases.

What has been done
The Barnegat Bay Shellfish Restoration Program (BBSRP), and its partner, ReClam the Bay (RCTB) work diligently to provide interesting and scientifically valid information about our environment. Coupling learning experiences with the natural beauty of NJ provides a true attraction and stimulates tourists who want to learn about the bay and its issues and, hopefully,

share that knowledge with family and friends. Promoting Cooperative Extension educational events is critical not only to their success but also to the wellbeing of our environment. Every time we promote an event we raise the awareness of the problems in the bay and the potential solutions.

Results

Volunteers learn not only about monitoring, but interpreting this data, and how the scientific and regulatory process works. They can then add the information they have learned into their educational and outreach materials, to help enhance understanding of the bay ecosystems. We estimate that more than 2,000 hours of volunteer time were devoted to growing shellfish, and over 1,100 hours were devoted to education. Administrative, PR and coordination with other organizations consumed another 1,300 hours. Other activities bring the total to 5,129 hours invested. According to the Independent Sector, the hourly value of volunteer time in NJ is at least $25. That correlates to over $128,000 in volunteer services. RCTB is pleased with the new members, and are also happy that we retained about 80% of our former volunteers. Our active email list includes about 290. This is the 7th year of operation for BBSRP/RCTB, the 501c3 volunteer organization established by the Barnegat Bay Shellfish Restoration Program. BBSRP has now trained over 120 Certified Shellfish Gardeners who, with other BBSRP volunteers have put about 10.7 million clams and 3 million oysters in Barnegat Bay. More importantly, in 2011 alone, we told about 9,500 people that a major problem in the Barnegat Bay is too much nitrogen which causes both healthy and unhealthy algae to grow beyond the ability of nature to reach a balance.

NJAES researchers are investigating the genome analysis of harmful Algai blooms which is the first comprehensive analyses of gene expression for harmful algae methods are being developed to open a window into the physiology of A. tamarense and H. aircularisquama, which have major impact on shell fisheries around the world.

4. Associated Knowledge Areas

KA Code	Knowledge Area
135	Aquatic and Terrestrial Wildlife

Outcome #7

1. Outcome Measures

Long Term - Climate Change and Atmospheric Forcing of Water Quality Changes in the Mullica River-Great Bay Estuary, New Jersey: 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	Actual
2011	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Climate Change and Atmospheric Forcing of Water Quality Changes in the Mullica River-Great Bay Estuary, New Jersey

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
Extensive meteorological and water quality databases were collected during 2011 to assess the temporal and spatial trends of physicochemical conditions in the Mullica River-Great Bay Estuary with respect to meteorological forcing factors. More than 50 professors and students, research scientists, and technical staff at Rutgers University, Richard Stockton College of New Jersey, Georgian Court University, and other academic institutions have directly utilized the databases and other components of the study. Government agencies (e.g., New Jersey Department of Environmental Protection and U.S. Environmental Protection Agency), national estuary programs (e.g., Barnegat Bay Partnership), National Estuarine Research Reserve (NERR) system sites, as well as numerous recreational and commercial fishermen have used the meteorological and water quality data. These data are permanently stored on computers at the Central Data Management Office of the NERR system in Charleston, South Carolina, and also posted on the World Wide Web for use by business, industry, and the general public. Therefore, it potentially reaches tens of thousands of individuals. Elements of the project are also widely disseminated to people in Ocean County and other areas of New Jersey through education and outreach programs of the Jacques Cousteau National Estuarine Research Reserve (JCNERR) and through activities at the Life on the Edge Exhibit in the Tuckerton Seaport. More than 10,000 people visited the seaport exhibit in 2011 and observed the datalogger exhibit that simulated data acquisition in the field. There is a wide array of other venues where information on this project is provided to many people. Included here are Lunch-and-Learn sessions, estuarine field days, green expos, senior programs, workshops, conferences, and ecological tours. An open-house day at the Rutgers University Marine Field Station in Tuckerton in September 2011 drew nearly 450 people, and the Barnegat Bay Festival in June 2011 had more than 500 visitors. Both events included displays of dataloggers.

Results
Data obtained in this project, therefore, are producing new measures useful for improving coastal zone management programs (e.g., water and air quality initiatives) and thus have the potential for forging significant positive change in coastal administrative actions. The water quality and atmospheric data collected in this project are also useful for improving the analysis and

assessment of habitat conditions and habitat utilization by commercial and recreational fish species in the study area, such as summer flounder, weakfish, and striped bass. The data are also of value to ichthyologists investigating the life history and ecology of an array of fish populations in the region, with special emphasis on the role of habitat as it affects recruitment success and abundance of finfish assemblages in estuarine and near-shore ocean waters in the Jacques Cousteau National Estuarine Research Reserve. The outcome is positive, therefore, for fisheries interests in New Jersey and elsewhere.

In addition, tens of thousands of people now have access to web-based databases collected in the project and posted for general use. It is clearly evident that this project has had an impact on many people in New Jersey and other coastal states.

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)

Evaluation Results

See Qualitative Outcomes

Key Items of Evaluation

See Qualitative Outcomes

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
101	Appraisal of Soil Resources	10%		5%	
102	Soil, Plant, Water, Nutrient Relationships	5%		5%	
104	Protect Soil from Harmful Effects of Natural Elements	5%		5%	
311	Animal Diseases	0%		5%	
314	Toxic Chemicals, Poisonous Plants, Naturally Occurring Toxins, and Other Hazards Affecting Animals	0%		5%	
404	Instrumentation and Control Systems	0%		5%	
501	New and Improved Food Processing Technologies	5%		10%	
502	New and Improved Food Products	10%		10%	
503	Quality Maintenance in Storing and Marketing Food Products	10%		5%	
504	Home and Commercial Food Service	15%		10%	
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	5%		5%	
723	Hazards to Human Health and Safety	15%		10%	
	Total	100%		100%	

V(C). Planned Program (Inputs)

1. Actual amount of FTE/SYs expended this Program

Year: 2011	Extension		Research	
	1862	1890	1862	1890

Actual Paid Professional	3.0	0.0	4.0	0.0
Actual Volunteer	0.0	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**
50264	0	224857	0
1862 Matching	**1890 Matching**	**1862 Matching**	**1890 Matching**
285003	0	957525	0
1862 All Other	**1890 All Other**	**1862 All Other**	**1890 All Other**
15081	0	528313	0

V(D). Planned Program (Activity)

1. Brief description of the Activity

• Conduct training and certificate programs for growers, producers, food workers, consumers andvendors
to increase knowledge of food safety practicies.
• Design strategies, tools and processes to detect and eliminate pathogens, chemical and physicalcontaminants during production, transportation, processing and preparation of food.
• Invesitgate 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 communites
• NJAES - faculty - staff - students
• Food manufacturers
• Schools - child care providers - food service workers

3. How was eXtension used?

eXtension was not used in this program

V(E). Planned Program (Outputs)

1. Standard output measures

2011	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Actual	14050	20000	2100	9500

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

Patent Applications Submitted

Year: 2011

Actual: 1

Patents listed

61/480,406

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

2011	Extension	Research	Total
Actual	5	18	23

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.

Year	Actual
2011	0

V(G). State Defined Outcomes

V. State Defined Outcomes Table of Content

O. No.	OUTCOME NAME
1	Medium Term - Microbial Food Safety for the Fruit and Vegetable Industry: Adoption of safe food handling practices at the individual, family, community, production and supply system levels.
2	Medium Term - Food Safety and Preservation: Adoption of safe food handling practices at the individual, family, community,production and supply system levels.
3	Long Term - Improving Food Safety Through Predictive Models and Microbial Risk Assessment: A safe food supply resulting from reduced incidence of food-borne illnesses.
4	Long Term - Food Safety Cognitions of Middles Schoolers and Parents of Middle Schoolers: A safe food supply resulting from reduced incidence of food-borne illnesses.
5	Long Term - Sussex County Commercial Kitchen: A safe food supply resulting from reduced incidence of food-borne illnesses.
6	Shorterm - Increase knowledge of viable technologies, detection prevention, intervention and control techonologies and practices to ensure food safety. Increase understanding of the ecology of threats to food safety from microbial and chemical sources.

Outcome #1

1. Outcome Measures

Medium Term - Microbial Food Safety for the Fruit and Vegetable Industry: 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	Actual
2011	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 Safety Modernization Act which will be implemented over the next three years.

What has been done
The project was initiated at the request of the produce industry in 1999. Growers started to receive letters from supermarkets requesting they have food safety plans and third party audits in place for the 1999 growing season. Fundamentals for training needs were solicited from individual growers and buyers to help design the project.

The goals and objectives of the project were to:
Train the produce industry (wholesale/retail growers and distributors) in basic food safety
Train wholesale/retail growers on how to carry out a risk assessment on their operations; write a food safety plan and prepare for a third party audit
Train first level buyers on food safety and how to prepare for third party audits
Have growers and buyers who participate in food safety training pass their third party audits
Determine research needs in the food safety area
Design and carry out research that directly benefits the fruit and vegetable industry

The project was delivered through the following methods:
Presentations at produce industry meetings across the state (30-60 minutes)

Monthly and weekly newsletter articles (Cultivating Cumberland and Statewide Plant and Pest Advisory Fruit and Vegetable Editions)
Website (http://njveg.rutgers.edu) where training materials are placed for self training and new food safety information is reported.
In-depth training sessions growers and buyers (4-6 hours)
One-on-one critiques of food safety plans on individual farms (mock/second party audit)
Webinar presentations

Results

The number of operations passing a USDA Good Agricultural Practices & Good Handling Practices Audit Verification was 69 compared to 57 in 2010. At least ten operations passed a Primus Laboratories Audit, at least one passed a Safety Quality Foods Audit (SQF), a British Consortium Audit, AIB Audit or Davis Fresh Audit in New Jersey.

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.

Even growers who have not been trained in food safety have made changes on their operations. It was a common practice to pack herbs such as cilantro, parsley and basil on the packinghouse floor before food safety became an issue. Now no one packs on the floor and many are incorporating either stainless steel tables or another surface which can be sanitized.

4. Associated Knowledge Areas

KA Code	Knowledge Area
101	Appraisal of Soil Resources
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 #2

1. Outcome Measures

Medium Term - Food Safety and Preservation: 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	Actual
2011	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Food Safety and Preservation

While the food system in the United States is the safest in the world, food safety concerns continue to threaten the health of families and individuals. Foodborne pathogens, improper food handling and environmental factors can result in foodborne illness and even death. The CDC reports numerous cases of foodborne illness each year. Research shows that consumers either do not know appropriate food handling practices or that they say one thing or do another. Foodborne illness has both health and economic consequences.
There is an increased interest in home food preservation - canning and freezing in recent years. As more people plant home gardens, participate in CSA's or buy from local farm markets, they want to preserve the extra produce for later in the year. Many people have never preserved food at home and others are using outdated or unsafe recipes and procedures.

What has been done
Family and Community Health Sciences Educators have conducted workshops on food safety and canning and freezing?s to help consumers understand basic food safety concepts such as hand washing, avoiding cross contamination, and using food thermometers. Participants in canning and freezing workshops learned the rationale and requirements for safe home food preservation, sources for safe, tested recipes for canning and to follow proper procedures for canning and freezing food.

Results
Post workshop survey results revealed that:
Participants are always surprised to learn how long one needs to wash their hands and they

promise to do better. Few participants report using a food thermometer to determine doneness on a regular basis and they report planning to use one more often after the class.

Participants in the county workshops reported gaining knowledge both in understanding the importance of proper food preservation to ensure safety and the techniques required for a safe and high quality product. Prior to the workshops, people said they used untested and potentially unsafe family recipes. After the class, they said they would only use tested recipes from a reliable source.

4. Associated Knowledge Areas

KA Code	Knowledge Area
101	Appraisal of Soil Resources
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 - Improving Food Safety Through Predictive Models and Microbial Risk Assessment: 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	Actual
2011	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 still an essential component for the state's economic growth.

What has been done

Individuals who worked on the project includes 6 graduate students, who conducted original research and more than 20 undergraduate students who assisted with the research and 2 international visitors. Collaborators and contacts include more than 30 research collaborators on 11 different research projects, representing more than 20 different institutions. Partner Organizations include more than 15 different for-profit companies, several non-profits, the Food and Drug Administration, the Centers for Disease Control and Prevention and more than 5 state and local departments of health. Training or professional development was also provided for the 6 graduate students, who conducted original research and more than 20 undergraduate students who assisted with the research and 2 international visitors.

Target audiences include the general public and more than 15 different for-profit companies, several non-profits, the Food and Drug Administration, the Centers for Disease Control and Prevention and more than 5 state and local departments of health. Efforts include one magazine interview, six Internet news source interviews, four radio interviews (including 2 for NPR), and 7 newspaper interviews, all on a variety of food safety topics. Other efforts include two invited presentations at the International Association for Food Protection annual meeting and two other meetings, a talk to individuals from the Iraqi Ministry of Health in Washington, DC and serving as an invited speaker for a number of different webinars or web based training for several organizations. Local short courses include coordinating and/or teaching in the usual yearly courses offered through the Office of Continuing Professional Education. Other training courses includes a Microbial Challenge testing class in Sacramento California (March, 2011), and several presentations in NJ on food safety for Annie's Project, a nationally acclaimed farm business educational program for farm women coordinated by Rutgers Cooperative Extension. Invited presentations on the development of a risk assessment for Salmonella in formulated dry foods, in Wageningen, Netherlands, and University of Copenhagen, Denmark, as well as a short course in Edmonton, Alberta were also presented.

The Extension Specialist in Food Safety provided technical assistance for small and medium-sized companies, helping to keep them in business, while still assuring the safety of the food supply. In 2011 the Extension Specialist assisted NJ-based companies with a microbial safety assessment of novel dry food pasteurization method; a search of the peer-reviewed literature on microbial contamination of the kitchen; advice on managing aflatoxin risk in peanuts; development of a safety validation for bread baking operation; provided advice on advertising claims for anti-bacterial soaps; and with a literature research on causes of odor formation on kitchen sponges. In addition to the assistance provided to NJ-based companies, assistance was also provide to Michigan, New York, Ohio, Pennsylvania and Utah and internationally. This assistance saved

these companies over $100,000 in product losses and recalls.

In addition to the work of the food science specialist NJAES researchers are continuing to conduct analyses regarding public perceptions of food contamination and food recalls. The results of the work were disseminated to stakeholders in academic, industry and government.

Results

Food recalls were avoided. The value of products affected exceeded $100,000. The Extension Specialists' lab received three new competitive USDA grants in 2011. All three are multi-year, multi-institution, multi-investigator grants with the Extension Specialists? team serving as the modeling and risk assessment lead or team member and in some cases as extension and outreach team member.

As a result of biosecurity communications research and practices consumers are motivated to respond appropriately to food recalls as cited by several companies with incidents of products with food contamination.

4. Associated Knowledge Areas

KA Code	Knowledge Area
101	Appraisal of Soil Resources
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

Long Term - Food Safety Cognitions of Middles Schoolers and Parents of Middle Schoolers: 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	Actual
2011	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Food Safety Cognitions of Middles 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. Changes in the educational system, that once taught food safety in family and consumer sciences (home economics) classes in virtually every secondary school, have resulted in a reduction or even elimination of such courses over the past two decades. 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 foodborne illness arising from unsafe food handling in the home is likely to rise.

What has been done
To promote a greater understanding of food safety knowledge and intended behavior among youth, a computer education game (Ninja Kitchen) was developed in collaboration with New Mexico State University and implemented and field tested in two states (NJ and TX).

Results
Middle schoolers' knowledge of cross-contamination prevention, danger zone, and safe cooking temperatures for meat/fish/poultry increased significantly ($p<0.05$). In addition, their attitude toward the importance of food safety, food safety self-efficacy, and intended behaviors associated with the danger zone increased significantly. Middle schoolers reporting always washing hands before preparing food and washing fresh produce before consumption increased significantly. Thus, this computer game increased food safety knowledge and cognitions and could be a valuable resource for food safety education in middle schoolers.

4. Associated Knowledge Areas

KA Code	Knowledge Area
101	Appraisal of Soil Resources
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
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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 - Sussex County Commercial Kitchen: 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	Actual
2011	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Sussex County Commercial Kitchen

Agricultural producers in Sussex County, NJ are constantly seeking new and innovative ways to market their crops, extend the growing season and increase revenue for their farms. One potential way to achieve this goal is to develop value-added products such as jellies and jams. Processing these products can potentially achieve these goals. However, these products must be produced in a certified kitchen by trained producers.

What has been done

In cooperation with Sussex County Board of Agriculture, New Jersey Department of Agriculture, and Sussex County Technical School, County Agricultural Agent initiated a pilot program to:

Develop a model program utilizing a regional kitchen facility for the production of value-added agricultural products by small-scale agricultural producers.

Teach producers to develop value-added products which are made in a legal and safe manner.

Empower farmer partnerships and assist in the development, production, and marketing of value-added products.

Develop training materials to enable producers in other counties to conduct a similar program.

In cooperation with the Extension Specialist in Food Science; the Sussex County Agricultural Development Board Coordinator; and representatives from the New Jersey Department of Agriculture, United States Department of Agriculture and Sussex County Board of Health, we coordinated the development of an educational curriculum designed to meet the objectives of the program. This comprehensive curriculum included:

Three educational programs totaling 27 lecture hours, on the microbiology of processed foods, principles of acidified foods, thermally processed foods, area sanitation, glass closures, regulatory issues and labeling.

Participants were given fourteen individual examinations in compliance with U. S. Food and Drug Administration guidelines.

Successful participants were certified for glass closures and acidified food canning. This federal certification is required for all producers who wish to develop acidified processed foods in a commercial kitchen.

The program was implemented during the 2010 growing season. Trained producers were allowed to develop and produce value-added agricultural products in the Sussex County Technical School facility. This partnership is the first known of its kind and provided producers an affordable facility, equipped with commercial equipment in which to develop these products. To assist producers, the team secured a grant from the NJ Highlands Council to pay for the facility rental and to purchase additional equipment including nutritional labeling software and a high-speed automatic filler to increase the efficiency of operation and increase capacity.

Results

Evaluations from the Better Process Control School program (n=37) indicated:

92% of the participants passed the course and obtained their Better Process Control Certification for both canning and glass closures.

85% reported that this program will allow them to develop new products.

38% reported that this program will help increase profits.

The Better Process Control School participants were asked to evaluate their knowledge about canning before and after the program, on a scale of 1-10, 1 = little knowledge, 10 = extensive knowledge.

Thirty seven respondents reported:
(Following bullets list topic, then before program average rating and after program average rating.)

Microbiology of processed foods - 2.76, 8.1

Principles of acidified foods - 3.23, 8.9
Principles of thermally processed foods - 2.85, 8.1
Sanitation - 6.5, 9.3
Glass closures - 4.6, 8.9

Producers reported a 102% increase in sale price by making value-added product (e.g. tomato sauce) when compared to selling raw products (e.g. tomatoes).

77% of the participants reported that they intended to use the Sussex County Technical School or another commercial kitchen to develop a value-added product.

Three farmer collaborations were developed to produce a value-added product. The products developed included a locally produced salsa, baked products featuring locally grown products, and several different jellies and jams.

8 of the participants reported that they have begun producing value-added products in the technical school kitchen.

66% of the respondents reported additional income from the sale of value-added products greater than $1,000.00.

A follow-up survey was conducted in 2011 to determine the impact of this program. Among respondents (N=11) 64% have developed value-added agricultural products resulting in an average of 26% in increased farm revenues.

4. Associated Knowledge Areas

KA Code	Knowledge Area
101	Appraisal of Soil Resources
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
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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 #6

1. **Outcome Measures**

Shorterm - Increase knowledge of viable technologies, detection prevention, intervention and control techonologies 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

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, goverment, consumers and communities
• Funding to support research and outreach education
• State and federal food safety regulations

V(I). Planned Program (Evaluation Studies)

Evaluation Results

See Qualitative Outcomes

Key Items of Evaluation

See Qualitative Outcomes

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%	
	Total	100%		100%	

V(C). Planned Program (Inputs)

1. Actual amount of FTE/SYs expended this Program

Year: 2011	Extension		Research	
	1862	1890	1862	1890
Actual Paid Professional	4.0	0.0	1.0	0.0
Actual Volunteer	0.0	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**
33815	0	18063	0
1862 Matching	**1890 Matching**	**1862 Matching**	**1890 Matching**
449986	0	174609	0
1862 All Other	**1890 All Other**	**1862 All Other**	**1890 All Other**
0	0	514001	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
• Entrepernuers
• Policy and decision makers

3. How was eXtension used?

Farm Energy CoP
Faculty developed collaborative educational products.

V(E). Planned Program (Outputs)

1. Standard output measures

2011	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Actual	500	3500	250	1500

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

Patent Applications Submitted

Year: 2011
Actual: 0

Patents listed

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

2011	Extension	Research	Total
Actual	0	5	0

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	Actual
2011	0

V(G). State Defined Outcomes

V. State Defined Outcomes Table of Content

O. No.	OUTCOME NAME
1	Medium Term - Energy Conservation Practices and Poinsettia Cultivar Evaluations for New Jersey: 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	Long Term - Agriculture Energy: 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.
3	Long Term - Reducing Greenhouse Energy Use by Investigating Current and Alternative Technologies: 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.
4	Short Term - Increase knowledge, energy efficiency technologies and conservation practices related to energy use. Explore research strategies to replace fossil fuel consumption.

Outcome #1

1. Outcome Measures

Medium Term - Energy Conservation Practices and Poinsettia Cultivar Evaluations for New Jersey: 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	Actual
2011	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Energy Conservation Practices and Poinsettia Cultivar Evaluations for New Jersey

The dramatic increase in greenhouse heating fuel has directed our attention to evaluating simple changes in production methods to save energy. The simplest and most obvious way to save energy is to reduce greenhouse temperatures, and consequently heating costs.

What has been done

Extension Specialists use a free software package published by the USDA/ARS to evaluate potential energy savings brought about by the 5F lowering of night temperature using the typical weather scenario for Newark NJ. Using fuel oil costs of $3.62 a gallon it was estimated by the software that $267 was saved by the cool temperature finishing of the crop. This is about $0.22 a square foot for that five week period or about $0.054 per sq. ft. per day.

The amount may seem trivial but when considered on a per acre basis a grower can potentially save $234 per day and a large grower (10 acres for ease of example) $2,340 per day. New Jersey has many growers in excess of 12 acres.

It is important to keep in mind that actual temperature, actual oil prices and the type of heating system used will greatly effect this prediction with mild weather and recent falling prices greatly reducing impact. Nonetheless, significant savings is possible under any circumstance as even at $2.00 per gallon $1,400 per acre per day can be saved, and the culture change if managed correctly results in a better quality plant which should then attract a better price in the market place.

These confirmatory results were again witnessed by Commercial Greenhouse growers in NJ and USA, as well as hundreds of visitors to this years? Poinsettia Open House and will be extended thru newsletter and grower meetings in Spring and Fall of 2012. It is an opportunity for growers and the public to evaluate the performance of over 100 Poinsettia cultivars in the market presently or in the near future.

Results

Greenhouse growers will be growing their future crops at lower temperatures and reducing heating costs without detriment to crop quality according to attendees at the Poinsettia Trial Open houses held December 2011.

4. Associated Knowledge Areas

KA Code	Knowledge Area
605	Natural Resource and Environmental Economics

Outcome #2

1. Outcome Measures

Long Term - Agriculture Energy: 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	Actual
2011	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Agriculture Energy

The American population is too dependent on foreign energy resources. To sustain our future it is essential that we address issues such as: reasonably priced energy, alternative/renewable energy, energy security, clean energy and energy conservation.

What has been done

Extension Specialist in Agricultural Energy developed and disseminates educational information on energy conservation and on biomass crops for energy. Delivery included winter meeting, staff training, field day presentations, facts sheets, web-based materials, Extension articles and Sustainable Energy Working Group Meetings.
Audiences reached included, Extension agents and staff, Federal and State Agriculture, Environmental and Energy Agencies, Agri-environmental Organizations, website visitors, farmers.

Results

Advisory Report resulting from this was provided as input to NJ State Energy Master Plan to New Jersey Board of Public Utilities (NJBPU)and resulted in an adopted State policy.

4. Associated Knowledge Areas

KA Code	Knowledge Area
605	Natural Resource and Environmental Economics

Outcome #3

1. Outcome Measures

Long Term - Reducing Greenhouse Energy Use by Investigating Current and Alternative Technologies: 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	Actual
2011	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. Alternative energy sources and novel technologies need to be investigated for

potential applicability and economic return. Some of the technologies involved require relatively high initial investment costs. Therefore, research is needed to determine the best possible applications before growers are able to make informed investment decisions. Education outreach efforts are necessary to reach target audiences.

What has been done

Extension Specialist in Controlled Environment Engineering conducted at the open-roof greenhouse located on Hort Farm 3 (Cook Campus, New Brunswick, NJ) 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. Research is continuing on an alternative energy project originally funded by the New Jersey Department of Environmental Protection (landfill gas fired microturbines used for heat and power production at the NJ EcoComplex greenhouse in Bordentown, NJ).

The recent renewal of interest in energy requirements for greenhouses has resulted in several invited presentations around the US and abroad on conservation and alternatives. Commercial greenhouses that have adopted most practices developed under the predecessor projects of NE-1035, including gutter connected double IR inhibited poly structures with movable insulation and floor heating, require about one tenth the heating energy of the average Ohio greenhouse in 1979. 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. Using a spreadsheet design approach with hourly weather data, the option of using storage so a small heat pump can operate 24 hours per day is shown to be advantageous. Utilizing the first increment of energy for floor heating at relatively low delivery temperatures maximizes the efficiency (coefficient of performance) of the heat pump. The feasibility of using the heat pump to cool water during the daytime with a heat exchanger for first stage cooling and storing the heat for night use in floor heating is also being investigated as a design option. Simulations with a Mid Atlantic composite hourly weather data set for a well insulated greenhouse indicated a system incorporating a heat pump delivering only 10 percent of peak heat requirement can provide 38 percent of annual heat requirements when drawing heat from the greenhouse when it requires cooling and from a ground source at other times.

Funding for two new projects was received. Both projects are collaborations with several other educational institutions from across the country. One of the projects will investigate the use of light emitting diode (LED) lighting systems for photoperiodic and supplemental lighting of vegetable and flowering crops. The other project will result in an online (undergraduate) course consisting of individual lectures (modules) focused on engineering and crop production issues that can be integrated into a variety of courses related to controlled environment plant production.

Results

The original floor heating research has resulted in 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%.

Updating and disseminating energy conservation information (e.g., an Extension bulletin) is helping to further reduce dependence on scarce fossil fuel resources. Incorporation of heat pump technology to take advantage of heat storage to provide both heating and cooling can reduce total energy requirements.

4. Associated Knowledge Areas

KA Code	Knowledge Area
605	Natural Resource and Environmental Economics

Outcome #4

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

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)

Evaluation Results

See Qualitative Outcomes

Key Items of Evaluation

See Qualitative Outcomes