2009 Rutgers Combined Research and Extension Annual Report of Accomplishments and Results

Status: Accepted

Date Accepted: 06/23/2010

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 under represented 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
Indoor Air Quality
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

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

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

The Rutgers Cooperative Extension Water Resources Program has implemented innovative means to manage storm water through the development and evaluation of best management practices, nutrient trading programs and the preparation of regional storm water management plans. Master Gardeners and others have been actively engaged in establishing rain gardens and installing rain barrels to conserve water resources and have made a positive foot print on the environment.

Rutgers Cooperative Extension nutrition education programs targeted to limited resource families, have documented diet summaries to support a positive change at exit recalls with increased consumption of fruits, vegetables, grains and milk. These efforts, in conjunction with the New Jersey Get Moving Get Healthy initiative, are changing the way that NJ families and youth eat and make behavior changes to address the critical issues related to health and obesity.

A 2009 University Presidential initiative, Rutgers Against Hunger (RAH) is extending the outreach of NJAES nutrition programming by working in collaboration with faculty and staff to impact the lives of those suffering from hunger. RAH works to increase awareness of hunger and encourage community involvement to help those in need. Significant impacts from this initiative will be reported in subsequent reports.

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

viability which is evidence by the application for 33 patents and issuance of 24 during 2009. The Rutgers Food Innovation Center (FIC) is a model for community and economic development and jobs creation. It has provided assistance to entrepreneurs, farmers, and existing food companies in business development, marketing and sales, product and process development, quality assurance and food safety, regulations and compliance and workforce development and training. FIC has created over 350 new jobs in new and existing companies and provided training to over 135 people in 2009.

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

The Rutgers EcoComplex, an environmental and alternative energy business incubator and research center, is actively engaged in "Green Business" development, providing state-of-the-art facilities and assistance to entrepreneurs in business plan development technology and evaluation and commercialization. The EcoComplex has graduated 6 successful companies, assisted in securing over $19.7 million in third party funding for clients. Total revenue generated by client companies to date is $29 million. The efforts of the EcoComplex will help New Jersey to fulfill its renewable electric energy goals of 20% by 2020.

Volunteers recruited, trained and managed by RCE faculty and staff continues to be the engine for extending educational outreach. The value of volunteer service in support of the 4-H Youth Development and Master Gardener programs is at $15 million. The Rutgers Environment Steward volunteers have worked as advocates and stewards of public lands providing significant value-added to NJ.

NJAES is committed to serving the diverse needs of the residents of NJ and has an organizational commitment to engage underserved communities in our urban centers where language differences, limited resources, and access have been barriers in the past. 4-H SET programming has targeted urban youth engaging them in on campus experiences to enhance science knowledge and explore opportunities available at Rutgers for post-secondary education. The New Brunswick 4-H program in collaboration with the Latino community planned and implemented a culturally appropriate 4-H youth development experience supported by local businesses and organizations.

The urban entomology program has been engaged in current research on insect behavior, monitoring insecticide resistance, novel control techniques, and integrated pest management to find the most effective and least toxic strategies for public use. The extension specialist in urban entomology has worked in limited resource communities with tenants and home owners on the management of household insects and pests.

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

NJAES researchers and extension agricultural agents have been engaged in a multistate project focused on engaging small to mid-size famers in growing specialty ethnic crops and creating new value-added opportunities to address the ethnic diversity and food trends of the region.

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-seven percent (37%) of funding is from federal grants and contracts; 30.4% state appropriations; 16.6% other sources; 8.5% federal appropriations and 7.5% 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: 2009	Extension		Research	
	1862	1890	1862	1890
Plan	156.0	0.0	65.0	0.0
Actual	78.9	0.0	109.8	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 2009 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 2009 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.

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
2541911	0	2972814	0

2. Totaled Actual dollars from Planned Programs Inputs				
	Extension		Research	
	Smith-Lever 3b & 3c	1890 Extension	Hatch	Evans-Allen
Actual Formula	3122957	0	1081859	0
Actual Matching	4776563	0	11229487	0
Actual All Other	989252	0	9076930	0
Total Actual Expended	8888772	0	21388276	0

3. Amount of Above Actual Formula Dollars Expended which comes from Carryover funds from				
Carryover	581046	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
111	Conservation and Efficient Use of Water	20%		20%	
112	Watershed Protection and Management	50%		50%	
133	Pollution Prevention and Mitigation	20%		20%	
605	Natural Resource and Environmental Economics	10%		10%	
	Total	100%		100%	

V(C). Planned Program (Inputs)

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

Year: 2009	Extension		Research	
	1862	1890	1862	1890
Plan	6.0	0.0	4.0	0.0
Actual	6.0	0.0	8.0	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**
240036	0	53497	0
1862 Matching	**1890 Matching**	**1862 Matching**	**1890 Matching**
389770	0	972980	0
1862 All Other	**1890 All Other**	**1862 All Other**	**1890 All Other**
117332	0	727915	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 Dept. of Environmental Protection
- Staff and students who gain valuable scientific experience
- Industry partners who learn ways to meet water quality standards
- Communities who learn watershed restoration methods
- NJAES Faculty and Staff involved in water research/outreach
- School age youth
- Residents

V(E). Planned Program (Outputs)

1. Standard output measures

2009	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Plan	3000	45000	800	2000
Actual	2490	3585	1150	2100

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

Year: 2009
Plan: 0
Actual: 0

Patents listed

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

2009	Extension	Research	Total
Plan	6	0	
Actual	2	16	18

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

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

V(G). State Defined Outcomes

V. State Defined Outcomes Table of Content

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

Outcome #1

1. Outcome Measures

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

Not Reporting on this Outcome Measure

Outcome #2

1. Outcome Measures

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

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2009	20000	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Jersey Summer Shore Safety

The coastal counties of New Jersey experience severe population increases as residents who flock to use coastal natural resources, which impacts the coast, NY, NJ, PA and the region as a whole. The Jersey Summer Shore Safety program aims to educate both residents and visiting tourists of the impact of their activities both at home and at the shore, and to provide information on safe coastal recreational opportunities that pose minimum impact to the environment.

What has been done
The Jersey Summer Shore Safety program has focused on seafood safety, bacteria and beach closings as major topics of research and outreach education. Trained volunteers were engaged in the monitoring and optical brightener source tracking in surface waters. The water quality agenda was revised for the Barneget Bay Shellfish Restoration program. A collaborative partnerships was forged with the Long Beach Island Foundation of the Arts to establish a laboratory for water quality testing. They participated in a statewide Beach Sweep sponsored by the Clean Ocean Action, educating beach goers about non-point source pollution, beach closings, and reducing watershed pollution load.

Results
Three workshops were held to train 16 volunteers on bacterial water quality methodology. One hundred percent of respondents reported learning how to plan, conduct, and analyze bacterial water quality data, and indicated interest in continuing. Most of these volunteers monitored seven regular, and several special sites during the

summer of 2009 in conjunction with the Barnegat Bay Shellfish Restoration Program. Over the course of the ten cleanup events 149 volunteers removed, categorized, and reported a total of approximately 1,110 lbs of trash at this site. The dollar value of this volunteer labor to Ocean County is $9,387. The data on amount and types of trash collected was submitted to Clean Ocean Action for use in educational programming. Ninety two percent of respondents reported learning more about non point source pollution, and eighty eight learned ways to reduce their individual pollution load.

4. Associated Knowledge Areas

KA Code	Knowledge Area
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	Quantitative Target	Actual
2009	22000	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Environmental Best Management Practices Demonstration Horse Farm

There are over 7,200 equine operations in NJ and many will need to comply with the impending deadline for the Animal Waste Management Rule deadline of March 2010.

What has been done
Rutgers New Jersey Agriculture Experiment Station created a research and educational venue at one of the equine research facilities to showcase best management practices (BMPs) for equine and other animal facilities. This goal was met by accomplishing the following objectives: 1) implementation of stormwater BMPs that minimize water quality impacts and evaluating the efficacy of these practices, 2) establishment of pasture management strategies that are protective of the environment while maximizing forage quality and availability, 3) creating an effective manure management system to minimize the environmental impacts of animal waste, and 4) conducting educational demonstrations and workshops showcasing the BMPs for stakeholders. Educational programs were centered on the newly constructed BMPs that are of particular interest to small farm owners. On-farm demonstrations allow interested stakeholders to see a wide range of developed BMPs first hand and to talk with

the people who designed, constructed and maintained these BMPs. This is an invaluable resource especially for the large number of novice farm owners so common in our state.
Visit the following websites for additional information, www.esc.rutgers.edu and www.esc.rutgers.edu/rlp/rlpmain.htm

Results
Surveys on the Equine Science Center's website show that viewers certainly have increased their knowledge after viewing the Ryders Lane Farm pages. The project was funded by the New Jersey Agricultural Experiment Station's State Equine Initiative, New Jersey Department of Agriculture, Natural Resource Conservation Service (NRCS), NJ Department of Environmental Protection and the Environmental Protection Agency for a total of $425,000, strong evidence that this project addressed environmental issues important to our stakeholders in NJ.

4. Associated Knowledge Areas

KA Code	Knowledge Area
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

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

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2009	{No Data Entered}	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Storm Water Management

Urban development, suburban sprawl, agriculture and other modified land uses will continue to be major contributors to waterway degradation in NJ unless comprehensive action is taken to address their impacts. The Rutgers Cooperative Extension (RCE) Water Resources Program is a specialty program committed to providing solutions for many of the water quality and quantity issues facing NJ today. Solutions are attained through research, project development, assessment and extension efforts in stormwater management.

What has been done

A statewide extension program entitled Stormwater Management in Your Backyard (SWMIYB) focused on rain gardens and rain barrels was carried out extensively by the RCE Water Resources Program in 2009. The program consists of conducting workshops to groups of residents, explaining how they can become stewards of their own residential property by implementing certain best management practices (BMPs) such as rain gardens and rain barrels. The workshops include an in-class lecture on stormwater management planning and engineering which is typically followed by a hands-on training session involving assembly of a rain barrel or installation of a demonstration rain garden. A comprehensive Rain Garden webpage was maintained throughout 2009 on the Rutgers Cooperative Extension Water Resources Program website. The webpage provides stakeholders with site-specific information regarding a majority of the demonstration rain gardens that the RCE Water Resources Program staff helped to install. During 2009, there were approximately 2,480 page loads, 1,680 unique visitors, and 422 returning visitors to the rain garden main web page (http://water.rutgers.edu/Rain_Gardens/RGWebsite/raingardens.html).

Results

A Rain Garden Online Survey was developed and sent out by the RCE Water Resources Program in Fall 2009. With a response rate of approximately 12%, the results indicated that 90% of the respondents had enough information to get started with their own rain garden project. However, only 40% of the respondents indicated that they installed a rain garden at their residence or within their community. Besides implementing rain gardens on their property, respondents were asked if they took any sustainable landscaping actions (i.e., rain barrels, redirect downspouts, pervious pavement installments, using low phosphorus fertilizer, soil testing, and stopping fertilizing). Results indicated that 25% of respondents redirected their downspouts, 14% installed a rain barrel, 12% conducted soil testing, 11% have stopped fertilizing, 7% use low-P fertilizer, and 5% installed pervious pavement at their residences. Therefore, the results from the Rain Garden Online Survey indicate that the respondents that have attended the New Jersey SWMIYB rain garden programming are changing their behavior when it comes to sustainable landscaping practices. In Union County 8 community gardens planted since 2008, treat run off from 9,000 sq.ft. of pasture/overland flow and 7,828 sq.ft. of impervious surface. The gardens treat and recharge approximately 195,700 gallons of water from impervious surface annually. This type of environmental impact is replicated across the state.

4. Associated Knowledge Areas

KA Code	Knowledge Area
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

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

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2009	{No Data Entered}	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Special Recycling Issues

The State, the municipalities, and the waste industry are very knowledgeable in managing recyclables. However, there are special issues that need to be studied to develop improved management practices. For example, mixed glass cullet (crushed broken recycled glass containers) is stockpiled uncovered before being used as roadway construction aggregate or as drainage layer or daily cover in landfills. When rain percolates through these stockpiles, they release run-off contaminated with food and beverage residuals, a recently discovered potential source of water pollution. As another example, there is one documented case in New Jersey where stormwater runoff from wood mulch stockpiles caused the death of fish in a lake. Low quality recycled glass containers are the result of the prevalent comingled curbside collection, where glass containers are collected with other recyclable containers. Therefore, an assessment of the overall glass recycling system in New Jersey and its energy flows and the development of improved management practices are necessary.

What has been done
To address the challenges the glass container recycling industry faces in New Jersey and nation-wide, the energy and glass container flows, from extraction of raw materials to final disposal, for glass containers recycled in New Jersey in 2008 were assessed. The amount of recycled glass used in new container production provided about half of the demand for cullet use for glass manufacturers in New Jersey, even though there is plenty of recycled glass in New Jersey. To meet the need for high quality cullet, the manufacturers imported the other half of recycled glass from states that implement bottle bills, where glass bottles were collected separate from other recyclables. To increase cullet use in glass container production, which achieves greater energy savings, the quality of the recycled glass from the comingled collection stream must be improved. Recommendations for potential energy and raw material savings for different recycling scenarios (e.g., single stream, drop-off and bottle bill recycling) are being developed.

Results
The outcome of the project is knowledge gain and the expansion of markets and improvements in recycling in New Jersey. Based on communications with stakeholders, facility operators now know how to avoid surface and groundwater pollution from glass cullet stockpiles. For example, one facility now collects all leachate and transports it to a wastewater treatment facility.

4. Associated Knowledge Areas

KA Code	Knowledge Area
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

Watershed Restoration and Protection Planning-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	Quantitative Target	Actual
2009	{No Data Entered}	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Watershed Restoration and Protection Planning

Proper management of water can help to ensure that there will be plenty available for future needs including agricultural, drinking water, recreation, irrigation and ecological sustenance. Misuse of water resources by unknowing participants can create situations where too much fresh water is quickly diverted to streams and is routed out of the watershed in the course of "drainage". Stormwater management on a watershed basis holds the potential to bring together participants from several municipalities or counties to address sustainable use of water resources and the way to accomplish this is Watershed Restoration and Protection Planning. New Jersey continues to add urban and suburban areas while decreasing agriculture and open spaces. These change in land use alter the hydrologic cycle to one where rainwater is diverted away from infiltrating to the groundwater, which is the natural, intended path. If rainwater is allowed to infiltrate close to where it falls, natural aquifer recharge will occur. This will also reduce large volumes of runoff from entering streams quickly after rainfall. This simple bypassing of the hydrologic cycle eventually causes reduced aquifer recharge, flooding, streambank erosion and lower water quality.

What has been done
In 2004, New Jersey promulgated Stormwater Rules that aid in stormwater management for new development. All lands developed prior to those rules continue in stormwater practices that are not sustainable. All lands developed after need to be managed according to new rules that many planners do not comprehend. The RCE Water Resources Program has worked with state, county and municipal officials, as well as residents and non-profit groups, to clearly define and prioritize the issues facing New Jersey watersheds. This cooperative effort is intended to lead to a stronger desire for making the changes necessary to create sustainable water resources. The RCE Water Resources Program has secured funding for Watershed Restoration and Protection Planning from several different agencies. The New Jersey Department of Environmental Protection (NJDEP) has funded our efforts in watershed restoration and protection planning throughout New Jersey with their 319(h) grant funding program. Watersheds funded through this program during the 2008-2009 year include the Musquapsink and Tenakill Brooks in Bergen County, Neshanic River in Hunterdon County, Musconetcong River in Warren and Hunterdon Counties, Upper Salem River in Salem County, Upper Cohansey River in Cumberland County, and Assiscunk Creek in Burlington County. Additionally, the National Fish and Wildlife Federation provided funding for the creation of a plan for Oldman's Creek Watershed in Salem and Gloucester Counties.

Results
Regional Stormwater Management Plans recently funded through NJDEP's 319(h) program. The implementation of these plans have been devised to reduce excess phosphorus, nitrogen, and total suspended solids to the waterways. These plans also lead to a reduction of pathogens that are discharged to these impaired waters. These plans address water quality problems in 44 municipalities in 8 counties covering over 197 square miles. The plans contain specific recommendations for incorporating programs run by Rutgers Cooperative Extension to increase the environmental educational benefit.

4. Associated Knowledge Areas

KA Code	Knowledge Area
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

Animal Waste Management Rule-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	Quantitative Target	Actual
2009	{No Data Entered}	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Animal Waste Management Rule

As of March of 2009, the state of New Jersey passed a law that requires all livestock farms, regardless of number of animals, as well as those who handle manure, to proactively address and manage non-point source pollution that may originate from livestock operations.

What has been done
Animal Waste Management Workshops were conducted by Rutgers Cooperative Extension. Once the rule was adopted and added to the state register, 41 meetings were held in 10 counties. Approximately 1,000 livestock owners and managers, manure handlers and other industry professionals attended these educational workshops. Those who attended the workshops were educated on what the Animal Waste Management Rule entailed, how it affected them and their operations, how to meet compliance with the rule, and basics on nutrient management.

Results
All who attended the educational Animal Waste Management Workshops received valuable information and knowledge so that they may be in compliance with the New Jersey Animal Waste Management Rule. Producers have developed waste management and nutirient plans, which will prevent adverse environmental impacts to wells, streams and other bodies of water while at the same time meeting the standards set by state regulatory bodies.

4. Associated Knowledge Areas

KA Code	Knowledge Area
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

Rutgers Environmental Stewards-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	Quantitative Target	Actual
2009	{No Data Entered}	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Rutgers Environmental Stewards

Environmental issues are among the most serious problems faced statewide and nationally the top four environmental issues in New Jersey 1. land use change, 2. indoor pollution, 3. invasive species and 4. outdoor air pollution. The Final Report of the New Jersey Comparative Risk Project explicitly pointed out that a looming environmental problem for the state was the management of the tens of thousands of acres that it had worked so diligently to preserve in preceding years. Little or no public funding has been provided for the management of conserved lands for biodiversity. This funding gap was filled by the creation of group of volunteers. They could work on and advocate for the stewardship of public lands from positions on municipal environmental commissions, planning boards, and zoning boards, and from county and state government. The Rutgers Environmental Stewards is a structured volunteer training and management program focused on the envrionment that provides significant value-added to NJ.

What has been done

Rutgers Cooperative Extension formed a partnership with Duke Farms 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 2009 regional classes have been conducted for five years providing 780 hours of training to 225 students. To support promotion and management of the program a web site was created, http://envirostewards.Rutgers.edu. The site functions as both a promotional tool to attract students and serve them as an educational resource.

Results
Rutgers Environmental Stewards entered its fifth year with

225 of 245 91.84% Completed Training
121 53.78% Engaged in Intern Project
64 28.44% Completed Intern Project
22 9.78% On Environmental Commission

Impact summaries of work conducted by the 64 Rutgers Environmental Stewards who have attained certification in the program are available on-line at
http://envirostewards.rutgers.edu/CertifiedRutgersEnvironmentalStewardsImpactsandProjects.html

4. Associated Knowledge Areas

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

V(H). Planned Program (External Factors)

External factors which affected outcomes

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

Brief Explanation

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

1. Evaluation Studies Planned

- Before-After (before and after program)
- During (during program)

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

Evaluation Results

Key Items of Evaluation

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 professional FTE/SYs expended this Program

Year: 2009	Extension		Research	
	1862	1890	1862	1890
Plan	5.0	0.0	5.0	0.0
Actual	19.5	0.0	6.6	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**
633543	0	99399	0
1862 Matching	**1890 Matching**	**1862 Matching**	**1890 Matching**
998553	0	1034582	0
1862 All Other	**1890 All Other**	**1862 All Other**	**1890 All Other**
323424	0	975690	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 Professionals
  -Child Health Summit
- Educate Teachers/School Nurses
- Educate Communities

Indirect Methods:

- Website

2. Brief description of the target audience

- Clinicians and Physicians Nurses School
- 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

V(E). Planned Program (Outputs)

1. Standard output measures

2009	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Plan	4000	21000	2000	1500
Actual	22297	31170	8569	2000

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

Year: 2009
Plan: 0
Actual: 0

Patents listed

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

2009	Extension	Research	Total
Plan	5	22	
Actual	6	11	17

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

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

V(G). State Defined Outcomes

V. State Defined Outcomes Table of Content

O. No.	OUTCOME NAME
1	Short Term Individuals gain awareness, knowledge, skills related to: Attitudes about healthy eating for adults/youth Healthy food choices for adults/youth Selection of healthy foods for adults/youth Benefits of physical activity (reduced overweight and obesity, reduced risk of diabetes, heart disease and cancer) Physical activity recommendations for health for adults/youth Identify factors that promote excessive weight gain as 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 Understand 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	Genetics, Taste Perception and Obesity-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 Understand 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	Promoting Healthy Eating to Prevent Excessive Weight Gain in Young Adults-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 Understand 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 as 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 Understand the process by which perilipins at the surface of lipid droplets control how much energy is released from the adipocyte at times of need Understanding how the intestines and body uptake and process dairy fat Identify genes, their protein product and how the proteins influence the way the body processes fat.

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2009	14000	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Obesity/Nutrition and Other Health-Related Research

Obesity has reached epidemic proportions in the United States, and is associated with rising levels of diabetes, heart disease, and other chronic health conditions among U.S. residents. Increased incidence of these health conditions leads to rising health care costs and declining quality of life for those affected.

What has been done
NJAES researchers have made contributions in a range of relevant areas, from basic research into the biochemical mechanics that lead to or exacerbate a tendency towards obesity to interventions to address this national priority

area and its sequelae. Research into the molecular mechanisms of lipid transport in the intestinal cell, in order to enable the regulation of dietary lipid assimilation, yield findings that demonstrate key structural elements involved in fatty acid transport by lipid-binding proteins, and the effects of structural changes on transport function. Our cell-based and animal-based studies demonstrate clearly that lipid assimilation in the intestinal cell is controlled differently depending on whether the lipid is delivered to the cell via the diet or via the bloodstream. These studies are leading to an understanding of the basic mechanisms by which we absorb and utilize lipid, and thus may lead to rational strategies to modulate this important process. Further, NJAES researchers are also seeing that specific lipid metabolites, in particular monoacylglycerol, may play a functional role not only in lipid synthesis, but also in the regulation of appetite and energy expenditure. These studies have important implications for the nutritional and pharmacologic treatment of disorders ranging from obesity and its metabolic sequelae, to malabsorption. The importance of intestinal lipid metabolites in the regulation of appetite is also potentially useful as a tool for controlling food intake.

Results
Other research findings provide the first evidence of the absolute need of macrophages (white blood cells within tissues) for glutamine. The findings indicate that the high number of macrophages that infiltrate adipose tissue (body fat) during obesity, and which are believed to contribute to the development of insulin resistance, would require glutamine in very large amounts. A further finding of very low expression of glutamine synthetase in such cells, together with the very low rate of blood flow through adipose tissue, indicate that glutamine synthesis by adipocytes may play an important role in maintaining macrophages, and thus the development of insulin resistance, during obesity. Modification of adipose tissue glutamine metabolism in vivo may offer a means to prevent, or minimize, the detrimental effects of macrophages-based inflammation in adipose tissue and thus prevent obesity-linked insulin resistance and the development of Type 2 diabetes mellitus.

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	Quantitative Target	Actual

2009	18000	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Get Moving-Get Healthy New Jersey

Obesity has reached epidemic proportions in the United States and is associated with rising levels of diabetes, heart disease, and other chronic health conditions among youth and adults. Poor food choices and lack of physical activity are major causes of this epidemic.

What has been done
Extension faculty and staff in the Family and Community Health Sciences and 4-H Youth Development Departments have implemented educational programs and campaigns to encourage youth and adults to change dietary behaviors and increase physical activity.

Results
The NJ School Walking program was implemented in 10 schools across the state to 4th and 6th grade elementary school classes reaching 1,077 youth who walked 53,037 miles. 4-H youth were trained as 4-H Food Fitness Ambassadors to work with 4-H professionals to present Get Moving-Get Healthy at county fairs, community health fairs and educational programs. Family Fun Nights were implemented to engage the entire family in nutrition lessons and physical activities.
Adult and youth have engaged in the Walking Point to Point program. Survey results document that participants have:
-increased their consumption of fruits and vegetables, whole grains and low-fat dariy products
-decreased consumption of sugared beverages and high fat and sugar foods
-correctly identified appropriate portion sizes
-increased physical activity
-increased the number of family meals eaten together

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

Genetics, Taste Perception and Obesity-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 Understand the process by which perilipins at the surface of lipid droplets control how much energy is released from the adipocyte at times of need Understanding how the intestines and body uptake and process dairy fat Identify genes, their protein product and how the proteins influence the way the body processes fat.

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2009	{No Data Entered}	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Genetics, Taste Perception and Obesity.

Obesity in the US is at epidemic proportions we are bombarded with food in many venues and eat. Overeating and disregard for serving size coupled with a variety of choices lead to excessive calories and ultimately obesity.

What has been done
NJAES researchers are investigating the linkages between genetic variation in bitter taste perception in food preferences, dietary habits, and body weight, 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 increased body weight, which we have observed among middle-aged, PROP non-taster women. Since exposure to a variety of high-fat/energy-dense, foods is known to promote excess energy intake and weight gain, we investigated if PROP non-taster women would be more susceptible to overeating in a buffet setting. Previous findings showed that all participants ate more when offered a buffet lunch as compared to free-access to a control lunch. However, non-taster women ate 88% more calories from the buffet meal whereas super-taster women ate only 38% more calories from the buffet meal. As a follow-up, researchers examined exposure to buffet meals over a 3-day period to determine the more long-term consequences of this type of dietary exposure.

Results
Interim analyses show that buffet feeding resulted in higher daily energy intakes and higher fat intakes in all subjects as compared to control feeding. Participants consumed more servings of grains, meats and added fats, and fewer servings of fruits and vegetables during buffet feeding than during the control condition. Thus, in addition to promoting higher energy intake, buffet feeding appears to have negative effects on fruit and vegetable consumption. Non-taster women consumed slightly more daily energy during the buffet condition than super-taster women. Also, non-taster women consumed more snacks than super-taster women during both the control condition and the buffet condition. These data support the idea that non-taster women habitually consume more energy when exposed to energy-dense foods, and snack foods may be contributing to this overconsumption. PROP status may be a useful tool for understanding the dietary patterns that lead to the development of obesity in women.

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

Promoting Healthy Eating to Prevent Excessive Weight Gain in Young Adults-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 Understand the process by which perilipins at the surface of lipid droplets control how much energy is released from the adipocyte at times of need Understanding how the intestines and body uptake and process dairy fat Identify genes, their protein product and how the proteins influence the way the body processes fat.

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2009	{No Data Entered}	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Promoting Healthy Eating to Prevent Excessive Weight Gain in Young Adults

The development of a sustainable intervention to reduce risk of obesity in young adults using community-based participatory research is the focus of another multistate extension-based investigation. About 40% of US young adults are enrolled in college, and evidence is mounting that the transition to college life is a critical period of risk for weight gain. However, little is known about the extent to which university environments promote healthy eating, physical activity, and other healthy behaviors.

What has been done
NJAES researchers are collaborating with other institutions in a multistate project employing the PRECEDE-PROCEED health program and planning framework to develop effective interventions aimed at young adults. The project is now in the PRECEDE phase, where data are gather to assess factors affecting health and to create a "diagnosis" to guide development of health behavior change interventions to be implemented during the PROCEED phase. An inventory was developed to assess the prevalence, type and polarity of health-related advertisements; this inventory was used to assess advertising on and near the campus of a major university. Health-related advertising on and near this campus was prevalent, diverse with regard to type of health behavior, and mostly promoted good health practices. Another environmental assessment focused on university campus food, evaluating the nutritional quality of vending machine foods sold in academic buildings, student centers, and residence halls. Findings, based on the mean nutrient-density score, indicates that vending foods were not nutrient dense and do not support health snaking.

Results

In a recent survey of college students from 11 campuses, respondents generally reported adequate exercise but low fruit/vegetable intake. Over 90 percent of the respondents indicated that they were willing to improve their dietary choices, sleeping habits, exercise regiments, and better manage time/stress in order to maintain a healthy weight. Desired environmental changes on college campus were: reduce the cost of nutrient dense foods; increase healthy food options on campus; more walkable environment; and greater availability of exercise facilities. Investigators also modified the Nutrition Environment Measures Surveys to assess the food/eating environment in on-campus dining establishments, including student center food-courts, dining halls, and snack bars. This instrument was administered on 11 university campuses. Few significant differences by state/location emerged, but significant differences across institutions were noted among venues, enhancers and/or barriers of nutritional information, pricing, and portion size. Dining halls provide more healthful choices than other venues, but students may have difficulty making good choices.

4. Associated Knowledge Areas

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

V(H). Planned Program (External Factors)

External factors which affected outcomes

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

Brief Explanation

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

1. Evaluation Studies Planned

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

Evaluation Results

{No Data Entered}

Key Items of Evaluation

{No Data Entered}

V(A). Planned Program (Summary)

Program # 3

1. Name of the Planned Program

Indoor Air Quality

V(B). Program Knowledge Area(s)

1. Program Knowledge Areas and Percentage

KA Code	Knowledge Area	%1862 Extension	%1890 Extension	%1862 Research	%1890 Research
723	Hazards to Human Health and Safety	0%		50%	
804	Human Environmental Issues Concerning Apparel, Textiles, and Residential and Commercial Structures	0%		50%	
	Total	0%		100%	

V(C). Planned Program (Inputs)

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

Year: 2009	Extension		Research	
	1862	1890	1862	1890
Plan	0.0	0.0	3.0	0.0
Actual	0.0	0.0	1.1	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**
0	0	21841	0
1862 Matching	**1890 Matching**	**1862 Matching**	**1890 Matching**
0	0	231382	0
1862 All Other	**1890 All Other**	**1862 All Other**	**1890 All Other**
0	0	194490	0

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 with initiative to improve numbers of children screened for elevated blood lead

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

V(E). Planned Program (Outputs)

1. Standard output measures

2009	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Plan	200	1000	0	0
Actual	0	0	0	0

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

Year: 2009
Plan: 0
Actual: 0

Patents listed

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

2009	Extension	Research	Total
Plan	0	10	
Actual	0	6	6

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 dwelling service (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 dwelling service (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

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

1. Evaluation Studies Planned

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

Evaluation Results

Key Items of Evaluation

V(A). Planned Program (Summary)

Program # 4

1. Name of the Planned Program

4-H Youth Development

V(B). Program Knowledge Area(s)

1. Program Knowledge Areas and Percentage

KA Code	Knowledge Area	%1862 Extension	%1890 Extension	%1862 Research	%1890 Research
806	Youth Development	100%		100%	
	Total	100%		100%	

V(C). Planned Program (Inputs)

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

Year: 2009	Extension		Research	
	1862	1890	1862	1890
Plan	30.0	0.0	1.0	0.0
Actual	12.1	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**
360240	0	0	0
1862 Matching	**1890 Matching**	**1862 Matching**	**1890 Matching**
646325	0	0	0
1862 All Other	**1890 All Other**	**1862 All Other**	**1890 All Other**
156794	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 cience, 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&ndash13, one year out of high school) and their parents
- 4-H Volunteers (adult and youth)
- Teachers/Educators/other youth development educators
- School Age Child Care Providers
- College Students (interns, collegiate 4-H)
- Other Extension Professionals and university partners
- Communities: stakeholders and non-profit, social service, government agencies
- Under-served and under-represented audiences

Delivery modes:
- 4-H Clubs and related activities
- 4-H Afterschool (clubs and short-term programs)
- 4-H School Enrichment
- 4-H Special Interest
- 4-H Camping (day camps and overnight camping)
- 4-H Mentoring and Individual Study

V(E). Planned Program (Outputs)

1. Standard output measures

2009	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Plan	2300	11000	46000	21000
Actual	3734	19500	44750	45060

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

Year: 2009
Plan: 0
Actual: 0

Patents listed

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

2009	Extension	Research	Total
Plan	6	0	
Actual	6	0	6

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

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

V(G). State Defined Outcomes

V. State Defined Outcomes Table of Content

O. No.	OUTCOME NAME
1	Short Term Youth increase awareness, knowledge, attitudes, and skills related to essential elements, workforce development, life skill development, and relevant subject matter. Volunteers increase knowledge and awareness of practices fostering positive youth development, including youth/adult partnerships. Youth development professionals and stakeholders increase awareness and knowledge of problems and solutions supporting positive youth development, including: * policies that need to be addressed. * community resources and support.
2	Medium Term Youth apply knowledge, attitudes, skills, and behaviors needed to become competent, caring and contributing citizens by: * taking on leadership roles in their youth organizations and schools. * 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. * becoming productive members of the workforce. 4-H youth are engaged partners in decision making regarding RCE programming including but not limited to 4-Hyouth 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	New Jersey 4-H After School Training-Medium Term Youth apply knowledge, attitudes, skills, and behaviors needed to become competent, caring and contributing by: * taking on leadership roles in their youth organizations and schools. * 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	4-H 4-REEL: After School Digital Filmmaking Program-Medium Term Youth apply knowledge, attitudes, skills, and behaviors needed to become competent, caring and contributing by: * taking on leadership roles in their youth organizations and schools. * 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	Character Education-Long Term Youth demonstrate mastery and competencies needed to become engaged by *assuming leadership positions in communities. *developing and implementing action plans to address community needs. *becoming productive members of the workforce.

	4-H youth are engaged partners in decision making regarding RCE programming including but not limited to 4-Hyouth 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.
7	New Brunswick 4-H-Long Term Youth demonstrate mastery and competencies needed to become engaged by *assuming leadership positions in communities. *developing and implementing action plans to address community needs. *becoming productive members of the workforce. 4-H youth are engaged partners in decision making regarding RCE programming including but not limited to 4-Hyouth 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.
8	Operation: Military Kids Camping Programs-Long Term Youth demonstrate mastery and competencies needed to become engaged by * assuming leadership positions in communities. * developing and implementing action plans to address community needs. * becoming productive members of the workforce. 4-H youth are engaged partners in decision making regarding RCE programming including but not limited to 4-Hyouth 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.
9	Union County Summer Science Program for Urban Youth-Long Term Youth demonstrate mastery and competencies needed to become engaged by * assuming leadership positions in communities. * developing and implementing action plans to address community needs. * becoming productive members of the workforce. 4-H youth are engaged partners in decision making regarding RCE programming including but not limited to 4-Hyouth development programming. 4-H alumni and volunteers become engaged citizens by assuming leadership positions in communities. Youth development professionals and stakeholders influence decision makers in policy development related to youth development needs and issues.

Outcome #1

1. Outcome Measures

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

Not Reporting on this Outcome Measure

Outcome #2

1. Outcome Measures

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

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2009	37000	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
"Science Adventures" 4-H Summer Camp

School test results show that a large number of youth in Cumberland County are not proficient in science. 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
Fifty-one youth in K-5 grades participated in the week-long 4-H Summer Enrichment Program held August 24-28 at the Cumberland 4-H Center. The theme for this day camp program was "Science Adventures." This program featured an opportunity for boys and girls to learn that science is all around us and part of everything we do as well as discover and learn about a variety of science topics and science processes through a variety of age-appropriate and fun hands-on activities. Each day consisted of activity sessions, arts and crafts, food preparation, group activities and games and relays. The participants in this program were grouped by age and each group had different science-related topics that they learned about each day. Group I consisted of youth in grades K-2 and group II was for youth in grades 3-5. Group I topics were Gizmos & Gadgets; Up, Up & Away - balloons and movement; Water Wonders; Mix It Up - Chemical Reactions & Kitchen Science; and Things that Fly - the Science of Flight. Youth in Group II learned about engineering, electricity, movement and physics through activities such as balls and tracks, trebuchet construction, wiring a house and rubberband powered cars.

Results
The evaluation methods for this program included a Pre Test/Post Test Survey, End-of-Program Evaluation and a Parent Survey. Evaluation results are as follows:
*87% of the youth who completed the pre-post test increased their score by an average of 39%.
*92% of the participants indicated on an end-of-program evaluation that the program was "Excellent."
*94% of participants in Group I indicated that they learned "A Lot" about science and 87% learned "A Lot" about aerospace and things that fly.

*92% of the Group II participants indicated that they learned "A Lot" about engineering.
*100% of the Group II participants indicated that they learned "A Lot" or "Some" about electricity.
*91% of participants indicated they would like to learn more about science.
*100% of the participants will tell someone what they learned.
*100% of the participants indicated that they would attend the 4-H Summer Enrichment Program again.
*On the end-of-program parent survey, 80% of the parents felt that their child(ren) developed the life skill of getting along with others and ninety-one percent (91%) felt that their child(ren) developed the ability to follow directions and to try something new.
*95% of the parents evaluated stated that their children enjoyed the "Science Adventures" program.
*100% of the parents indicated that this educational program was "Very Valuable" or "Valuable" for their child(ren).

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. * becoming productive members of the workforce. 4-H youth are engaged partners in decision making regarding RCE programming including but not limited to 4-Hyouth development programming. 4-H alumni and volunteers become engaged citizens by assuming leadership positions in communities. Youth development professionals and stakeholders influence decision makers in policy development related to youth development needs and issues.

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2009	40000	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Rutgers 4-H Summer Science Program

The Rutgers 4-H Summer Science Program was established in 2009 as an opportunity for traditionally underserved youth to:
*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 SET Ambassador in their home community.

What has been done

In its inaugural year, forty-four (44) high school youth from four urban communities throughout New Jersey participated in the campus-based portion of the program, July 6-10, at the Rutgers School of Environmental and Biological Sciences. During their weeklong residential experience, they explored science through hands-on activities at the Equine Science Center, the Center for Remote Sensing and Spatial Analysis, the Institute of Marine and Coastal Sciences, the Food Science Department, and the Liberty Science Center. The 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 SET (Science, Engineering and Technology) Ambassadors. They participated in workshops on leadership, the experiential learning process, working with younger youth, and additional 4-H opportunities. As 4-H SET Ambassadors, they returned home and worked with their local 4-H program to promote 4-H and science to other youth.

Results

*95% of youth reported a better understanding of what it means to be a scientist.
*84% reported excellent or good interactions with the Rutgers scientists. (30% Excellent)
*Youth comments on what they had learned from the science faculty:
"I now have a better grasp of what a researcher's daily life is like."
"Science can be very exciting."
"What we learn in school applies to real life and can be used in career and everyday lives."
"I learned more about a field in science that I am now considering that before I knew very little about."
Youths' video production of their experience can be viewed at
http://njaes.rutgers.edu/spotlight/4h-summer-science.asp.
Through a pre-post survey, participants reported the following (n=43):
*100% now understand what it means to be a 4-H SET Ambassador.
*Students increased their level of readiness to become a SET Ambassador in the following categories:
86% reported an improved ability to communicate about 4-H SET to community leaders. The data shows a significant shift from pre to post.
88% reported they could motivate middle/high school students to participate in 4-H SET.
83% reported they could present activities on science topics.
*Youth participants noted in their open ended responses:
"I learned leadership, and how to teach younger kids, and different areas in science."
"I learned team building and interaction skills."
"I learned you should always put yourself out there to try new things."

4. Associated Knowledge Areas

KA Code	Knowledge Area
806	Youth Development

Outcome #4

1. Outcome Measures

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

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2009	{No Data Entered}	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
New Jersey 4-H After School Training

Quality training for after-school providers is a costly endeavor especially considering the current financial recession. In partnership with New Jersey School Age Care Coalition (NJSACC), local YMCAs, Boys and Girls Clubs, and local community afterschool programs, 4-H provided trainings to after-school care providers. Curriculum used included: Tools of the Trade by the University of Nevada and the 4-H Afterschool Civic Engagement Resource Guide.
*To contribute to improving the quality of after-school programming in New Jersey by providing afterschool educators with high quality 4-H training at little or no cost.
*To infuse civic engagement into after-school programs.
*To increase the number of youth engaged in high quality after-school programs, thereby enhancing positive youth development opportunities at after-school sites.
*To increase local awareness about and partnership opportunities with, county 4-H educators.
*To provide high quality 4-H training at little or no cost.

What has been done
Each training consisted of 2 compulsory workshops, Tools of the Trade and Civic Engagement, and 2 workshops of choice. Site contact staffs were surveyed for the choice topics and also a "menu' of possible topics was provided, enabling the workshops offered to match local needs with 4-H expertise. There was no charge for any of the trainings; however each site supplied refreshments and lunch. Lunchtime presentations provided information about 4-H Youth Development programming in that county. This was designed so that the local community could establish connections with 4-H and also see the breadth and depth of partnership opportunities with 4-H. In addition, each workshop presenter discussed 4-H Youth Development programming and the opportunities for program collaboration.

Results
415 after-school educators participated in 9, 8 hour trainings, held in 7 counties across the state.
*96% of the participants surveyed answered, "yes" to the question, "Are you leaving this program with a better understanding of how you can be an effective afterschool educator?"
*91% of the respondents rated the training program as "excellent" or "good" when compared to similar programs they had attended, with a choice of "excellent", "good", "fair", "poor".
*When asked to identify what was learned from the program, responses included, "Service learning projects can be simple to incorporate with any kind of program.", "Teamwork and leadership. How to bring it back to your after school program.", "There are a lot more activities to do with kids other than games and crafts.", "How to have fun in after school."

4. Associated Knowledge Areas

KA Code	Knowledge Area
806	Youth Development

Outcome #5

1. Outcome Measures

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

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2009	{No Data Entered}	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
4-H 4-REEL: Afterschool Digital Filmmaking Program

As a project-based learning program, 4-H 4-REEL is designed to productively engage urban youth during the after-school hours. The primary goals are for youth to increase their technology, teamwork, planning, organizing, and communication skills.

What has been done
*Assembled a Mobile Technology Lab (MTL) including five notebook computers, digital hard drive camcorders, tripods, and Adobe Premier Elements software for use at the afterschool sites.
*Designed and delivered a 10-12 week program that directs teams of afterschool youth in the creation of short digital films. Each team created one of five types: instructional, documentary, interview, performance, or positive message.
*Maintained collaboration with participating afterschool sites administered by Boys and Girls Club, Isles, Martin House, and the Trenton After School Program.
*Involved three teens as cross-age teachers for program delivery.
*Coordinated a closing recognition event for participating youth, staff, and families from all four sites. All films were shared and recognition was provided to all participants.
*Coordinated a recognition trip for the highest scoring team from each site. The four winning teams and their parents traveled to NYC and toured NBC Studios and the Sony Wonder Technology Lab.
*Presented the program at the 2009 Urban Extension Conference and the 2009 CYFAR Conference.

Results
Sixty (60) youth from four collaborating sites participated in 4-H 4-REEL during the spring semester of 2009. Each site produced five short films that were viewed at the program's closing event in June. Each participant received a DVD containing their film. Twenty-seven (27) of the participating youth (two of the four participating sites) completed a retrospective pre-post survey following their involvement (scale of 0-3, 0-no ability, 1-some ability, 2-good ability, 3-excellent ability). The survey included three sections-life skills, computer skills, and

filmmaking knowledge and skills. The overall life skills score increased from 1.96 to 2.47, the overall computer skills score increased from 1.93 to 2.57, and the overall filmmaking score increased from 1.48 to 2.36.

4. Associated Knowledge Areas

KA Code	Knowledge Area
806	Youth Development

Outcome #6

1. Outcome Measures

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

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2009	{No Data Entered}	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Character Education

Children today are bombarded with messages that question human character. A quick review of today's headlines will confirm this. Lying, cheating, and stealing abound. This program reviews the elements of character: trustworthiness, responsibility, caring, respect, fairness, and citizenship.

What has been done
For six weeks the 4-H Character Education Program of Union County provided character instruction to fifth graders at Central Five Elementary School in Union Township, NJ.

Results
In 2009 4-H conducted a character education program for 48 fifth grade youth at Central Five Elementary School in Union, NJ. Forty-eight students completed an end-of-program survey. These surveys showed:
91% will do something new or different
74% will change the way they think, act, or behave.
97% will use or share what they learned.
85% are more interested in the topic.
97% said the information was useful.

4. Associated Knowledge Areas

KA Code	Knowledge Area
806	Youth Development

Outcome #7

1. Outcome Measures

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

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2009	{No Data Entered}	0

3c. Qualitative Outcome or Impact Statement

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

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 researchers, (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. Positive Youth Development (PYD) opportunities can greatly enhance the outcomes for these youth. The Tufts University Longitudinal study of 4-H and PYD found that youth who participated in 4-H had better grades and were more likely to stay in school and attend post-secondary education. They also found that immigrant youth involved in 4-H demonstrated positive functioning.

What has been done

Latino organizations expressed a need for sustainable youth development programming in their community, as transportation to already existing 4-H programs was unavailable. Previous programs for the Latino community have been short term educational programs in schools during after school, but have not resulted in a sustained youth development program in the community. The New Brunswick 4-H program was developed to meet these needs, utilizing the structure and philosophy of 4-H, while working in collaboration with community organizations such as Lazos America Unida. Lazos is a non-profit organization whose mission is to integrate the public, private and civic sectors of New Brunswick through a variety of community projects, and empower them by obtaining educational, economic, cultural, and social equity.

Program Objectives:
*Provide a positive youth development experience for underserved Latino Youth.
*Develop leadership skills in youth and adults.
*Enable adults in the Latino community to assist with the running of club and projects.
*Provide positive leadership development opportunities for youth and adults.
*Provide an opportunity for youth to develop and maintain community and cultural connections.
*Build family strengths in the Latino community.
*Provide a connection with Rutgers University through opportunities for college students to serve as mentors, resource leaders for 4-H clubs and to assist 4-H youth with development of career goals.

Program Methods:
*The New Brunswick 4-H program utilizes a "mega-club" concept to provide an opportunity for youth to participate in projects that interest them. Project areas include leadership, cultural arts and dance, arts and crafts, babysitting, sports and fitness, ESL, gardening and foods and nutrition. Partnered with New Brunswick agencies and businesses to provide support for club meeting space and resource support for clubs.
*Two bilingual part-time staff assist with the development and implementation of the program, and with program promotion.
*4-H clubs meet at local schools, and in community centers. Efforts are underway to secure a permanent location for the 4-H clubs and New Brunswick 4-H office.
*National 4-H curriculum is used for educational programming in 4-H clubs.
*The Rutgers New Brunswick 4-H Team, a group of Rutgers University students assist with the running of 4-H clubs, provides for additional recruitment of New Brunswick 4-H club volunteers, assist with fund development, and provide a sustainable link between Rutgers University students and the New Brunswick 4-H Program.
The New Brunswick 4-H program provides programming for youth in grades K-13. A kick off event was held in May of 2009 to showcase the 4-H clubs and was attended by over 200 New Brunswick residents. Program promotion through schools, libraries and community events has generated interest in the New Brunswick 4-H program. Parents indicate that they are interested in 4-H due to the fact that it provides a supportive environment for youth, promotes educational programming and involves adults from the community as volunteer leaders.

Results
*As of December 2009, ten 4-H project area groups have been established, volunteer leaders have been assigned, meeting locations have been secured and groups have begun meeting.
Over 175 youth have enrolled in the New Brunswick 4-H program. Continued training will be available for volunteer leaders to build, maintain and sustain these 4-H programs for community youth.
*Over thirty-five volunteers including adults from the community and Rutgers University students have been recruited and trained to work as leaders with the New Brunswick 4-H program.
*A New Brunswick 4-H Program Advisory Board has been formed which involves 4-H volunteers, community and business leaders, and Rutgers University students. This advisory board will assist with fund development and program promotion.
*A Rutgers University undergraduate student organization, the Rutgers New Brunswick 4-H Team, has been formed. The members assist with fund development to support 4-H programming efforts in New Brunswick, and serve as assistant volunteer leaders with 4-H clubs.
*Program recruitment and informational flyers, volunteer training materials, some curriculum and registration documents for youth, adult volunteers, and clubs has been translation into Spanish.
*Three Rutgers University undergraduate students are providing assistance to the program through their work with evaluation, fund raising, and program outreach.
*The New Brunswick 4-H program has been involved in other university programs such as the Rutgers University Nature through Nurture Working Group and the New Brunswick Community Farmer's market.
*Six New Brunswick 4-H youth, who are members of the New Brunswick 4-H leadership club, assisted with the

4-H Teen Council Project GIFT event (a free day of holiday shopping for limiting resource families) in December 2009 at the 4-H Center. These youth served as translators during the event to assist Spanish speaking clientele attending Project GIFT. Follow up surveys of these youth indicated that:
-100% of the youth indicated that they enjoyed being a part of the Project GIFT program and they felt their ability to translate for non-English speaking clientele was helpful to those attending the event.
-When asked to indicate the skills learned or practiced through participating in the Project GIFT program, the 6 youth indicated learning the following results:

33% How to be a better leader/leadership
100% How to communicate with others
85% How to work in a team
67% The importance of becoming involved in service to the community
100% How to work with people who may be different from me

*Youth comments included the following:
-"I plan to keep working on my leadership skills and to help out in my community as much as I can. I plan to get more involved in 4-H and get other teens and young adults involved."
-"The best part about helping in GIFT was that we translated for people and I feel like I was doing something good for other people."
-"I met kids and teens. Some became my friends. I did a lot of teamwork."

4. Associated Knowledge Areas

KA Code	Knowledge Area
806	Youth Development

Outcome #8

1. Outcome Measures

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

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2009	{No Data Entered}	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Operation: Military Kids Camping Programs

Since many military families, particularly in the Guard and Reserve units, do not live near a military installation, they may not have access to military family support systems. Teachers and counselors in schools seldom know which children in their classroom have parents in military service. More importantly, they are not cognizant of the unique challenges these youth must face while the parent is deployed. The general public is not aware that these families may be their next door neighbors, or that their Little League coach, town policeman, EMT, or local church deacon is also a soldier in the Guard or Reserve. In 2008, the National Guard alone deployed 3,000 soldiers, parents of 1,276 children from communities across the state of New Jersey.

What has been done
The focus of NJ OMK includes five specific outreach efforts. Each serves a unique purpose:
(1)Creating Community Awareness
Provide training for professional educators, counselors, service organizations, and community groups on the special challenges and needs of military youth.
(2)Speak Out Military Kids (SOMK)
Create a forum for teens, military and non-military to plan and implement community service projects that mobilize local students and organizations who want to help. Provide leadership training, team building, and public speaking skill development for teens.
(3)Hero Packs
Provide back packs filled with fun and educational items that also promote communication between the youth and their deployed parent. Organize youth groups to assemble the packs and include personal messages of hope and gratitude.
(4)Mobile Technology Lab (MTL)
Provide hands-on, educational technology-based programs focused on connecting youth with a deployed loved one.
(5)Outdoor Adventures
Provide social and recreational activities in an outdoor environment including day camps, weekend camps and family camps. Enhance interpersonal skills through leadership and outdoor skill development.

Results
In 2009, NJ OMK held 32 programs, briefings and network activities reaching over 2,800 youth, service members, and members of support organizations. One new initiative for the 2009 year was OMK camping programs. Two hundred and twelve youth from all over New Jersey and eastern Pennsylvania and southern New York participated in six OMK camping programs in 2009. The camping programs ranged from single day camps to weekend camps and targeted youth, teens and the entire families who had recently experienced deployment.

Family Camp:
Forty youth and fifty adults spent the weekend reconnecting in an outdoor environment while participating in traditional camp activities like archery, boating, fishing and hiking. Six volunteers, four staff and two teen counselors lead workshops, campfire songs, night hikes. Families worked together to create Family Memory Books.

The seventeen participating families reported that due to their participation in this program:
*100% will do something new or different.
*78% have changed the way they think, act or behave.
*100% plan to use or share what they learned.
*100% enjoyed their stay at camp.
*100% will return again and will recommend the OMK Family Camp to other military families.
One hundred and fifty-eight youth participated in four day camp programs that were held during the summer of 2009. These day camps ranged in length from a single day to two weeks.
*Marine Science Day Camp- Forty six Coast Guard youth participated in a two week day camp focusing on marine science themes.
*OMK Explorers Camp- Seventy National Guard youth participated in a one day camp focusing on group games. Three volunteers from the NJ OMK State Team, three OMK staff members, and six National Guard Soldiers assisted with the program. Eight 4-H teens served as camp counselors and facilitated group activities and the use of the mobile technology lab.
*Under the Middle Eastern Sky Day Camp- Thirty Army and National Guard youth learned about Middle Eastern

food and culture and astronomy.
*Aqua Adventures Day Camp- Twelve military youth explored the connection between marine science and the military at the Adventure Aquarium and the Battleship New Jersey.

OMK Teen Leadership Camp Out
Thirty youth from six New Jersey counties and one youth from New York City, including seven military youth, participated in the camp out. All of the participants completed an end of program survey. They reported that due to their participation in this program:
*92% will do something new or different.
*85% have changed the way they think, act or behave.
*96% plan to use or share what they learned.
*Participants planned to use what they learned in these settings:
-62% when leading other groups.
-17% in school.
-17% in 4-H club meetings.
*83% of participants indicated that because of the Leadership Camp Out they believe they can be better leaders.

4. Associated Knowledge Areas

KA Code	Knowledge Area
806	Youth Development

Outcome #9

1. Outcome Measures

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

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2009	{No Data Entered}	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Union County Summer Science Program for Urban Youth

Low income children in Union County score significantly lower on science achievement tests than middle and upper income students.

What has been done
4-H enriches the summer vacations of children by providing them with science education for seven weeks each summer. This is accomplished by providing science teachers to summer day camps located in the poorer parts of Union County. Approximately 600 children, ages 6 to 12, participated in the program this year.

Results
136 of the children who participated in the 2009 4-H Summer Science Program completed an end-of-program evaluation. The evaluation showed that, as a result of being in the 4-H Summer Science Program:
88% said that they can solve a problem better now.
82% said they can observe things better.
88% said they can do an experiment.
71% said they like science more than before.
76% said they would like to learn more about science.
67% said they would tell someone what they learned.
34% said they would like to become a scientist someday.

4. Associated Knowledge Areas

KA Code	Knowledge Area
806	Youth Development

V(H). Planned Program (External Factors)

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

Brief Explanation

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

1. Evaluation Studies Planned

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

Evaluation Results

{No Data Entered}

Key Items of Evaluation

{No Data Entered}

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	20%		20%	
211	Insects, Mites, and Other Arthropods Affecting Plants	20%		20%	
215	Biological Control of Pests Affecting Plants	20%		20%	
601	Economics of Agricultural Production and Farm Management	20%		20%	
604	Marketing and Distribution Practices	20%		20%	
	Total	100%		100%	

V(C). Planned Program (Inputs)

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

Year: 2009	Extension		Research	
	1862	1890	1862	1890
Plan	70.0	0.0	36.0	0.0
Actual	20.8	0.0	58.5	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**
1087712	0	588643	0
1862 Matching	**1890 Matching**	**1862 Matching**	**1890 Matching**
1412644	0	5329271	0
1862 All Other	**1890 All Other**	**1862 All Other**	**1890 All Other**
159898	0	5064404	0

V(D). Planned Program (Activity)

1. Brief description of the Activity

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

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

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

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

2. Brief description of the target audience

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

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

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

V(E). Planned Program (Outputs)

1. Standard output measures

2009	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Plan	8700	1216000	95	160
Actual	31760	339714	8455	550

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

Year: 2009
Plan: 2
Actual: 33

Patents listed

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

2009	Extension	Research	Total
Plan	55	20	
Actual	63	93	156

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

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

V(G). State Defined Outcomes

V. State Defined Outcomes Table of Content

O. No.	OUTCOME NAME
1	Short Term Increases in knowledge and skills of agricultural and horticultural industry professionals will occur. * Nutrient management * Pest management * Waste/by-products management and utilization * improving water quality and conserving water * conserving energy * marketing skills * labor management * risk management * policy e.g. farmland preservation * sustainable ag and organic ag production methods * new crops and use/alternative crops
2	Medium Term Productive agricultural land is stabilized to meet the needs of the agricultural industry and the "open space" needs of people of NJ. Agriculture remains a relevant and viable economic sector as profits increase (through reduced costs and/or increased or new sales or revenue streams). Measurable reductions in environmental impact (clear and adequate sources of water, reduced waste, reduced soil losses, reductions in non-point source pollution, etc.) will occur through the adoption of improved and sound management practices. Overall state environmental quality will be enhanced by agriculture, such as through the utilization and recycling of biowastes generated by the non-ag sector or the enhancement of air quality. The products of NJ agriculture will add to the nutritional quality of New Jerseyans food.
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	Wine Grape Production and Marketing-Medium Term Productive agricultural land is stabilized to meet the needs of the agricultural industry and the "open space" needs of people of NJ. Agriculture remains a relevant and viable economic sector as profits increase (through reduced costs and/or increased or new sales or revenue streams). Measurable reductions in environmental impact (clear and adequate sources of water, reduced waste, reduced soil losses, reductions in non-point source pollution, etc.) will occur through the adoption of improved and sound management practices. Overall state environmental quality will be enhanced by agriculture, such as through the utilization and recycling of biowastes generated by the non-ag sector or the enhancement of air quality. The products of NJ agriculture will add to the nutritional quality of New Jerseyans food.
5	Farmer-to-Consumer Characteristics-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.
6	Farm Management-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.

7	Cow Side Ketosis Test-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.

Outcome #1

1. Outcome Measures

Short Term Increases in knowledge and skills of agricultural and horticultural industry professionals will occur. * Nutrient management * Pest management * Waste/by-products management and utilization * improving water quality and conserving water * conserving energy * marketing skills * labor management * risk management * policy e.g. farmland preservation * sustainable ag and organic ag production methods * new crops and use/alternative crops

Not Reporting on this Outcome Measure

Outcome #2

1. Outcome Measures

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

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2009	50000	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.
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. These annual efforts strive to increase public awareness, appreciation and education of proper horticulture techniques and decision-making.

What has been done

In 2009, the Melda C. Snyder Teaching Garden presented several horticultural and educational displays for the home gardener, chef gardener, and even 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. 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. Wagon tours led by staff highlighted ongoing Rutgers NJAES agricultural and horticultural research. Master Gardeners from several surrounding counties assisted the visiting public, answering questions in the teaching garden, and of course serving over 80 varieties of heirloom and hybrid tomatoes. Following this event, an online questionnaire and survey was developed and emailed to approximately 500 email addresses from 2009 registrations.

Results

The following responses were recorded (n = 240, a 48.00% response rate from the 500 surveyed):

*91.1 % strongly agreed or agreed that they are now more likely to favor community initiatives aimed at preserving and strengthening agriculture in NJ.

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

*79.4 % strongly agreed or agreed that they are now more likely to purchase tomatoes, peaches, apples and other produce at local farm markets and roadside stands.

*90.08 % strongly agreed or agreed that the Rutgers Snyder Research Farm and Rutgers NJAES Cooperative Extension faculty, staff, and Master Gardener volunteers provided timely and useful food and agricultural information.

*65.4 % strongly agreed or agreed that they improved their gardening knowledge by visiting the Teaching Garden during the Rutgers NJAES Tomato Tasting event.

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

*90.0 % strongly agreed or agreed that they now 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.

*86.1 % strongly agreed or agreed that they are now more aware of the number of new apple and peach varieties available for purchase.

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	Quantitative Target	Actual
2009	60000	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Commercial Kitchen and Value-Added Agricultural Products Program

Agricultural producers in New Jersey are interested in developing value-added products. The development of value-added products, such as jellies made from locally grown fruits, can increase the sales season for producers while providing a potential option for increased profits. Although the production of value-added products has tremendous potential, there are very few locations where producers can develop these products. There is also a need for formal training to ensure that these products are produced in a safe and legal manner.

What has been done
In cooperation with Sussex County Board of Agriculture, New Jersey Department of Agriculture, and Sussex County Technical School, Rutgers faculty 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 Rutgers Extension Specialist in Food Science; 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, Rutgers Cooperative Extension, Sussex County 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.

Results
The team developed and administered program evaluations and follow-up surveys for these programs. Results 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.

Producers were also surveyed to quantify the level of knowledge gained by the participants in 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 are as follows:
-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.
-6 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.

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

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

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2009	{No Data Entered}	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Wine Grape Production and Marketing

Agriculture is still a big business in this three county area. Growers are looking for a new crops with higher revenues. Wine grapes can generate more revenue from $9,000 to $15,000 per acre depending on yields and cultivars. In 2008 New Jersey's wineries produced more than 6.3 million gallons of wine, making New Jersey the fifth largest wine making state in the country. New Jersey is also the fifth largest wine-consuming state in the U.S. (at 3.07 gallons per person), with New Jersey wines accounting for approximately 1% of wines consumed in the United States. Wine grapes are the raw materials for a value added product that has few rivals in agriculture. Vineyards and wineries also contribute to tourism, hospitality industries, and offer other economic benefits for local and state agencies, businesses and communities. Vineyards are viewed as a viable agricultural hedge against rampant urban development counties like Gloucester, Salem and Cumberland.

What has been done
Rutgers NJAES County Agricultural Agent and Extension Pomologist takes the lead in educational program. Specialist in weed science have taken the lead in pest management programming. IPM Fruit Agent has begun working in viticultural pest management. With their help and the support and help of wine grape educators and specialist in the Mid Atlantic Region we have been able to work effectively in developing an outreach program. Nineteen articles on wine grape production and regional meetings were published in the PPA-Fruit edition that is distributed to 227 readers by email, mail, and by fax. Another 1,260 are downloaded from our web site from various links in Michigan, Virginia, Illinois, Ohio, West Virginia and New Jersey where it is linked. Development is underway for a new web site.

Results
We have seen an increase in vineyards and three new wineries have been licensed and three more are under construction but not licensed.
In 2007 there were 192 farms on 1,043 acres. As of 2009 according to the census there were 21 vineyards producing wine grapes on 88 acres in Gloucester Salem and Cumberland which represents about 9% of the acreage. Based on my calculations there are and additional 90 acres that are not part of these census so this would increase the percent to 18. We are seeing increased acreage based on my personal data coupled with the data. More importantly we are seeing existing farm that were tree fruit and field crop operations not only growing grapes and also producing wine. We also have 12 addition operation that are new farmers that grow grapes and make wine exclusively.

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

Farmer-to-Consumer Characteristics-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	Quantitative Target	Actual
2009	{No Data Entered}	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Farmer-to-Consumer Characteristics

According to the US Census Bureau, Hispanic population has grown substantially making it the fastest growing minority group in the United States. The Hispanic ethnic population growth provides a great opportunity to the fruit and vegetable growers to introduce new produce items to meet the growing demand in the Northeast. In addition to taste and preferences, the ethnic produce market is driven by consumers' socio-cultural and demographic attributes. There is potential to increase profitability of new Hispanic ethnic produce items based on consumer preferences offered.

What has been done
In addition to tastes and preferences, the ethnic produce market is driven by consumer's socio-cultural and demographic attributes. The produce markets should accurately target at niches markets regardless of its size. US population is increasingly diverse with a fast growing Hispanic population. According to the Census Bureau of US, Hispanic population mushroomed by 58% from 1990-2000. A study based on primary data set collected from interviewing 542 Hispanic ethnic consumers. A survey questionnaire was prepared in Spanish for Hispanic ethnic sub-groups including Mexicans and Puerto Ricans in 16 states (CT, DE, FL, GA, ME, MD, MA, NH, NJ, NY, NC, PA, RI, SC, VT, VA)and Washington, DC. Results indicate 54% of Hispanic consumers were willing to buy ethnic produce that is recently introduced or new to market and the remaining 46% of them were not. In terms of sub-groups, 57% of Mexicans and 51% of Puerto Ricans were willing to buy new ethnic produce. On an average each respondent's family spent about $78/month on ethnic produce. Monthly average expenditure of Mexican ($79) on ethnic produce was $2 more than Puerto Ricans ($77). Hispanic respondents spend an average of approximately $116 per month, Mexicans $109 and Puerto Ricans $123 on total produce, which includes ethnic produce items.

Results
This study analyzed the influence of socioeconomic characteristics on the likelihood of Hispanic ethnic consumers willing to buy produce that is recently introduced or new to the market. The findings may be helpful for policy makers, market intermediaries and farmers to better understand Hispanic consumer's perceptions and the factors that drive the willingness to buy ethnic produce that is recently introduced or new to market. Targeting characteristics that were found to increase the likelihood of a Mexican consumer's willingness to buy new ethnic produce item compared to a Puerto Rican ethnic consumer are respondents' expenditure on overall produce and ethnic produce, perceptions such as the importance of store availability, language, and willingness to buy locally grown, organic, genetically modified, country or origin labeled produce items. While this study had several significant variables that may be useful for ethnic consumer targeting and implementing marketing strategies, caution should be exercised when applying such findings. Given that the socioeconomic characteristics of the sample area characterized by dense population, overall higher produce expenditure by ethnic Mexicans were maybe specific to East-coast US and may not apply elsewhere. However, further research are needed to explore why Puerto Rican consumers are less likely to buy ethnic produce that is recently introduced or new to the market because this might provide valuable information in introducing new ethnic produce items in an ethnic market place. The Hispanic ethnic new or newly introduced produce items can significantly enhance farmers' profits with a steady income. In addition to the potential direct revenue generation brought about by bringing Hispanic residents to the farm, direct marketing and agritourism also benefit farmers in other ways. Agritourism and direct marketing can create positive interactions between farmers and ethnic consumer's contributing to a "culture of understanding" that is necessary for both to coexist. The benefits of direct marketing and agritourism also extend beyond the farm boundaries. Particularly in urbanizing areas, these activities contribute to and enhance the

overall quality of life as they expand recreational opportunities, diversify the economic base, promote the retention of agricultural lands and open spaces, and contribute to community development.

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

Farm Management-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	Quantitative Target	Actual
2009	{No Data Entered}	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Farm Management

The greenhouse and nursery industry is the number one agricultural commodity in New Jersey with a value of cash receipts of $460,265,000, totaling in excess of 41% of the state's total farm receipts and almost 3% of the total US value for this commodity. Currently, there are approximately 350 greenhouse and 600 nursery operations in New Jersey. The U.S. floricultural and nursery industry is the second most important sector in U.S. agriculture in terms of economic output. The green industry is the leading sector in agricultural in New Jersey and four other states (CT, MA, NH, and RI), all located in the Northeast where heating cost is a concern. The total cash value for this agricultural sector for the Northeast is almost $3.0 billion, equating to 18.5% of all farm cash receipts for the green industry across the country. In 2003, the average greenhouse in New Jersey spent 5.3% of sales on heating fuel and had profits of 9.4% of sales. Up until the middle of 2008, crude oil prices continued to rise and reached a high of $147 per barrel. Fuel oil used to heat greenhouses almost tripled in price, but has since come down to levels experienced during the middle of the decade. If, as expected, oil prices start to climb again, a typical commercial greenhouse operation would experience significant difficulty making a profit, and the industry would be in peril.

What has been done
The Extension Specialist has reached producers in New Jersey through a combination of workshops, meetings,

field visits, a newsletter, and The Rutgers Farm Management Website. The primary audience is the ornamental industry which includes nurseries, greenhouses, and garden centers. As survey was conducted in 2008 to obtain information to help growers find ways to cope with ever increasing energy costs. One option some growers were considering was to produce their own bio-fuels. We wanted to find out how many growers had enough land to consider this option. We also wanted to know how growers were handling the fuel cost increases.

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

4. Associated Knowledge Areas

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

Cow Side Ketosis Test-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	Quantitative Target	Actual
2009	{No Data Entered}	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Cow Side Ketosis Test

Ketosis is a condition that occurs in dairy cattle when the demand for energy exceeds intake, resulting in a negative energy balance. This condition occurs most frequently in the postpartum period, especially in high-

producing cows. When the diet does not provide enough energy, the body begins to metabolize fat reserves, resulting in the formation of ketones. Beta-hydroxybutyrate (BHB) is one of the ketones produced during this process. This is the ketone that is measured using the PortaBHB milk ketone test. Long term effects of ketosis include lowered milk production, an increased risk of other diseases such as displaced abomasum, and even impaired fertility. By detecting ketosis before it becomes clinical, producers can take steps to avoid clinical health effects and loss of income. Currently, the test that is accepted as the industry standard is the Abbott Precision Xtra blood ketone monitoring system.

What has been done

Milk samples were collected on several farms across New Jersey in order to calibrate the PortaBHB cow side ketosis test strips so that they would most accurately reflect results found in the Abbott Precision Xtra blood ketone monitoring test. Hundreds of samples proved that the PortaBHB milk ketone test correlates acceptably with the Abbott test. This is very useful since the PortaBHB test costs less per test and is less invasive since it uses milk rather than blood to measure ketone levels in a cow.

Results

The field work and analysis conducted by Rutgers Cooperative Extension of Salem County using PortaBHB milk ketone test strips proved that the new test correlated acceptably with the industry standard test, the Abbott Precision Xtra blood ketone monitoring test. The PortaBHB milk ketone test strips also proved to be more accurate that ketone test strips that use urine for analysis. Along with accurate results, the fact that the Porta BHB test strips use milk for analysis makes the test more convenient than the tests that use blood or urine, since no syringes are needed and since cows are not always easily made to urinate. With the work conducted by Rutgers Cooperative Extension of Salem County, Porta Check, Inc. has been able to launch the PortaBHB milk ketone test into the world dairy market. With the launch of this product, dairymen worldwide benefit by using the product to identify cases of sub clinical ketosis and manage them in a timely and efficient manner to avoid further cow health issues. Also, since Porta Check, Inc. is a Moorestown, NJ based company, the new product will help to keep the company in state to boost the economy of New Jersey.

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 and Data Collection)

1. Evaluation Studies Planned

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

Evaluation Results

{No Data Entered}

Key Items of Evaluation

{No Data Entered}

V(A). Planned Program (Summary)

Program # 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 professional FTE/SYs expended this Program

Year: 2009	Extension		Research	
	1862	1890	1862	1890
Plan	6.0	0.0	3.0	0.0
Actual	4.6	0.0	1.6	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**
133389	0	43665	0
1862 Matching	**1890 Matching**	**1862 Matching**	**1890 Matching**
262929	0	302304	0
1862 All Other	**1890 All Other**	**1862 All Other**	**1890 All Other**
70428	0	105210	0

V(D). Planned Program (Activity)

1. Brief description of the Activity

- Share the results of the 2006 Economic Impact Study
- Horse Management seminars and Equine Science Update-county and statewide
- Maintain Research-based websiteConduct research to impact policy decisions for industry
- Conduct Roundtables
- Produce research based materials
- Hold Annual Stakeholder meeting to identify issues of importance

- RUBEA &ndash advisory committee to facilitate the opportunity to network within the industry
- Public relations and promotions
- Actively engaged as outside speakers for the industry State 4-H horse program
- Perform consultations to individuals and agricultural organizations
- Facilitate the opportunity to network within the industry

2. Brief description of the target audience

- Equine users-including, students/youth, equestrians, owners
- Equine professionals: veterinarians, researchers, industry leaders, farmers, service providers, trainers, breeders, stable managers
- Legislators/Government Officials/Industry Officials e.g. Racing Commission, Sport and Competition Officials (FEI, USEF)
- Educators
- General public

V(E). Planned Program (Outputs)

1. Standard output measures

2009	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Plan	5000	35000	4000	10000
Actual	6724	55643	4532	40500

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

Year: 2009
Plan: 1
Actual: 0

Patents listed

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

2009	Extension	Research	Total
Plan	6	20	
Actual	6	12	18

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

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

V(G). State Defined Outcomes

V. State Defined Outcomes Table of Content

O. No.	OUTCOME NAME
1	Short Term New Jersey residents and government officials will be made aware of the importance of the equine industry. Equine enthusiasts take leadership roles to unify the industry and will acquire knowledge to support the industry's sustainability. Equine industry segments will learn the importance and benefits of speaking in one voice.
2	Medium Term Diverse equine-related units are organized into one voice. Misperceptions by the general public re: the segments of equine industry are corrected. All uses of the horse are recognized as agricultural by local and state government officials.
3	Long Term Equine industry is unified and is economically sustainable. Equine industry is recognized as a critical component of the economic development, of traditional agriculture, and the preservation of open space.
4	Horses 2009-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.
5	Equine Risk Management-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.

Outcome #1

1. Outcome Measures

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

Not Reporting on this Outcome Measure

Outcome #2

1. Outcome Measures

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

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2009	35000	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
New Jersey Horse Program

With our children falling behind other countries in scientific knowledge, and New Jersey farmland still being converted into housing developments at such a rapid rate, there continues to be a great need for 4-H agricultural science programs especially in animal science. In these programs youth gain an understanding of such a wide array of science topics from anatomy, physiology, nutrition and health that can transfer to interest in careers in medicine, nutrition, pharmacology, and research.
Youth also gain skills in animal management that can relate to equine careers in racing, veterinary science, nutrition and feeding, breeding and reproduction and riding and showing. Giving youth the opportunity to find what interests them and potential career paths is very important.
These youth and their parents help to keep agriculture viable in New Jersey. This is a topic of great importance to all New Jersey residents. The Equine industry is a multimillion dollar force in the New Jersey economy.

What has been done
The New Jersey 4-H Horse Project continues to be one of the largest projects in the state with over 1,600 club members in 2009. Youth grades 1- 13 from almost every county in the state can and do participate in some fashion. Many of these 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 exception because there are so many different opportunities for youth to learn, and so many different ways for this learning to take place.

Some of these members and groups may never have a live horse to work with, but they learn through reading books, taking field trips, using models, watching educational videos, inviting equine professionals to do a workshop, talk or demonstration for their club. 4-H Horse Club members study anatomy, styles of riding, feeds, nutrition and feeding, tack and equipment, reproduction, training, breed identification, equine physiology and more. The 4-H Model Horse Project helps youth who may not otherwise have access to a live horse the opportunity to learn about equine science topics. In 2009 twenty five (25) youth from 5 counties participated in the show.
New Jersey Equine Presentations"
Youth in the program learn to do in depth research on a subject and present it to a crowd. The subject matter must be correct and their presentation skills must be excellent to succeed in this contest. Fifteen (15) youth from five counties participated in Formal Speeches, Team Presentations and Demonstrations. The Equine Presentation team consists of an individual presentation, a speech, and a team presentation this team competed in the Eastern National Round Up competition in Kentucky. One hundred and forty five (145) competitors (36 teams) from 12 counties participated in the New Jersey 4-H Horse Bowl. Horse Judging includes evaluating a class of 4 horses and judging or placing them first, second third and forth in their class. There is an oral reasons component in which the member must defend their reasons for placing the class the way they do. Participating in this county team helps youth learn how to evaluate equines, identify different breeds, coat colors and conformational faults as well as select animals for breeding and soundness for a discipline. They gain confidence in their oral speaking abilities and decision making skills.
Eighty nine (89) competitors, twenty five (25) teams competed in this contest representing eleven (11) counties. From this group, 4 individuals worked with a coach to compete at Eastern National 4-H Round Up and Quarter Horse Congress.
The format for Hippology competition includes a Horse Judging component and skillathon stations which present a varied number of situations and problems which the member and team must solve. The topics of the stations run across a broad range of topics related to equine science including feeds and feeding, nutrition, foaling and reproduction, types of equipment, breeds and coat colors and styles of riding or types of competition.
One hundred and eight (108) competitors, thirty one (31) teams from 11 counties competed in this state event. From this group, 4 individuals represented New Jersey at the Eastern National 4-H Round Up Competition.

Results
Participants in the 4-H Horse Program, report learning life and subject matter skills. Results from evaluations revealed the following results:
90% said 4-Htaught them how to get along with other people.
85% said they learned communication skills
84% said the 4-H Horse Program teaches children about all aspect of the horse
80% agree that 4-H taught them the importance of taking part in community service projects.
80% said 4-Htaught them to be a better person.
78% said they learned about conformation and balance
75% said they learned about the horse's anatomy and physiology
75% said that they learned everything they know about horses from the 4-H program
70% agree that 4-H has improved their public speaking skills.
58% said they learned about time management
51 % said being a part of the County 4-H Hippology Team taught them to be a team player

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	Quantitative Target	Actual
2009	40000	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Functional Equine Best Management Practices

Current environmental issues facing today's farmers, including impacts of erosion and animal waste runoff from poorly maintained pastures, and adverse effects of improper manure storage and management.

What has been done
Self-guided tour allows farmers, horse owners and agriculture specialists to visit the farm on their own or in their own groups, tour each BMP on the farm. Each BMP is also highlighted on the new virtual farm tour published on the Equine Science Center (esc) website (www.esc.rutgers.edu) for those who are not able to come to the farm itself. The BMPs include the following: Compost Area, Rotational Grazing System, Biofiltration Swale, Back Paddock Drainage, Manure Storage Area, Rain Garden and Front Paddock Drainage, Forage Demonstration Plots and Whole Farm Nutrient Management Plan

Results
The ESC at Rutgers' NJAES serves as a showcase for NJ, combining agricultural and environmental engineering principles. These principles not only apply to equine facilities but many farm animal operations. The project targets constructing stormwater BMPs to address several observed nonpoint sources of pollution at the ESC including roadways, paddocks, pastures, rooftops, and agricultural fields. These constructed stormwater BMPs are evaluated for their pollutant removal efficiency over time as well as their ability to minimize the water quality impacts from the impervious surfaces at the ESC. The ESC is also used to demonstrate the results of good pasture management practices to minimize the environmental impact of these farms, such as properly timed soil test-based fertilizer applications, weed identification and control, frequent mowing, rotation, and renovation.
The project has many environmental returns. This type of education is needed for NJ since there are many areas that are rapidly urbanizing. The BMPs are perfect for working on the urban fringe. According to the 1996 NJ Equine Industry Survey, there are 7,600 farms with 49,000 horses in the state. In addition, there are 260,000 total acres devoted to equine production and use. With the approximate 450,000 tons of manure per year that is produced in NJ, the ancillary benefits of our program helps farmers stay out of regulatory problems, help keep the industry viable, and help decrease water pollution to area waterways. Other sources of funding for research on the pasture, manure and stormwater systems are being explored. Due to the magnitude of this project there has been a lot of interest in the Northeast through other universities and environmental organizations.

Other educational projects besides the self-guided tour and the virtual tour on the ESC website have taken place over the last few years and plan to continue.

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

Horses 2009-Medium Term Diverse equine-related units are organized into one voice. Misperceptions by the general public re: the segments of equine industry are corrected. All uses of the horse are recognized as agricultural by local and state government officials.

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2009	{No Data Entered}	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Horses 2009

Horse owners, horse farm owners and managers, veterinarians, educators, key horse industry people as well as those involved in the racing business need to maintain updated knowledge and training, which is essential to a viable and thriving equine industry. Our audience members were mostly from the NJ, NY and PA areas as well as from DE and even as far as IL and MT. Veterinarians and vet techs who attended both days of the conference earned eleven hours of Continuing Education credits. The curriculum emphasized topics such as horse health, nutrition, behavior, and subjects related to good horse-keeping.

What has been done
The Horses 2009 educational conference, which attracted approximately 800 attendees, partners, sponsors and speakers. This event took place March 28-29, 2009. The event was organized entirely by the Rutgers Equine Science Center, with input and participation by Cornell University, the University of Delaware, the University of Maryland, the University of Vermont, Centenary College, and Delaware Valley College.

Results
Results from program evaluations were outstanding. In every aspect of the evaluations, the overwhelming

majority of respondents gave the program, speakers and overall content a good to excellent rating. Out of a possible four points, the program received a ranking of 3.7. Virtually all respondents (99 percent) said they would use the knowledge they learned at Horses 2009 to change and improve their own activities and procedures.

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 #5

1. Outcome Measures

Equine Risk Management-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	Quantitative Target	Actual
2009	{No Data Entered}	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Equine Risk Management

The equine industry generates $1.1 billion in economic impact annually for New Jersey and includes over 7,000 operations. The horse industry in southern New Jersey is comprised of a few large operations and many smaller ones, including "backyard farms." Two legal risks have recently been identified that smaller equine operations might not be aware of: newly adopted rules to make Animal Waste Management Plans (AWMP) a requirement for farms and "New Jersey Sales and Use Tax Act" applications to equine businesses.

What has been done
A workshop was held that addressed the AWMP and Sales Tax issue, as well as several other risk management topics relevant to horse farm owners. These included: Current and Emerging Equine Health Issues, The Unwanted Horse Problem in the U.S., Feed Supplements: Using Them Wisely, and Equine Right to Farm. Flyers were posted in feed stores and other businesses frequented by horse farm owners, ads were placed in local newspapers, and a radio segment was aired advertising the meeting. The goal was to inform horse farm owners of the new legal issues through advertising, which would encourage them to attend the meeting to learn how to comply with the rules.

Results

End of the program evaluations revealed that:

94% felt that they better understood the rules for Animal Waste Management Plans, and 33% said that they intended on developing a Plan for their facility.

83% of responders felt that they understand the implications of the "New Jersey Sales and Use Tax Act,"

27% had assessed their own operation's compliance with it.

Two evaluation responders noted that they would be downsizing their herd as a result of the meeting, and several will be making feed changes and developing Animal Waste Management Plans.

A follow-up survey revealed that:

70% of participants had utilized the binder or CD provided to look into developing an Animal Waste Management Plan

50% had taken steps toward developing a plan.

40% of responders had implemented the Sales and Use Tax in their operations (an additional 50% were not affected by it).

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 and Data Collection)

1. Evaluation Studies Planned

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

Evaluation Results

{No Data Entered}

Key Items of Evaluation

{No Data Entered}

V(A). Planned Program (Summary)

Program # 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 professional FTE/SYs expended this Program

Year: 2009	Extension		Research	
	1862	1890	1862	1890
Plan	3.0	0.0	3.2	0.0
Actual	10.9	0.0	14.3	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**
439775	0	136484	0
1862 Matching	**1890 Matching**	**1862 Matching**	**1890 Matching**
698915	0	1686725	0
1862 All Other	**1890 All Other**	**1862 All Other**	**1890 All Other**
121544	0	1426261	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 &ndash lawn, garden and grounds management
- Commercial horticulture - professional management and maintenance

Environmentally sound household, structural pest control
- Home pest control &ndash termites, carpenter ants, etc.
- Human-heath related pest control &ndash mosquitoes, ticks, etc.
- A school IPM program will be developed to train end-users sound management techniques,

Develop an inventory of local (county based) and regional and statewide programs designed to meet these needs.

Identify team members and their roles.

Create a multi-task effort to generate and share research-based information with clientele, including research, demonstrations, educational meetings and workshops, certification programs, trainings, etc.

Research on plant cultivars that exhibit increased disease and insect rsistance, as well as reduced for fertilizer and irrigation water, will lead to reduced dependence on chemical contorl of pests, lessening the impact of 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
- Municipalities and other governmental and non-governmental agencies, including Parks Commission, Public Health, Mosquito Commission, schools, etc.
- Local environmental commissions or others that have interest in these areas

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

Underserved and underrepresented audiences

V(E). Planned Program (Outputs)

1. Standard output measures

2009	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Plan	22000	6900	220	80
Actual	24250	12500	4366	300

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

Year: 2009
Plan: 0
Actual: 1

Patents listed

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

2009	Extension	Research	Total
Plan	6	0	

Actual	10	37	47

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

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

V(G). State Defined Outcomes

V. State Defined Outcomes Table of Content

O. No.	OUTCOME NAME
1	Short Term Increased knowledge and improved decision making skills of professionals and volunteers (Master Gardeners and Environmental Stewards) working in commercial horticulture professions (management and maintenance), commercial pest control operators, public health officials, municipalities and other governmental and non-governmental agencies. Increased number of trained youth and adult volunteers, and measurable impact of their assistance on clientele. Increased number of certified pest control operators. Increased number of youth and adult clientele utilizing Extension information and service to improve their own and others knowledge and decision making skills.
2	Medium Term Educated youth and adult clientele, both professional and residential, utilize their newly gained knowledge and skills to implement and make changes such as: Efficient and effective pest control techniques. Proper utilization of fertilizers and other soil amendments as needed based on soil testing. Proper selection of plant materials to reduce need for chemical inputs. Reduction in the damage caused by structural pests. Reduction in health related incidents and costs association with human health vectors (ticks, mosquitoes). Protect health and safety of school children. Enhance or maintain environmental quality.
3	Long Term New Jersey's residents will reside, work and play in a healthy, safe, and sound environment -- in their homes, gardens, schools, parks and workplaces.
4	2009 Eco-Ventures at the Earth Center-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.
5	Rutgers Environmental Stewards-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.

Outcome #1

1. Outcome Measures

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

Not Reporting on this Outcome Measure

Outcome #2

1. Outcome Measures

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

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2009	45000	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 volunteer program 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. Over 2,500 fourth grade students in approximately 80 Union County schools participated in the program.

Results

A sampling of 226 students showed that as a result of the Rutgers/4-H Class on Tree Appreciation:
71% said they were less likely to damage trees.
90% said they were more likely to take better care of trees around their homes.
86% said they were more likely to take better care of trees around their schools.
70% will observe trees more closely.
69% are more likely to plant a tree.
98% learned that there are many different kinds of trees.
84% were more likely to stop others from damaging trees.
78% want to learn more about tree care and planting.
83% 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 #3

1. Outcome Measures

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

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2009	50000	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Private Non-Industrial Forest Management and Stewardship

Almost eighty-nine thousand landowners own approximately 1.3 million acres of forestland in New Jersey, yet less than 5 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
Six evening programs and three field days were conducted for private woodland owners focusing on invasive species, forest health, biological controls, forest stewardship, woodlot management, and timber harvesting.

Results
Approximately 300 landowners attended the programs. It is difficult to document the impact of information on developing issues such as forest health and biological controls for various forest pests. Presenting information on insect and disease issues, as well as on management alternatives and demonstrating proper harvesting techniques during stewardship field days, however, can help 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 4,500 to 6,000 acres have benefited from more knowledgeable landowners and subsequent better management. If improved management activities increase timber values by ten dollars per acre, the resulting economic benefit ranges from $45,000 to $60,000.

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

2009 Eco-Ventures at the Earth Center-Medium Term Educated youth and adult clientele, both professional and residential, utilize their newly gained knowledge and skills to implement and make changes such as: Efficient and effective pest control techniques. Proper utilization of fertilizers and other soil amendments as needed based on soil testing. Proper selection of plant materials to reduce need for chemical inputs. Reduction in the damage caused by structural pests. Reduction in health related incidents and costs association with human health vectors (ticks, mosquitoes). Protect health and safety of school children. Enhance or maintain environmental quality.

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2009	{No Data Entered}	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
2009 Eco-Ventures at the Earth Center

According to the New Jersey Department of Education, students best learn science 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. The National Science Education Standards underscore the importance of residents understanding the science underlying civic issues: In a world filled with the products of scientific inquiry, scientific literacy has

become a necessity for everyone. Youth can also develop a sense of ownership toward environmental issues on a personal level. Developing in-depth knowledge about issues, and personal investment in issues related to the environment can lead toward responsible actions and better decision making around environmental issues, and a personal commitment to resolving environmental issues. (Hungerford and Volk, 1990).

What has been done
The Eco-Ventures at the Earth Center program provides opportunities for youth to learn in the outdoors and to gain the understanding and skills needed to become involved in addressing environmental issues on a personal, family and local level. Through participation in this one week summer program, youth in grades five through eight participate in educational activities that introduce ecological concepts, are introduced to environmental issues, and design and film public service announcements based on topics introduced during the program. At the end of the program, youth develop a personal plan of action to make positive changes in their impact on their environment. Three Rutgers University college students served as equal partners with Extension staff in the design and implementation of the program. In 2009, these students worked independently to develop and teach lessons and activities for the program.

Results
In 2009, the program included 28 youth. 50% of participants had attended the program in 2008. 85% of participants and parents reported that they would like to attend the program again in the future, would like an advanced program for older youth to be developed, and would like to expand the program to two weeks. Rutgers undergraduate students reported that their involvement in the program made them "more effective with teachers and presenters" and helped them develop a better understanding of how to motivate youth to learn and appreciate science. Students also reported that their involvement in the design and teaching during the program resulted in a greater ability to participate in college classes and take part in class discussions and public speaking projects.

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

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

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual

2009	{No Data Entered}	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Rutgers Environmental Stewards

Environmental issues are among the most serious problems faced statewide and nationally the top four environmental issues in New Jersey 1)land use change 2)indoor pollution 3)invasive species and 4)outdoor air pollution. The Final Report of the New Jersey Comparative Risk Project explicitly pointed out that a looming environmental problem for the state was the management of the tens of thousands of acres that it had worked so diligently to preserve in preceding years. Little or no public funding has been provided for the management of conserved lands for biodiversity. This funding gap was filled by the creation of group of volunteers. They could work on and advocate for the stewardship of public lands from positions on municipal environmental commissions, planning boards, and zoning boards, and from county and state government.

What has been done
Rutgers Cooperative Extension formed a partnership with Duke Farms 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 2009 regional classes have been conducted for five years providing 780 hours of training to 225 students. To support promotion and management of the program a web site was created, http://envirostewards.Rutgers.edu. The site functions as both a promotional tool to attract students and serve them as an educational resource.

Results
The Rutgers Environmental Stewards is a structured volunteer training and management program focused on the environment that provides significant value-added to NJ.

Rutgers Environmental Stewards entered its fifth year with
225 of 245 91.84% Completed Training
121 53.78% Engaged in Intern Project
64 28.44% Completed Intern Project
22 9.78% On Environmental Commission
Impact summaries of work conducted by the 64 Rutgers Environmental Stewards who have attained certification in the program are available on-line at
http://envirostewards.rutgers.edu/CertifiedRutgersEnvironmentalStewardsImpactsandProjects.html

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 and Data Collection)

1. Evaluation Studies Planned

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

Evaluation Results

{No Data Entered}

Key Items of Evaluation

{No Data Entered}

V(A). Planned Program (Summary)

Program # 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 professional FTE/SYs expended this Program

Year: 2009	Extension		Research	
	1862	1890	1862	1890
Plan	24.0	0.0	13.0	0.0
Actual	4.2	0.0	6.3	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**
194608	0	63264	0
1862 Matching	**1890 Matching**	**1862 Matching**	**1890 Matching**
307682	0	668034	0
1862 All Other	**1890 All Other**	**1862 All Other**	**1890 All Other**
37667	0	270560	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

- 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 citizens
- School faculty, staff and children
- NJAES researchers
- Secondary and university students
- Governmental agencies
- Environmental organizations
- Agricultural, landscape, fine turf and other related industries

V(E). Planned Program (Outputs)

1. Standard output measures

2009	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Plan	400	2000	20	200
Actual	1750	1450	75	800

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

Year: 2009
Plan: 0
Actual: 0

Patents listed

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

2009	Extension	Research	Total
Plan	24	2	
Actual	5	23	28

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

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

V(G). State Defined Outcomes

V. State Defined Outcomes Table of Content

O. No.	OUTCOME NAME
1	Short Term 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	Developing Integrated Urban Pest Management Strategies-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.
5	Impact of the Vegetable Entomology Research Program on the Production and Marketability of Bell Peppers in NJ-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.
6	Pesticide Safety Information Program/Integrated Pest Management Program-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.
7	Greenhouse/Nursery IPM-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.
8	Turf Entomology Program-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.

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

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	Quantitative Target	Actual
2009	2000	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Pesticide Safety

This annual program was originally developed to meet the educational needs of farmers utilizing pesticides. Program evaluations from a 2008 pesticide safety meeting identified a need/concern relating to pesticide infiltration to water bodies and pesticide runoff. As a result of this information, Rutgers Cooperative Extension of Salem

County applied to and received funding from the Northeast Center for Risk Management Education to conduct another pesticide safety meeting.

What has been done
The annual 2009 Salem County pesticide safety meeting, entitled "Prudent Use of Pesticides to Minimize Surface and Groundwater Contamination," was held. Over 70 farmers of various commodities attended this workshop to learn about current and emerging insecticides, pesticide control and monitoring in groundwater, weed resistance and herbicides for vegetable crops, worker protection standards and pesticide regulations, weed control for grain crops, and pesticide infiltration into water sources.

Results
As a result of this educational program:
*75 farmers received sprayer-calibration jars to ensure proper application rates.
*100% of farmers surveyed 6 months after the meeting have utilized calibration equipment
*4 producers changed record-keeping policies to coincide with NJDEP regulations
*6 producers made appropriate changes to reduce herbicide resistance in weeds on their operation
*1 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
*5 producers plan to utilize filter strips and/or swales to reduce pesticide runoff
*Overall, 43% of participants made changes to their operations as a result of this meeting

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	Quantitative Target	Actual
2009	2500	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Surveillance and Risk Assessment of Mosquito-Borne Arboviruses

Vector bone diseases pose a potential health hazard in a state such as NJ with a diversity of terrain such as, salt-

marsh, wetland, streams and urban sights were standing water pools.

What has been done
To ensure public health in the state of NJ, the Center for Vector Biology reported weekly surveillance results of the NJDHSS' Public Health Environmental Laboratories (PHEL) and the Cape May Division of Mosquito Control BSL3 Lab (CMD) towards monitoring arboviral activities of Eastern Equine Encephalitis virus (EEE), West Nile virus (WNV), Saint Louis Encephalitis(SLE) and La Crosse virus (LAC). The 21 county mosquito control agencies collected, identified, pooled and delivered mosquitoes from resting boxes (for EEE) and other mosquito traps (for WNV, SLE and LAC) to PHEL and/or CMD, who ran RT-PCR for the detection of the viruses. In 2009 22 weekly reports were compiled and disseminated to county and state agencies during the mosquito season through the Center's website: http://vectorbio.rutgers.edu/vector.php. Surveillance of EEE indicated high activity levels in the enzootic vector Culiseta Melanura with 57 positive pools found out of 371 pools submitted from the traditional resting box sites. This represented a five-fold increase from the previous year. Surveillance of WNV used a variety of traps to find most activity in the urban/suburban corridors between NYC and Philadelphia. One horse case and three human cases developed

Results
Weekly reported on positive mosquito pools, changes in seasonal vector populations and national perspectives on virus activity were made available to all of the 21 county mosquito control agency superintendents and directors plus the state agency that aids counties in aerial control of mosquitoes. Reports included EEE mosquito pool testing results, minimum field infection rats and their significance, population levels and seasonal changes of Culiseta Melanura (the enzootic vector of EEE) with interpretations of population changes, concurrent climatic changes in NJ, and EEE activity in the US. For WNV, reports included the WNV pool results per species, the number of positive pools and MFIR values per species within each county and the national activity level of WNV. SLE and LAC surveillance included respective pool results per species. When positive mosquito pools were found and programs informed, this change of knowledge effected a change in action that resulted in control of potentially disease-inflicting populations of mosquitoes. Data from this program was used to model the risk associated with WNV which can be part of the arsenal of information that county superintendents and directors used to further refine their IPM programs in the control of disease vectors.

4. Associated Knowledge Areas

KA Code	Knowledge Area
216	Integrated Pest Management Systems

Outcome #4

1. Outcome Measures

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

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2009	{No Data Entered}	0

3c. Qualitative Outcome or Impact Statement

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

Infestation of insects and other pest, pose major health threats.

What has been done
The urban entomology program works closely with pest management professionals, chemical companies, public health workers, county extension agents, property managers and the general public to evaluate new pest control methods, identify best practices, educate the public and provide technical assistance. Research on insect behavior, monitoring, insecticide resistance and novel control techniques and IPM aims to find the most effective and least toxic strategies for pest control.

Results
The invention of bed bug intercepting devices resulted in immediate commercialization of a monitor and adoption of monitors in bed bug control programs. Installing bed bug interceptors is now an integrated part of bed bug IPM programs.
New technology: invented two inexpensive and effective bed bug monitoring devices
Products: Two videos: 1)Bed bug prevention and control video(20mins) 2)Bed bugs (2mins)
Patent application: "crawling arthropod intercepting device and method"

4. Associated Knowledge Areas

KA Code	Knowledge Area
216	Integrated Pest Management Systems

Outcome #5

1. Outcome Measures

Impact of the Vegetable Entomology Research Program on the Production and Marketability of Bell Peppers in NJ-Long Term Protect commodities, homes and communities from pests. Increased abundance of high quality food and fiber products. Increased acreage in New Jersey grown under IPM practices, Reduced environmental problems associated with current pest management practices, A comprehensive understanding of best management practices for IPM that are economically viable and environmentally safe.

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual

2009	{No Data Entered}	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Impact of the Vegetable Entomology Research Program on the Production and Marketability of Bell Peppers in NJ

The European corn borer can be devastating to pepper growers, causing up to 60% damage to peppers annually, depending on weather. Typical grower management programs include 7-9 foliar sprays of broad-sprectrum pyrethroid insecticides each year to reduce borer damage to fruit. After meeting with pepper growers, IPM specialists and county agents at the annual Pepper Grower Advisory meeting, it was determined a need existed to develop alternatives to multiple spray applications for pepper growers that would still protect fruit and reduce cost and pesticide inputs.

What has been done
A long-term, 4-5 year research program was initiated in 2004 to examine the use of a new class of insecticides recently developed that could be used in drip irrigation systems and provide effective control of the corn borer. Research was initiated at the request of pepper growers to determine if chemigation was feasible and practical. Laboratory studies (in cooperation with DuPont de Nemours Agricultural Chemical Company) and field studies were conducted at RAREC. The target audience includes NJ pepper growers, agricultural agents, agrichemical industry representatives, and extension specialists in other pepper producing states (Michigan, Florida, Texas, Virginia). Research results were presented at professional meetings.

Results
Research demonstrated that low rates of Coragen (3-5 oz/acre) could be applied through 1-2 times/season through a drip irrigation system for effective control of the corn borer, resulting in damage that was equal to or better than the grower standard program of multiple foliar applications of insecticides. These practices result in significant economic benefits since peppers are the #1 economic vegetable crop produced in NJ. Growers report a reduction in total pesticide inputs using chemigation, a reduction in energy use (tractor, fuel, labor) and an increase in marketable pepper fruit.

4. Associated Knowledge Areas

KA Code	Knowledge Area
216	Integrated Pest Management Systems

Outcome #6

1. Outcome Measures

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

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2009	{No Data Entered}	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Pesticide Safety Information Program/Integrated Pest Management Program

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. The New Jersey Information Network for Pesticides and Alternative Strategies (NJinPAS) is part of a land-grant university collaboration of 'Mid-Atlantic Partners' of Delaware, Maryland, New Jersey, New York, and West Virginia. The 'Mid Atlantic Information Network for Pesticides & Alternative Strategies' (MAINPAS) state collaboration is designed to provide a structure to gather and transmit information on issues relevant to both current and transitional pest management strategies. The information gathered and distributed by NJinPAS is essential to informed decision-making by Federal regulators on pest management issues that will impact New Jersey. 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
NJAES researchers and extension faculty/staff have been actively engaged in the 1)PESP, 2)NJinPAS, 3)IPM programs providing training to their clientele in both English and Spanish to ensure the safe and effective implementation of IPM practices.

Results
Several who participated in PESP private pesticide applicators, and commercial pesticide applicators and operators were provided with basic information that allowed then 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. 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. NJinPAS program participants/applicators, etc. are better able to use the most up to date practices and keep abreast of regulatory and other changes. In addition, the crop profiles and pest management strategy plans are helping to influence EPA decisions regarding pesticide registrations. Pesticide use in tree fruit was reduced between 50 to 80% for Oriental fruit moth control. Growers in the vegetable IPM program received more timely information that resulted in less pesticide use, Nursery growers were better able to predict pest outbreaks and more effectively manage these outbreaks, Greenhouse growers were better able to manage pests and reduce insecticide and fungicide use because of the scouting program provided by the greenhouse IPM program.

4. Associated Knowledge Areas

KA Code	Knowledge Area
216	Integrated Pest Management Systems

Outcome #7

1. Outcome Measures

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

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2009	{No Data Entered}	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Greenhouse/Nursery IPM

*IPM (integrated pest management) is broadly accepted as a more effective and environmentally sound method for pest management in greenhouse and nursery production systems.
*Production greenhouses and nurseries often struggle to practice IPM methods during their respective crop cycles during the year.
*Time constraints and lack of effective plant monitoring knowledge are often limiting factors with many greenhouse and nursery production methodologies.
*An accumulation of routine scouting information is required for any IPM program to be successful.

What has been done
RCE IPM methods are to provide to greenhouse/nursery growers to ensure healthy crop growth through effective pest management interventions that are economic and often less environmentally obtrusive. Pest management observations and recommendations are the primary services provided to the cooperators and are delivered weekly during the growing seasons. *If scouting observations indicate pest management interventions are necessary, then selective treatments can be provided to areas when they are most effective.

Results
Results of the 2009 evaluation survey revealed that 1) greenhouse growers will continue to utilize the RCE scouting program next year 2) the IPM scouting has allowed them to concentrate free time to other crop management duties 3) reported no negative or dissappointing results from the IPM scouting program.

In addition IPM resulted in a reduction of pesticide use during the 2009 season, only spot treated greenhouse areas with higher pest populations resulting in a decrease in the numbers of plants sprayed, and that scouting helped to reassure them of the efficiency of treatments allowing them to determine if follow-up treatments were necessary or not.

4. Associated Knowledge Areas

KA Code	Knowledge Area
216	Integrated Pest Management Systems

Outcome #8

1. Outcome Measures

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

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2009	{No Data Entered}	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Turf Entomology Program

In the USA (in New Jersey), turfgrass in its many forms, e.g. lawns, parks, cemeteries, sod farms, golf courses, athletic fields, covers > 30 million (0.9 million) acres and is a $45 billion ($0.8 billion) industry. In suburban counties there has been too much reliance on chemical pesticides and nitrogen fertilizers in the maintenance of lawns and landscapes, as a a result air, water and soil quality have been compromised and these are clear threats to human health, household pets and beneficial organisms (eg. White grubs are the most wide spread, destructive, and difficult to control turfgrass insect pest in New Jersey and the Northeastern USA.
There is a dire need for the development of alternative control agents and control strategies.

What has been done
Cooperative Extension talks, local and regional turf conferences, Continuing Education courses turf insect management recommendations (publications and by email/phone/personal), publications (trade journal and newsletter articles, fact sheets, bulletins).
NJAES Researchers:
Developed and implemented ecologically-based IPM for turfgrass systems with emphasis on sustainability and biological control.
Developed Steinernema scarabaei as a curative and long term white grubs control agent. Developed mating disruption technology for oriental beetle. Developed sustainable control options for the annual bluegrass weevil. Developed sustainable control options for turfgrass lepidopteran pests. Tested new insecticidal compounds and non-target effects of new insecticidal compounds.

Results
The efforts of NJAES helped turfgrass managers and homeowners in New Jersey and the Northeast to manage turfgrass insect pests more effectively with reduced risk to health and environment. The financial impact cannot

be estimated at this time, as it will depend on the cost and persistence of the developed control agents/strategies. However, in most turfgrass situations health and environmental concerns tend to outweigh financial concerns. Evaluation of Extension educational programs report that they learned something to apply to their turf management practices and that they would make more informed pest management decisions.

4. Associated Knowledge Areas

KA Code	Knowledge Area
216	Integrated Pest Management Systems

Outcome #9

1. Outcome Measures

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

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2009	{No Data Entered}	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Resistance Management for Fresh-Market and Processing Vegetable Crops Grown in New Jersey

In the mid-Atlantic region of the United States over 200,000 acres 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 5,000 fungicide resistance management guidelines have been distributed to commercial vegetable growers in the mid-Atlantic and surrounding region. 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 2009. A new FRAC table was developed for cucurbit growers the mid-Atlantic and Northeast Region in 2009 for the control of cucurbit powdery and downy mildew. Both fungicide 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 2009, each year that the fungicide resistance management guide is distributed more vegetable growers in the region are educated on the importance of understanding resistance management.

4. Associated Knowledge Areas

KA Code	Knowledge Area
216	Integrated Pest Management Systems

V(H). Planned Program (External Factors)

External factors which affected outcomes

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

Brief Explanation

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

1. Evaluation Studies Planned

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

Evaluation Results

{No Data Entered}

Key Items of Evaluation

{No Data Entered}

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 professional FTE/SYs expended this Program

Year: 2009	Extension		Research	
	1862	1890	1862	1890
Plan	2.3	0.0	4.8	0.0
Actual	0.8	0.0	13.2	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**
33654	0	75066	0
1862 Matching	**1890 Matching**	**1862 Matching**	**1890 Matching**
59745	0	1004209	0
1862 All Other	**1890 All Other**	**1862 All Other**	**1890 All Other**
2165	0	312400	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 Dept. of Environmental Protection
- State Dept. of Agriculture
- Industry partners who learn ways to improve or protect their harvests
- Communities who depend on aquaculture-related revenue
- NJAES Faculty and Staff involved in water research/outreach
- Consumers of aquaculture products, including recreational fishing

V(E). Planned Program (Outputs)

1. Standard output measures

2009	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Plan	100	300	30	300
Actual	650	800	225	550

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

Year: 2009
Plan: 1
Actual: 0

Patents listed

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

2009	Extension	Research	Total
Plan	2	48	
Actual	3	27	30

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

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

V(G). State Defined Outcomes

V. State Defined Outcomes Table of Content

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

Outcome #1

1. Outcome Measures

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

Not Reporting on this Outcome Measure

Outcome #2

1. Outcome Measures

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

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2009	300	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Census of New Jersey's Marine Fisheries and Fishing Grounds

New Jersey's aquaculture resources are finite and can sustain only fixed harvests while demand for quality fish and seafood continue to climb. Threats from disease and environmental contaminants and conditions provide additional challanges to producers to meet the demand for quality aquaculture products.

What has been done
A major effort during 2009 has been to update the web-site of The Fisheries Project and to coordinate the Mid-Atlantic/New Jersey fisheries research with research done in New England under the auspices of a "fisheries atlas" project. The Atlas web-site is populated with information on New Jersey and other Mid-Atlantic fishing communities, and forms the groundwork for community-oriented mapping. The "Cumulative impacts" research, that contributed to the "voice from the fisheries" project that is also on the web-site.
The 3rd revision of the document "Fish or Cut Bait" was completed and has been distributed widely through the internet, using the New Jersey Sea Grant web-site.

Results
One significant result, which has already contributed to the capacity for residents to meaningfully engage in participatory public policy, is the revised booklet "Fish or Cut Bait," a guide to the federal fisheries management system. Similarly, the web-based "Voices of the Fisheries," sponsored by the National Oceanic and Atmospheric

Administration's Fisheries unit, has an important public outreach function. The project's work on ecosystem-based management contributes to this policy-oriented topic by emphasizing the need to more fully and substantially include human dimensions in ecosystem-based management and planning, and our work in this regard has become widely acknowledged, as expressed through frequent requests to give talks and contribute to publications. That is also true of the work we have done on management of common pool resources such as fisheries, some of which was published in 2009. In a more general sense, the research done in this area contributes to social science perspectives on the fisheries of New Jersey and the larger Mid-Atlantic region to work on the Scientific and Statistical Committee of the Mid-Atlantic Fishery Management Council. Some of the mapping work is represented in a publication in the new book, "Mapping New Jersey," and as such will help communicate the importance of New Jersey's coastal fisheries to people of the state and beyond.

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	Quantitative Target	Actual
2009	350	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Atmospheric Exchange of Organic Pollutants in the Aquatic and Terrestrial Environments

What has been done
Activities for 2009 include continued atmospheric sampling for PCBs in the Delaware River Basin. These samples were used to develop atmospheric deposition loads for use in the water quality model used to calculate TMDLs (Total Maximum Daily Loads) for PCBs in the Delaware River. The existing database of atmospheric PCB concentrations in the Delaware River Basin was therefore expanded, and the atmospheric input functions were refined. This helped the DRBC to reduce the loads of PCBs to the river so that they can meet the TMDL for PCBs, allowing the bans on fish consumption in the Delaware to be lifted. Since 15 million people use the Delaware River for drinking and industrial use, this project helped a large segment of the US population to enjoy better water quality. In addition, what we learn about atmospheric sources of PCBs is useful in other areas of the US. The

watershed of the NY/NJ Harbor is home to about 20 million people. NJAES research is therefore helping this large segment of the US population to enjoy better water quality. Researchers found that PCBs are produced inadvertently during the production of diarylide yellow pigments, which are commonly used in printing. They measured concentrations of PCBs from these inks in printed materials, including newspapers, cardboard boxes used as food packaging, and yellow plastic grocery bags that were collected from locations around the world. They also showed that the PCBs from these inks are present in the waters of the NY/NJ Harbor and the Delaware River at concentrations above the water quality standard. They are a significant environmental problem. Identification of this source of contamination to surface waters will benefit everyone in the US and people worldwide, since we can now work to eliminate it.

Results
The measurements of PCBs in the atmosphere of the Delaware River Basin have enhanced the accuracy of the water quality model and the TMDLs calculated from toxic contaminants in the New York/New Jersey Harbor. She examined PCB concentrations in effluents from facilities on the river that have NPDES (National Pollution Discharge Elimination System). Through this work, identified specific sources of PCBs, and found strong evidence that PCBs are actually detoxified in sewers. This improves our understanding of how Water Pollution Control Facilities (i.e. wastewater treatment plants), which were originally designed just to remove solids and sanitary waste, are actually very effective in detoxifying many synthetic pollutants. This knowledge will help us design sewer systems nationwide that perform even better at detoxifying chemicals like PCBs, and will therefore help to improve water quality across the US.

4. Associated Knowledge Areas

KA Code	Knowledge Area
135	Aquatic and Terrestrial Wildlife

Outcome #4

1. Outcome Measures

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

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2009	{No Data Entered}	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Aquaculture Techniques for New Jersey

New Jersey's aquaculture resources are finite and can sustain only fixed harvests while demand for quality fish and

seafood continue to climb. Threats from disease and environmental contaminants and conditions provide additional challanges to producers to meet the demand for quality aquaculture products. In particular, resources along with much of the Atlantic coast have been devastated by diseases. To meet this increased demand, commercial fishermen and others in the seafood industry must develop new sources of seafood products that are high quality and disease resistant.

What has been done

Effects of brown tide on hard clam aquaculture and population dynamics. Effects of QPX disease on hard clam aquaculture stocks. Development of multispecies aquaculture demonstration facility-oyster production. Oyster population dynamics and aquaculture. Environmental effects of clam aquaculture. Overwintering of hard clam seed. Climate effects on Delaware Bay shellfish. This project supports work on aquaculture and aquaculture related projects throughout the state. Clam energy storage relative to time spent in inactive states is being tested in field and laboratory studies. Size specific effects of brown tide on hard clams are being tested in field and laboratory studies. These are being integrated into a physiologically based numerical model of hard clam life history allowing evaluation of effects at the individual, cohort and population level. We continue development of a hard clam numerical simulation model for hard clams and the experiments necessary to extend that model to Barnegat Bay, NJ. The new NJAES Multispecies Aquaculture Demonstration Facility in Cape May has provided enhanced production capabilities for our oyster program. This is a major new facility capable of providing aquaculture services for the New Jersey and mid Atlantic industry. Funding was received to produce oysters for a demonstration project in Delaware Bay and 8,000,000 seed were produced. NJAES researchers received funding to evaluate the environmental effects of clam aquaculture.

Results

The hard clam QPX-strain work prevented growers from purchasing seed that would die before harvest, and alerted hatchery operators to separaate broodstock of various strains. Brown tide work has provided for modeling effects of this and other environmental factors on clam populations. Continuing work is refining the basis for evaluating effects of this harmful algae on wild and aquacultured hard clams. The long term oyster data, used for presentations before the US House of Representatives, and the NOAA Review Team was, in part, responsible for withdrawal of the petition declaring the Eastern oyster an endangered species. This prevented the potential for closure of the entire oyster fishery and aquaculture sectors along the east coast. Past efforts with the EPA Aquaculture Effluents Task force resulted in exemption of shellfish aquaculture from unnecessary regulation of hatchery and nursery effluent. The EPA accepted the science indicating these facilities have little impact on the waters on which they are sited. These rulings saved the industry time in the permitting process and countless funds in preparing environmental impact reports. Work on shell resources has opened an understudied part of oyster production and aids restoration efforts based on shelling. Oyster seed production in the new facility increases the efforts to develop hatchery based disease resistant oysters to supplement harvests from Delaware Bay. Work in Raritan Bay provided information on clam production from this important system and made recommendations for management. Evaluation of the environmental effects of hard clam aquaculture will provide a scientific basis for assessment of potential environmental enhancement and damage. Potential significant negative effects could be ameliorated by establishing BMP's, and environmental enhancements may be maximized.

4. Associated Knowledge Areas

KA Code	Knowledge Area
135	Aquatic and Terrestrial Wildlife

V(H). Planned Program (External Factors)

External factors which affected outcomes

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

Brief Explanation

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

1. Evaluation Studies Planned

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

Evaluation Results

Key Items of Evaluation