Certification of New Jersey Annual Report of Accomplishments and Results (FY 2006)

Approval:

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TABLE OF CONTENTS

Introduction 3

A. Planned Programs 4

Goal 1: An agricultural system that is highly competitive in the global community 4

Goal 2: A safe and secure food and fiber system 17

Goal 3: A healthy, well-nourished population 22

Goal 4: Greater harmony between agriculture and the environment 35

Goal 5: Enhanced economic opportunity and quality of life for Americans 60

B. Stakeholder Input Process 66

C. Program Review Process 67

D. Evaluation of the Success of Multi and Joint Activities 67

E. Multistate Extensions Activities 67

F. Integrated Research and Extension Activities 73

Supplement to the Annual Report of Accomplishments and Results

Multistate Extension Activities 78

Integrated Activities (Hatch Act Funds) 79

Integrated Activities (Smith-Lever Act Funds) 80

Introduction:

New Jersey has been actively involved in the implementations of the integrated research/extension 5-Year Plan of Work for fiscal years 2000-2004 and the supplemental update for fiscal year 2005-2006. The implementation of this plan has engaged New Jersey Agricultural Experiment Station (NJAES) researchers and Rutgers Cooperative Extension (RCE) specialists, agents and staff in the generation and transfer of knowledge and technologies related to agriculture, food systems, the environment and human and community development. The diversity of our state presents research and Extension with complex challenges, which are being effectively addressed through basic, applied and policy-oriented research, education and outreach.

Early in the plan of work cycle, we engaged residents of the state in a Visioning and Planning process which resulted in a strategic plan for Cook College and the New Jersey Agricultural Experiment Station, which has provided a framework for the future direction and focus of the College and the Station. Programmatic focus areas are agricultural viability, environment and natural resource management, food, nutrition and health, and human and community development. Our goal is to be recognized nationally as the "Solutions State" where quality of life is heightened by the thriving agriculture, and sound environmental rural and urban communities. Stakeholders have played a pivotal role in the process and will continue to be viewed as partners in the planning and program development process for issues identification including those of the underserved and underrepresented.

Integrated research and Extension programs as well as multi-state, multi-institutional and multi-disciplinary research and Extension activities have addressed identified critical issues resulting in significant economic, environmental and social impacts which have proven beneficial to the state while at the same time achieving the goal of improved program efficiencies and effectiveness within NJAES and Rutgers Cooperative Extension.

A. Planned Programs

Goal 1

Overview:

Operating within the most densely populated and urban state in the nation, New Jersey's Agricultural producers face challenges unparalleled to their competitors in other regions of the United States. These challenges include high land prices, property taxes, and labor costs, stringent environmental regulations, severe wildlife damage, and urban neighbors who desire rural, rustic settings, but do not appreciate the complexity of agricultural practices. However, proximity to the large consumer markets, sophisticated food manufacturing and delivery systems and center of the pharmaceutical industry also provides unique opportunities for our producers. In light of these challenges and opportunities, we have focused our resources to increase the profitability of New Jersey's agricultural producers by:

- Adding value to existing crops or products through enhancements or identification of new market opportunities
- Protecting crops from pests and disease
- Increasing production efficiency and reducing costs.

Peaches as a single plant species represents the second largest cash fruit crop in the Garden State slightly behind blueberries. Research evaluations have resulted in a variety of recommendations and new plantings in New Jersey and the Mid-Atlantic area. Three yellow-fleshed varieties bred and researched at New Jersey Agricultural Experiment Station were introduced and licensed to one nursery. 800 trees of these varieties were planted in 2006 and 3,500 are propagated for planting in 2007.

The minor crop labels for use of Stinger 3A and Sandea 75DF are the result of a nation-wide cooperative effort between university faculty, government agencies such as IR-4 and EPA and industry. The effort was initiated by the innovative and accurate results of the weed control research conducted at Rutgers.

Research results on fungicide chemistry (FRAC groups) helped determine that some FRAC group II fungicides should no longer be used to control cucurbit powdery mildew.

Goal 1

Allocated Resources:

Research

Hatch Funds:	$1,346K
All Funds:	$19,856K
SY's:	35

Extension

Smith-Lever Funds:	$8,865K
All Funds:	$4,736K
FTE's:	57

Goal 1

Key Theme:

Agricultural Competitiveness
Agricultural Profitability
Plant Genomics

Activity:

The six-county area in southern New Jersey has a significant history and infrastructure that revolves around the peach industry of approximately 7,000 acres of peaches and nectarines with a 2006 production value of $35,500,000 and tree value of $140,000,000. Approximately 80 commercial peach growers grow, pack, and ship the peaches they grow in New Jersey and in the United States as far west as Minnesota, Missouri and Texas. Growers are also major exporters of peaches to Quebec and Ontario and occasionally to Mexico and Central America.

Peaches as a single plant species represent the second largest cash fruit or vegetable crop in the Garden State slightly behind blueberries. This six county area produces 92% of the fruit in New Jersey which ranks 4th in the United States behind California, Georgia, and South Carolina. The New Jersey peach industry and the research and educational programs of Rutgers in peach science are known nationally and internationally. Wholesale peach revenue has declined or remained static from 2002 through 2004 with increases in 2005 and 2006.

Extension county agents and specialists conducted educational conferences, research meetings, presented at professional meetings, authored articles in scientific and trade journals, produced newsletters and exercised other delivery methods to provide science based information that is environmentally sound for the preservation of farmland and open space and to preserve on farm resources like water and soil. Contained efforts are made to promote best management practices in fruit production and remaining compatible within the rapidly growing south Jersey counties, while at the same time reducing and maintaining costs of production to increase profitability and viability of peach farms and other production operations on these farms.

Research has focused on development and evaluation of peach and other stone fruit cultivars around tree, fruit and flower characteristics during and after harvest. On farm research and demonstration work is centered around disease, insect and weed science with an emphasis on cost effective management. A peach science website is maintained and updated regularly with new and cutting edge information. The 2006 New Jersey Tree Fruit Production Guide is a valuable resource to the industry in New Jersey and beyond.

Impact:

Research evaluations have resulted in a variety of recommendations and new plantings in New Jersey and the Mid-Atlantic area. Three yellow-fleshed varieties bred and researched at New Jersey Agricultural Experiment Station were introduced and licensed to one nursery. 800 trees of these varieties were planted in 2006 and 3,500 are propagated for planting in 2007. The flavor and firmness retention of these varieties will result in increased sales and consumption.

The first flat or peento peach, Saturn, was developed by us and was patented for a commercial nursery. It is now marketed internationally as a donut peach in supermarkets and specialty produce stores. Grown mostly in California and Washington, it is a niche market item of untold value for growers and shippers and the only flat peach ever introduced. Approximately 180 acres have been planted in New Jersey and Pennsylvania. 3,000 packages were shipped from New Jersey in 2006 and almost 1,000,000 packages from California and Washington in 2006. Three new flat or peaches bred at NJAES were researched and introduced in 2006. They are NJ 15, NJ 16 and NJ 17. They were licensed to one nursery and are being named and trademarked by them. Five hundred trees were planted in 2006. Flat peaches have unique and generally exquisite flavor. They are novel and have increased shelf space for peaches particularly in specialty and high end produce stores. They have brought premium prices to growers. Growers who direct market peaches have increased sales and return customers with flat peaches. Growers/shippers with flat peaches use them as a marketing tool to sell other varieties because the demand far exceeded supply in 2006.

Source of Federal Funds:

Smith Lever 3(b) & (c), Hatch

Scope of Impact:

International, Mid-Atlantic Region, CA, WA

Goal 1

Key Theme:

Agricultural Systems
Agricultural Profitability

Activity:

The greenhouse and nursery industry is the number one agricultural commodity in New Jersey with a value of cash receipts totaling in excess of one third of the state's total farm receipts and 2.3% of the total U.S. 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. Location, demographics, years of growth and subsequent decline all have positioned New Jersey well. We have survived and profited during the booms years; and, have honed our skills in marketing and management to enable the green industry to continue to survive, thrive, and lead the nation. While the industry on the whole is profitable, the competitive edge is lost because producers rarely know the profit margins of individual crops. The recent volatility of fossil fuels and general energy prices, domestic competition, off-shore production, a weakening and stressed economy, and the growth of the mass market add-up to collectively produce downward pressure on prices. Thus, to stay competitive, producers must calculate their costs for individual crops so that they can develop the most profitable crop mix for their particular market. The Greenhouse Cost Accounting program aids managers in making decision about pricing, reducing unprofitable crops, controlling costs, and increasing sales of profitable crops. The program is also used in management classes and Extension workshops. The program has been requested by producers and educators all over the U.S. as well as in several foreign countries. A gratis, simplified version is on the Rutgers University Farm Management Website (http://aesop.rutgers.edu/~farmmgmt) and linked to the national risk management website. In addition, an Excel version is distributed through Rutgers Cooperative Extension so that producers can calculate their own costs. Using the Greenhouse Cost Accounting Program as a tool, a cost accounting educational program to help greenhouse growers calculate their individual operating costs was developed and delivered in New Jersey and the other top floricultural producing states of Indiana, Michigan, Pennsylvania, Ohio, Alabama, Virginia, Kentucky, Texas, and New Hampshire. The Rutgers Farm Management Website is viewed by an average of 2,563 people per month. Taking into account the 350 greenhouses in New Jersey, over 200 people now have access to the Excel version of the Greenhouse Cost Accounting Program. This represents over 50% 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 representing $70 million in annual sales and 5 million square feet of production area that is using the program. If by using this program they are 5% more efficient, this would represent $3.5 million in sales and 250,000 square feet of production area.

During 2006, the Rutgers Greenhouse Cost Accounting program was modified to allow clientele to monitor labor costs more closely, calculate break-even costs, use more cost categories and calculate the cost of producing plants outdoors.

Impact:

New Jersey Agricultural Experiment Station Rutgers Cooperative Extension Specialists' expertise has been recognized nationally. The USDA Risk Management Agency (RMA) requested that the specialist write a fact sheet explaining the risk management options to greenhouse and nursery producers which appears on the Rutgers Farm Management Website (http://aesop.rutgers.edu/~farmmgmt) that is linked to the national USDA Risk Management website.

Source of Federal Funds:

Smith Lever 3(b) & (c)

Scope of Impact:

Northeast Region, IN, MI, PA, OH, AL, VA, KY, TX, NH

Goal 1

Key Theme:

Agricultural Profitability
Agricultural Systems
Pest Management

Activity:

The cost of controlling weeds in vegetable and fruit crops continues to affect the profitability of these crops for New Jersey growers. Manufacturers continue to cancel registrations on old herbicides due to loss of market share in the major markets. Two new herbicides, clopyralid and halosulfuron, have received national (section 3) and/or state Special Local Needs (24C) labels for use in a variety of vegetable and fruit crops. Clopyralid controls galinsoga and other weeds in the composite plant family, including Canada thistle, and weeds in the legume plant family. Halosulfuron controls yellow nutsedge and galinsoga. Yellow nutsedge is the number one weed in row crop agriculture worldwide, including vegetables. Galinsoga is a summer annual weed. Originally native to South America, galinsoga was transported to southern Europe where it caused the abandonment of previously productive farmland. From Europe, galinsoga again crossed the Atlantic Ocean to North America where it is still considered one of the most difficult annual weeds to control in many vegetables. The initial phytotoxicity and efficacy research on many of the newly labeled vegetable crops was conducted at Rutgers Agricultural Research and Extension Center. Clopyralid research at Rutgers, beginning in the 1980's, identified an acceptable margin of crop safety in a variety of cole crops, spinach, onions and leeks, sweet corn, stone fruits and pome fruits, blueberries, and cranberries. The final outcome of the research initially conducted at Rutgers are labels for clopyralid (Stinger 3A) in over 20 different cole crops, spinach, sweet corn, stone fruits, and cranberries. The pome fruit label is currently in review at the EPA. Other new labels include asparagus, strawberries, and beets. Subsequent research conducted at Rutgers supported recommendations to lower the clopyralid (Stinger 3A) rate from 0.125 to 0.25 pounds of active ingredient per acre to as low as 0.032 pounds of active ingredient per acre when applied to control susceptible annual weeds such as galinsoga and ragweed species.

Halosulfuron research at Rutgers was the first to report crop safety in cucurbit crops. It reported crop safety preemergence and postemergence in cucumbers and cantaloupe, postemergence in squash and pumpkins, and preemergence in watermelon. Further research at Rutgers identified safety in asparagus and edible beans. Other states reported crop safety in tomatoes. The final outcome of the research initially conducted at Rutgers are labels for halosulfuron (Sandea 75DF) preemergence and postemergence in cucumbers and cantaloupe, preemergence and postemergence in winter squash and pumpkins, preemergence in watermelon, preemergence and postemergence in snap and lima beans, preplant or postemergence in tomatoes, and postemergence in asparagus. Additionally, halosulfuron is labeled for application as a banded directed spray between the rows of summer squash, peppers, and eggplant grown on plastic mulch. The injury initially observed at Rutgers when halosulfuron was used preemergence in squash and pumpkins has been repeatable, and is not recommended in the Mid-Atlantic region.

The minor crop labels for the use of Stinger 3A and Sandea 75DF are the result of a nation-wide cooperative effort between university faculty, government agencies such as IR-4 and the EPA and industry. The effort was initiated by the innovative and accurate results of the weed control research conducted at Rutgers.

Impact:

Research conducted at Rutgers Agricultural Research and Extension Center has made a major impact on weed control in fruit and vegetable crops. Stinger controls annual and perennial weeds in the composite and legume plant families. The primary use in strawberries, sweet corn and stone fruit is the control of Canada thistle and other perennials. Strawberry and sweet corn yield is near zero in patches of Canada thistle in infested fields. An estimated half the fields planted have an infestation of 5 to 10% of the field where yield loss in near 100%. The values of the sweet corn and strawberry crops were $8,000,000 and $1,500,000, and of the loss in these crops was $500,000 and $100,000 respectively. The primary use of Stinger in spinach and beets is the control of annual weeds, including ragweed, cocklebur. An estimated half of the spring sown acres are infested with one of these two weeds, which can reduce yields by 50 to 75 %, but more importantly render machine harvested fields grown for processing un-harvestable. Ten percent of the acres would not be harvested, and the remaining 40% would require and estimated $1,000 in labor to hand weed fields to permit machine harvest. The use of Stinger to control these weeds saved growers an estimated $2,000,000. The value of the peach crop was about $25,000,000. Canada thistle infests an estimated 2% of the acres. The weed competes with the crop, reduces peach size by an estimated half inch and reduces the value of the peaches by 25%. The estimated yield loss is valued at $125,000. In addition, Stinger controls clover species which increases the need for insecticide applications, and is an alternate host for vectors of the plum pox virus.

Cucurbit crops, including cucumbers, melons, pumpkins, winter squash and summer squash are grown on 9,000 acres and have an estimated value of over $18,000,000. Yellow nutsedge infests about 25% of the acres, about 15% lightly to moderately, and about 10% severely. Estimated yield losses due to yellow nutsedge are 25% in light to moderately infested fields and 75% in severely infested fields. Cultivation, hoeing, and removal by hand is not practical because the nutlet is capable of sprouting 6 to 8 times if cut by cultivation or the shoot is broken off by pulling. The estimated cucurbit crop loss to yellow nutsedge prior to the availability of Sandea was over $2,000,000.

The impact on the environment will be reduced by replacing ineffective controls that require repeated application with fewer more effective control efforts. Growers will experience less reduction in crop yield and quality, resulting in increased profitability.

Source of Federal Funds:

Smith Lever 3(b) & (c), Hatch

Scope of Impact:

State, Multi-State, DE

Goal 1

Key Theme:

Agricultural Profitability
Pest Management
Agricultural Systems

Activity:

Development of fungicide resistance to important fungicide chemistries used in vegetable production is at a critical point. Many of commonly used chemistries are at-risk for resistance development if overused or used improperly. Vegetable growers in NJ, as well as, the rest of the mid-Atlantic region need more information on fungicide chemistry (FRAC groups) in order to manage fungicide resistance development properly. Once resistance to some of these chemistries is developed by fungi, the efficacy of the fungicide, in most cases, is lost. A great emphasis has been put on teaching vegetable growers in the state the importance of knowing and understanding the importance of FRAC groups in fungicide resistance management in vegetable disease control. Over 2,500 acres of pumpkin crops are grown annually in New Jersey with an estimated 7.5 M ($3,000 A) going towards production costs. A portion of this cost is associated with fungicide applications for controlling important diseases. In previous years, FRAC group 11 fungicides were recommended in rotation with other fungicide FRAC groups for controlling cucurbit powdery mildew. Thus, approximately 50% of the fungicides applied to pumpkin crops belonged to FRAC group 11. Reducing the use of fungicide chemistries, such as FRAC group 11, that are no longer effective in controlling important diseases, such as cucurbit powdery mildew, will help growers save tens of thousands of dollars per year in ineffective fungicide applications. In 2005 and 2006, a study was done to determine if fungicide resistance would develop to two commonly used fungicides (FRAC group 3 and 11) in cucurbit powdery mildew production in NJ. Results of the study determined that fungicide resistance to the strobilurin fungicides (FRAC group 11) could develop on an annual basis in New Jersey if this group was mis- or overused in pumpkin production. Current recommendations for controlling powdery mildew have been changed resulting in the reduced use of FRAC group 11 fungicides for cucurbit powdery mildew control.

Impact:

The impact of this research helped determine that some FRAC group 11 fungicides should no longer be used to control cucurbit powdery mildew, thus reducing FRAC group 11 fungicide use in pumpkin and other cucurbit crop production, thereby greatly reducing the potential for fungicide resistance development, reducing potential impacts to the environment and helping growers save money by not applying ineffective fungicides.

Source of Federal Funds:

Smith Lever 3(b) & (c)

Scope of Impact:

State Specific

Goal 1

Key Theme:

Agricultural Systems
Animal & Animal Products

Activity:

The Mid-Atlantic Equine Pasture Initiative was developed and implemented to train Extension agents, governmental agency employees and other industry professionals to serve as informed field consultants and advisors to horse farmer owners and managers in New Jersey and the Mid-Atlantic region. The objective of the initiative is to increase outreach and assistance, improve knowledge and adoption of practices that improve pasture quality and reduce environmental impact. The essential elements of this pasture project include regional training meetings, and the development of training materials as well as a summary of resources accessible via web sites and video. Some of the key educational components include soil fertility, weed control, poisonous plants, grass species selection, pasture composition, paddock design and fencing, on-farm strategies to protect water quality, manure management, and proper fertilization based on soil test results. The goal is to have 25 agricultural extension agents, Natural Resource Conservation Service (NRCS) representatives, and other related agency and industry professionals in NJ, MD, DE, northern VA, eastern PA, and southern NY that will understand and advocate best pasture management practices, resulting in farm managers who adapt better manure management, reduce weed competition, increase nutritive value, and promote application of fertilizers to maintain soil nutrients based on soil tests in their pastures.

Impact:

Evaluations of training sessions conducted by the end of December 2005 found that on a scale of 1 to 5 with 5 being the most valuable and 1 being the least valuable, that after a year of working with the module the attendees felt the fact sheets were the most valuable portion on the CD with an average score of 4.4. Attending the actual training session with speakers demonstrating the module PowerPoints and the presentations themselves were scored an average of 4.0. Participants valued their opportunity to create a network of pasture professionals that will be able to assists them in developing their pasture programs for equine operation managers and owners least and gave this a 3.3. The evaluations asked the participants to rank the value of each PowerPoint presentation and the scores ranged from 3.8 to 4.3 with “Horse Health and Pasture Importance” being the highest ranked presentation. The train the trainer approach proved most effective in extending the educational outreach to small animal farm operators and horse owners resulting in improved management practices and environmental decisions.

Source of Federal Funds:

Smith Lever 3(b) & (c)

Scope of Impact:

State, Multi-State, NY, PA, DE, MD

Goal 1

Key Theme:

Aquaculture

Activity:

Since 1985 there has been a loss of about 900 full and part-time commercial clammers in NJ. The majority of clamming used to be concentrated in the Barnegat and Little Egg Harbor Bays. NJDEP Bureau of Shellfisheries reports significant reductions of hard clam, *Mercenaria mercenaria*, stocks in those same areas. Coastal development, increased boat activity, use of CCA treated lumber, harvest pressure, and use of bay water for nuclear reactor cooling have all been suggested as reasons why hard clam stocks are depleted. Many years ago, Barnegat Bay also supported several working oyster reefs. Because of many of the same reasons listed, those shellfish beds have long since been lost.

Shellfish harvesting was one of the main industries on which the early economy of Ocean County was built. Along with the loss of the shellfish, but not quite as obvious was the loss of habitat and nutrient reduction that can be attributed to both hard clams and oysters. A restoration of shellfish beds in Barnegat and Little Egg Harbor Bays may offer both an environmental benefit as well as an educational benefit of teaching the residents of the watershed more about the ecology of the Bays and the peoples' place in protecting and restoring some of the natural resources that support a healthy environment for the estuary.

Extension Marine Agents developed the Barnegat Bay Shellfish Restoration Program to involve volunteers in the revitalization of the clam and oyster populations in Barnegat Bay and educate the residents of Ocean County and the Barnegat Bay Watershed to the importance of shellfish of the bay and how they, as residents, can work to improve the bay's ecology through their actions.

- Volunteers were recruited by explaining the situation relating to shellfish and the environment of the bay in local newspapers.
- A series of 6 lectures were given to the 40 volunteers that encompassed shellfish biology, aquaculture, water quality, aquatic ecology, watershed issues and diseases.
- Volunteers assisted in the construction of the nursery systems and installed them for use. They also created a website to show their accomplishments (www.reclamthebay.org), and developed 4 committees to work on various phases of the program, and worked to form a Non-profit organization to be able to accept funds for the continuation of the program.
- In addition to the first two land-based sites from 2005, 4 more sites were added in 2006. There are now 6 sites.
- 1.4 million locally purchased seed clams were grown by the volunteers from 2mm up to an average size of 12mm in 10 weeks.
- The seed were planted under predator control netting for overwintering at 2 different sites the bay.
- At lease 8 articles were printed in 3 different newspapers outlining the progress of the program.
- A Public Art and Education Program was initiated which will be completed in 2007. This program will highlight the Hard Clam, information about the shellfish and the ecology of the Bay.

- An advisory and support program was initiated with the Ocean County Vocational Technical School's Marine Academy of Technology and Environmental Science. With this program three groups of high school students began research projects that will apply to shellfish aquaculture.
- A Clam Camp was initiated at the St. Francis Center with young children educating them about shellfish, bay ecology and water quality (Muscio).

Impact:

As a result of the Barnegat Bay Shellfish Restoration Program:

- Forty volunteers attended six two-hour classes between 4/18/06 and 5/23/06
- In 2005, the average reported change in knowledge by the volunteers was two scale points (scale of 1-4, four being high. Participants ranked knowledge before and knowledge after)
- An average of 86% percent of participants agreed or strongly agreed that the information presented was valuable to them as volunteers
- In 2006, post (n=13) tests indicate a class average 10.41 (scale of 15, with 15 equal to 100%) knowledge level
- Matched Pre and post tests (n=8) for the class series showed a 25% improvement in test scores, with the average score increasing from 7.69 to 10.31 (scale of 15, with 15 equal to 100%)
- The number of students that attempted answering one of two essay extra credit questions increased 33% after the class series
- Fifty percent more students answered the questions: What is a watershed? What watershed do you live in? correctly in the post testing
- Volunteers raised over 1,800,000 clams from seed in a two-year period for reintroduction into the Barnegat Bay plus 100,000 oyster seed.
- Volunteers have worked approximately 2308 hours building aquaculture structures, cleaning and caring for shellfish, and educating the public, at a total current labor value of $48,468.
- Because of the funds raised for the BBSRP, ReClam the Bay Inc., the volunteers non-profit organization, was able to attract $10,000 in matching funds from the George and Miriam Martin Foundation to continue the Shellfish Restoration Program after the local sources of funds is exhausted.
- Of significant importance to aquaculture in general, BBSRP has initiated a dialogue with NJDEP with respect to permits needed for Community Based Shellfish Restoration Programs and eventually for commercial shellfish aquaculture. Since the Aquaculture Development Act was signed into law in 1997, the Division of Land Use Planning had never addressed any issues related to shellfish aquaculture. This program has forced NJDEP to evaluate the processes involved in shellfish aquaculture.

Source of Federal Funds:

Smith Lever 3(b) & (c)

Scope of Impact:

State Specific

Goal 1

Key Theme:

Home Lawn and Gardening
Plant Health
Invasive Species

Activity:

The Asian Longhorned Beetle (ALB) is an invasive insect pests that has caused excessive damage to hardwood trees in New Jersey, New York and Illinois. ALB attacks and kills a great number of hardwood trees in the United States including maple, birch, horse chestnut, poplar, willow, elm, and ash. State and Federal governments have spent over $168 million dollars to date for the removal and control of ALB since its discovery in the United States in 2006. If ALB were to spread beyond current quarantined areas in New Jersey, New York and Illinois, ALB specialists at the Federal level estimate that this invasive pest could cause over $41 billion dollars in losses to the lumber, maple syrup, nursery, and tourism industries in the United States.

In New Jersey, ALB was initially detected in Jersey City on October 10, 2002. ALB was then found in Carteret in on August 2, 2004, Woodbridge on August 15, 2004, Rahway on October 5, 2004 and Linden on October 30,2004. Recent detections were found in August of 2006 in Linden. Over 22,965 ALB infected and high risk host trees have been removed in Middlesex and Union counties and an additional 348 trees in Hudson County. Over 12 million dollars have been spent on the eradication program for ALB in New Jersey since 2002. The value of removed trees is estimated to be from 34 to 58 million dollars in value.

After the initial detection in Jersey City New Jersey, an ALB educational program was initiated, developed and executed by Extension Agricultural and Resource Management Agents. Television PSAs and segments were aired on local and regional cable and broadcasts stations. As a result of the televised educational program, a second major area of infestation was found in Middlesex county by a resident informed by the media coverage. This early detection and quarantine as a result of educational efforts by our Extension team prevented the loss of an additional 15 to 20 million dollars in trees, if ALB had spread unchecked beyond these newly identified areas within several years.

The team created two educational CD ROMs on the proper identification and reporting of ALB. The first educational CD ROM was completed in the summer of 2003. A second updated CD ROM was completed in the summer of 2006. The CD's have been distributed to over 250 educators and scientists from 8 states and two provinces in Canada. The CD ROM has been used to train over 3,000 people including Master Gardeners, landscapers, horticultural professionals.

Additionally, they created an educational web site with information on the identification and reporting of ALB including fact sheets, PowerPoint slide shows and videos. The web site also records reports of suspected ALB findings from throughout the state and sends reports to USDA PPQ and university RCE colleagues for follow-up.

Under their leadership, the NJ Policy to burn all wood chips produced from the destruction of trees in the ALB quarantine zones was established.

Impact:

In 2006, 31,672 trees worth over $47,508,000 were surveyed by 10 professionals trained by our educational CD ROM. As a result of the survey 11,754 trees were removed worth over $17,631,000. The very conservative estimate of trees saved by proper surveying is 19,918 trees worth over $29,877,000. In reality the number of trees saved and their value would be many times the above numbers. Four levels of surveys were conducted at different distances from infection sites. This means that with many areas, only randomized sampling was done and the potential for tree death and removal with improper identification and unchecked spread of ALB would be much greater.

Since 2003, the ALB CD ROM has been used to train over 30 professional diagnosticians in New Jersey who examined well over 40,000 trees worth over 60 million dollars within the 25 acre of quarantined area in affected zones within the state.

The ALB CD's have been distributed to over 250 educators and scientists from 8 states and two provinces in Canada. The CD ROM has been used to train over 3,000 people including Master Gardeners, landscapers, horticultural professionals.

The video has aired repeatedly on eight central New Jersey cable stations to a potential audience of over 500,000 people in over 250,000 households. As a result of the airing of the video and PSAs on local television stations, a new infestation site was reported by a resident of Middlesex County. As a result of the resident reporting the infestation, the new area was quarantined and ALB was contained from further spread. If this new infestation site had not been identified, the insect could potentially damage an additional 20 million dollars or more worth of trees within a three to five year period.

As a result, it has become NJ Policy to burn all wood chips produced from the destruction of trees in the ALB quarantine zones. To date, over 23,000 trees have been removed producing 15,000 tons of wood chips which have been converted to 18.6 million Kilowatt-hours of electricity. This was enough electricity to supply 10,300 households with energy for 3 months. Electricity was provided to residents in Middlesex and Union counties through an agreement with Covanta energy.

In 2006, 11,754 trees were removed providing over 7,500 tons of wood chips and approximately 9 million Kilowatt-hours of electricity or enough to supply 5,100 households with energy for 3 months.

Source of Federal Funds:

Smith Lever 3(b) & (c)

Scope of Impact:

State Specific

Goal 2

Overview:

Approximately 70 percent of the nation's major food manufacturing firms have headquarters or research facilities within a hundred mile radius of the Rutgers University campus. New Jersey based food manufacturers are under a variety of regulatory, economic and environmental pressures. Retaining a strong manufacturing base is an essential component for the state's economic growth. NJAES designs and delivers innovative programs that address both the diverse food security, safety, and quality needs of consumers, and at the same time the food safety and handling technological needs of the agricultural and food system within the State.

The research and educational program conducted by the Extension food safety specialist targets small to medium-sized companies with technical assistance to ensure the safety of the food supply. Economically benefits have been realized through the prevention of product losses and recalls.

Food contamination, caused by pathogens in various raw or cooked foods, affects millions of people annually. This is of particular concern in seafood, where the pathogen Vibrio parahemalyticus is the major foodborne pathogen in seafood. Currently there is no set standard or treatment for Vibrio species in seafood. NJAES researchers have examined the effectiveness of a new antimicrobial substance, found in fish, against food-borne pathogens in perishable foods, especially in shellfish.

Family and Community Health Sciences Educators developed educational materials in English and Spanish on listeriosis to raise awareness on the subject and related food safety issues.

Goal 2

Allocated Resources:

Research

Hatch Funds:	$70K
All Funds:	$2,352K
SY's:	13

Extension

Smith-Lever Funds:	$85K
All Funds:	$372K
FTE's:	4.1

Goal 2

Key Theme:

Foodborne Pathogen Protection
Food Safety
Foodborne Illness

Activity:

A strong manufacturing base is an essential component for New Jersey's economic growth. NJ based manufacturers are under a variety of regulatory, economic and environmental pressures. The Extension Food Safety specialist provides technical assistance through short courses and telephone assistance for small and medium sized companies, helping to keep them in business, while assuring the safety of the food supply. Research and Extension programs targeted to small and medium sized companies help them to navigate a variety of regulatory, economic and environmental pressures while at the same time maintain a strong manufacturing base. Of note are specific instances where his assistance had a direct economic benefit to NJ companies.

Impact:

Assistance to a meat processor with 30 days of production without complete food safety documentation to prove the product was safe, allowed company to avoid a costly recall. The value of this product exceeded $150,000.

Following a major spinach related E. coli outbreak, visits to a spinach grower resulted in a testing program to determine microbiological contamination levels in NJ spinach.

Assistance to a New Jersey based bakery ingredient company resulted in the determination of appropriate microbial standards for flour used in bread making to control bread spoilage. This analysis directly impacted the status of more than 300 batches of flour produced over more than 1 month. The value of this product can be conservatively estimated to be more than $1,000,000.

Assistance to 3 meat processors with batches of product on hold by FSIS and facing a non-compliance record after an in-depth HACCP review saved food product costs in excess of $25,000 and allowed 3 plants to continue operating

Assistance to a New Jersey meat processor with potential recalls of two different fermented sausage products due to lack of scientific documentation on process safety, saved food product and recall costs in excess of $20,000 and allowed the plant to continue operating.

In addition to the assistance provided to NJ-based companies, assistance was provided to other states and internationally. Assisted a Utah based school foodservice operation with 23 batches of product that were subject to a cooling deviation. The value of this product exceeded $115,000. Assisted Canadian-based meat processor with evaluation of the safety of the thermal process used to inactivate pathogens in processed meats. While no product was directly affected, this analysis avoided many potential future problems.

Assisted Pennsylvania based Kosher poultry processor with 1 batch of raw poultry product on-hold by FSIS due to improper documentation of cooling. The value of the product in question exceeded $10,000.

Rutgers food safety expertise is recognized nationally and has served as an effective source of science-based information to secure the safety of the US food system.

Source of Federal Funds:

Smith Lever 3(b) & (c), Hatch

Scope of Impact:

State, Multi-State, PA, UT, International

Goal 2

Key Theme:

Foodborne Pathogen Protection
Food Safety
Foodborne Illness

Activity:

Foodborne illness is a critical issue nation-wide costing billions of dollars in lost productivity, hospitalization and in many cases resulting in death. Food contamination, caused by pathogens in various raw or cooked foods, affects millions of people annually. This is of particular concern in seafood, where the pathogen Vibrio parahemolyticus is the major foodborne pathogen. Currently there is no set standard or treatment for Vibrio species in seafood. NJAES researchers have examined the effectiveness of a new antimicrobial substance, found in fish, against foodborne pathogens in perishable foods, especially in shellfish.

Impact:

For communities in which shellfish is a significant part of the diet, pleurocidin can prevent the number of cases of foodborne illnesses due to shellfish contamination or improper shellfish processing. Previous work by our group revealed that pleurocidin is heat stable, salt tolerant and active over a wide pH range. It is non-toxic to human cells. The present work on shelf-life studies with shrimp using pleurocidin as an antimicrobial agent provides very important information about the usefulness of this antimicrobial peptide. Our results reveal that pleurocidin is not only effective against foodborne pathogens such as V. parahemolyticus in broth culture, but also in actual food matrices. Its use is not limited to seafood but extends to other types of food and beverages.

Source of Federal Funds:

Smith Lever 3(b) & (c), Hatch

Scope of Impact:

International, State Specific

Goal 2

Key Theme:

Food Safety

Activity:

Government agencies and the food industry have taken steps to reduce contamination of food by the Listeria bacterium. There are approximately 2,500 cases each year with 500 fatalities. The Food and Drug Administration and the U.S. Department of Agriculture monitor food regularly. When a processed food is contaminated, food monitoring and plant inspection are intensified and if necessary, the implicated food is recalled. The National Center for Infectious Diseases (NCID) is studying listeriosis in several states to help measure the impact of prevention activities, recognize disease occurrence and assist local and state health departments to identify sources of infection to prevent more cases of the disease.

An Extension Family and Community Health Sciences Educator with external funding provided through the public affairs department of Food and Drug Administration (FDA) developed educational materials in English and Spanish on listeriosis to raise public awareness on the subject. Preventing Listeriosis: A Foodborne Disease covers a review of the disease and recommendations to reduce the risk of listeriosis when handling foods as well as a brochure, Listeriosis – Food Safety to Protect Your Family. The educational program has been shared with peers at a professional meeting and used in training Food Stamp Nutrition Education Program paraprofessionals. Materials are also posted on the Rutgers Cooperative Extension website providing global exposure.

Impact:

84% of the professional peers who participated in the National Extension Association of Family and Consumer Sciences workshop reported that the information met their needs. Additional comments include:

- Will have EFNEP and FSNEP staff use information for teaching their clients
- I plan to do more investigation and research on this topic
- Good knowledge to present and share
- I will use the information at my state fair next week
- I will add this information for my “Cooking for a Crowd” classes that I teach
- I will use this information for a newspaper article in my county.

Source of Federal Funds:

Smith Lever 3(b) & (c)

Scope of Impact:

State, Multi State, WA, OR, PA, VA, VT, MD, DE

Goal 3

Overview:

New Jersey's culturally and economically diverse population includes those residents that can barely afford the most basic nutritional requirements and those who are willing and able to pay for high value health-promoting foods and dietary supplements. Across this entire spectrum, consumers are confused and concerned about nutrition-related information available through the media. New Jersey's agricultural and food system must serve these diverse needs. In response, the New Jersey Agricultural Experiment Station has mounted a major multi-disciplinary *Food, Nutrition and Health Initiative*. Research and Extension faculty from our Food Science, Nutritional Sciences, Plant Sciences, Family and Community Health Sciences, Agricultural, Food and Resource Economics Departments, in cooperation with other units within Rutgers University and other institutions within the region, are working on this initiative.

Obesity has become a national epidemic. This trend has a negative effect on disease and life expectancy for many New Jersey residents including our children.

Extension educators in the Family and Community Health Sciences department have planned and conducted nutrition and health educational programs to address the obesity epidemic. Of note are the "Children's Health Summit – Fighting Back Against Childhood Obesity" which resulted in the formation of Building Healthy Kids Coalitions to address children's health issues across the state.

The Get Moving – Get Healthy with New Jersey 4-H project was launched to address childhood obesity. The curriculum has proved effective in school enrichment and after school programs throughout the state.

Rutgers Cooperative Extension Nutrition Specialist conducted a comprehensive public information campaign regarding food allergies, known as "Ask Before You Eat" to inform the public about food allergies and the health-related consequences to persons with food allergies.

A "Stop Sale" was issued on home garden fertilizer as a result of an extension educational program on heavy metal pollution. The Extension Specialist authored a fact sheet, "Minimizing Health Risks from Lead Contaminated Soil" to encourage soil testing for lead and to provide recommendations for health protection. Results of this work were shared via an international symposium sponsored by the Soil Society of America.

The West Nile virus has underscored the need for mosquito research and control. Researchers are analyzing the scope of the threat to human health. This program, originally designed to monitor mosquito vectors has expanded to new invasive mosquito-borne pathogens and collections surveillance data. The NJAES has been at the forefront to create a cooperative working affiliation to assure that residents of the State receive maximum protection from invasive mosquito borne pathogens.

New Jersey's Expanded Food and Nutrition Education Program is making a difference for those families who participated; diets have improved and families are managing food resources more efficiently.

Goal 3

Allocated Resources:

Research

Hatch Funds:	$146K
All Funds:	$3,619K
SY's:	6

Extension

Smith-Lever Funds:	$83K
All Funds:	$684K
FTE's:	9.6

Goal 3

Key Theme:

Human Health
Human Nutrition

Activity:

Obesity continues to be a national epidemic. Childhood obesity increases risks for many chronic, life-threatening diseases including diabetes and heart disease. A September 2004 childhood Weight Status report published by the New Jersey Department of Health and Senior Services indicated that 20% of New Jersey's sixth graders are obese and another 18% are overweight. Currently the number of overweight and obese youth in New Jersey is higher than the national average. Children and families need reliable sound effective nutrition education. School administrators, food service workers and teachers need access to quality continuing education to effect change related to the obesity epidemic. As a result, Rutgers Cooperative Extension Family and Community Health Sciences Educators and 4-H County Agents and Professional staff have developed and implemented educational programs to empower children, families, school systems and communities to implement actions to reverse the obesity cycle.

The Get Moving – Get Healthy with New Jersey 4-H (GMGH) project was launched. The GMGH curriculum is being used in school enrichment and after school programs throughout the state with the objectives to:

- Increase the participants' understanding of MyPyramid and the appropriate amounts of food that should be eaten in each food group
- Increase the participants' understanding of the sizes of portions
- Increase the participants' knowledge of the easy ways to add physical activity to their daily lives
- Increase the number of participants eating the appropriate amounts of fruits and vegetables daily
- Decrease the amount of soda and sweetened beverages consumed by participants
- Increase the number of meals eaten together by families
- Increase the amount of shared physical activities families participate in together

In addition to the professional educators, teen 4-H Food & Fitness Ambassadors from eight counties have been trained to use the educational kits and teach youth about making wise food choices and incorporating physical activity into their daily life.

Family and Community Health Sciences Educators continue to expand the Children's Health Summits – Fighting Back Against Childhood Obesity across the state. To date, eight regional summits have been held.

Impact:

The Get Moving Get Healthy program has reached over 1500 elementary school age youth with in-depth training. Participants gave the program an average rating of 4.8 (with 1=poor and 5=excellent).

When asked to "list one or two things you learned", participant responses included comments about the importance of exercise, descriptions of portion sizes, and about learning how much sugar is in soda. When asked to list "one way you plan to use the information", the responses ranged from getting more exercise, to checking labels on food, to properly measuring and eating the correct amounts of food.

Evaluation results indicate the following:

Behavior changes reported:

- 94% of participants surveyed reported a better understanding of obesity causes
- 93% noted a better understanding of physical and emotional health consequences
- 93% reported a better understanding of portion sizes
- 87% noted a better understanding of the benefits of physical activity

Actions as a result of participation:

- 92% of Summit attendees agreed to share information from the conference with at least one other person
- 85% will encourage children to eat a nutritious diet
- 83% agreed to set a good example for children, in terms of eating habits and physical activity.

Participants self-reported a commitment to one or more of the following behaviors:

- Eat a healthy breakfast
- Help children find other ways besides food to handle set backs or successes
- Play and be physically active with children
- Teach children to accept all body shapes and sizes
- Recognize children for their positive qualities, strengths and abilities instead of their physical appearance

The average number of behavior changes that participants committed to is 12.

As a result of the Children's Health Summits, many community partnerships have developed. One of the outcomes of each Summit described above is the formation of the Building Healthy Kids Coalition (BHKC) in local communities. These coalitions are made up of people who attended the Summit and are interested in finding ways to address children's health issues in their local communities. To date, six coalitions have formed and are in the initial stages of community assessment and planning.

Source of Federal Funds:

Smith Lever 3(b) & (c)

Scope of Impact:

State, Multi State, NY

Goal 3

Key Theme:

Human Health

Activity:

Food allergies are a common, serious, and sometimes fatal problem. The prevalence of food allergies appears to be on the rise. Between 1997 and 2002 the number of children with peanut allergies nearly doubled. Close to 327,000 New Jerseyans have food allergies, of which 100,000 are children. Most food allergies are mild. However, for those who are severely allergic, exposure to even a trace amount of a food allergen (i.e., food that can cause an allergic reaction) may cause life-threatening reactions. The only proven way to prevent allergic reactions caused by trigger foods is to avoid those foods.

Public Law 2005, c.026 (A303 ACS 2R) set the stage to help restaurateurs and NJ residents prevent triggering food allergy reactions. In collaboration with the NJ Department of Health and Senior Services and NJ Restaurant Association, an Extension Specialist put the mandates of the law into action.
The goals were to:

- Prepare a fact sheet for food service personnel (restaurateurs) that explains food allergies and their health-related consequences to persons with allergies and make this fact sheet available to local boards of health by electronic or other means of distribution.
- Conduct a public information campaign regarding food allergies, known as "Ask Before You Eat" to inform the public about food allergies and the health-related consequences to persons with food allergies.

To accomplish these goals, an Allergies Advisory Panel was established. Panel members were drawn from the Food Allergy and Anaphylaxis Network, representatives from the NJ Department of Health and Senior Services, NJ Restaurant Association, Rutgers University, UMDNJ-Asthma & Allergy Research Center, American Academy of Allergy Asthma & Immunology, NJ Pediatric Association, NJ Dietetic Association, NJ School Food Service Association, NJ School Nurses Association, and county and municipality Health Officers.

Interviews of parents, teachers, school nurses, school food service personnel, and other interested adults were conducted to identify their knowledge, perceptions, and behaviors related to food allergy reaction prevention; key messages important as part of an educational campaign; and message delivery preferences.

Based on the focus group data and literature review, campaign materials were developed with the assistance of a graphic designer. Materials included printed media (fact sheets in English and Spanish), newspaper press releases, broadcast media (radio and television interviews, video clips at movie theaters and supermarkets), website, inservice workshops, and/or distribution of campaign materials at various key professional meetings, and health fair exhibit materials.

Stakeholder input was critical to the development of the educational materials and public campaign.

The campaign kicked-off on April 29, 2006 at Rutgers University's Ag Field Day and continued until May 25, 2006. The research team solicited heavy media coverage, including both newspaper and television spots, distributed the campaign materials, and ran campaign advertising. At least 6 newspapers with circulation in 16 of the 21 counties, ran either an article or a letter to the editor regarding the campaign. In total, these newspapers report a circulation of nearly 888,000 people throughout NJ, excluding Internet readership.

A variety of organizations across the state ran a story or announcement about food allergies and the campaign in their organization's newsletter, electronic listserv, or website. The professional organizations that reported they ran an announcement include professional organizations, healthcare organizations, and school/community organizations. These newsletter press releases were estimated to have a potential readership of 210,000.

To maximize the potential reach of the campaign, all radio and television stations in the state were contacted and unpaid mass media coverage of the campaign was achieved in 9 of the 21 counties throughout the state.

A half-page, full color advertisement was published in 7 Gannet Sunday Newspapers throughout NJ with a combined potential readership of 1,366,587.

Paid Broadcast Media included a 15-second audio/video advertisement developed for use in supermarkets and movie theaters. The theater advertisement was shown prior to movies playing in 11 theaters having 155 digital theater screens across the state. The advertisement ran 28 times per screen per week. The supermarket ad ran on video monitors located in the checkout lines in 178 Shop Rite, Pathmark, and Acme supermarkets throughout NJ. The ad ran 5 times per hour for a total of 252,000 showings with an estimated potential to reach approximately 6,061,800 shoppers.

A campaign website was developed (www.foodallergy.rutgers.edu). Traffic to the website was tracked during the three-week campaign and was high. During the campaign, the website had over 33,000 hits, averaging 527 hits daily. A total of 19 organizations included a link from their website to the campaign website and 7 organizations sent out a campaign press release (which included a link to the campaign website) to their respective listservs.

Impact:

A short random-digit dial telephone survey was conducted to help establish the effectiveness of the campaign. The pretest included 676 NJ adult residents and occurred in the week prior to the campaign launch. A total of 474 of these same individuals were available to be interviewed again at the post survey, which occurred after the campaign ended. The survey participants were primarily female (63%), white (80%), over age 50 (58%), had some education beyond high school (64%). Results of the phone survey indicated that at the post survey, the number reporting they had received food allergy

information increased significantly (p=0.04). In addition, there was a significant increase in food allergy knowledge among women (p=0.04), women who were the primary household food shopper (p=0.03), and women who shopped in one of the three supermarket chains participating in the campaign (p=0.01).

In addition, throughout the campaign numerous email messages were received at the campaign email address providing unsolicited feedback. These email messages came from parents of children with food allergies, health professionals working with people with food allergies (e.g., physicians, school nurses), as well as individuals working in the food production industry. Every email had something positive to say about the campaign and highlights from these emails are presented below.

E-mail Message Examples:

- "I am elated that you are getting the word out and educating people . . . I feel this (the campaign) will open many eyes for the future of our children's safety. . ."
- I love the new Ask Before You Eat website! As a mother of a child with multiple food allergies, I am thrilled that this campaign has now been launched."
- "My online allergy group forwarded your Ask Before You Eat Campaign Website and I just wanted to say – You're doing a great job by helping make people aware of food allergies."
- I hope that your article opens the eyes of restaurant and fast food restaurant owners to the seriousness of food allergies."

Source of Federal Funds:

Smith Lever 3(b) & (c)

Scope of Impact:

State Specific

Goal 3

Key Theme:

Human Health

Activity:

Heavy metal pollution is a concern for residents in densely populated urban locations where housing, gardening and other environmental factors may impact the environmental quality. Preventing human, especially child, exposure to heavy metals is important to protecting public health. Occurrence of lead contamination of soils is widespread in urban environments because of past use of lead based paints and leaded gasoline. Identifying soils that contain high lead concentrations is an important step in protecting public health from lead poisoning. By pinpointing locations where high concentrations of lead exist, techniques can be implemented to minimize human exposure to that lead, and can result in fewer cases of lead poisoning. A study was conducted to examine the feasibility of using routine soil fertility test methods to screen urban soils for lead.

Another cause of heavy metal pollution is the use of some commercial fertilizer products containing high levels of heavy metals. While the great majority of commercial fertilizer products are regarded as safe and free of heavy metal contamination, a lack of regulatory oversight allows some hazardous waste materials and mine tailings to be applied to soil as fertilizer. In New Jersey, as in many states, commercial fertilizer products are regulated for guaranteed nutrient concentration while the concentration s of non-nutrient substances are unregulated. As an example, one particular brand of home fertilizer on the market in many states contains up to 3600 mg/kg arsenic and 2900 mg/kg of lead. Home gardeners unaware of the high levels of heavy metals in this product have been unintentionally contaminating their garden soils and increasing human exposure to heavy metals. Extension programs were carried out to minimize public exposure to heavy metals from fertilizer source materials.

Over 90 soil samples suspected of lead contamination based on site history were collected from across New Jersey and extracted for lead using standard soil fertility test methods. Levels correlated with the more expensive USEPA 3050 method for total soil lead. Prediction equations and standards were developed for an inexpensive screen for lead contamination. Rutgers Cooperative Extension fact sheet, Minimizing Health Risks from Lead Contaminated Soil, was published to encourage soil testing for lead and to provide recommendations for health protection.

An international symposium sponsored by the Soil Science Society of America to bring attention and encourage networking among scientists, industry, and regulators was organized by the Extension Specialist. The symposium on Hazardous Materials in Fertilizers received input from 12 speakers and was attended by about 150 agronimists and soil scientists. Three newsletter articles were published to inform fertilizer users, industry, and the gardening public about health concerns with heavy metals in fertilizers.

Impact:

The Rutgers University Soil Testing Laboratory adopted the procedure that was developed for screening soils for lead contamination. The Rutgers lab ran about 493 soil

samples for lead from 2004 through 2006. Soil test lead results were reported to clients along with information on how to limit human exposure to lead from soil.

New Jersey fertilizer industry officials learned about how to avoid the most highly contaminated fertilizer source materials. A significant outcome of this extension program is that the New Jersey Department of Agriculture investigated and confirmed that the suspect brand of home garden fertilizer did in fact contain dangerous levels of heavy metals and in August 2005 issued a "Stop Sale" on this product. Following this action, Connecticut officials also stopped the sale of this product. The product is currently under investigation by Delaware officials.

While people of all ages are at risk, the developing brain and IQ of children are especially vulnerable to toxic metals, especially lead. As a result of this extension program and actions taken there will be less heavy metal added to soils and this will reduce the potential exposure and harm to human health and well being. On soils already contaminated with lead, people will be better informed as to how to minimize exposure to lead. The outcome will be fewer adults and children suffering from the negative health effects from exposure to high levels of lead and other heavy metals.

Source of Federal Funds:

Smith Lever 3(b) & (c)

Scope of Impact:

State Specific, Multi State, CT, DE

Goal 3

Key Theme:

Human Health

Activity:

Pest Control Companies and Health Officers protect the health of NJ residents by managing pests that can spread disease or cause damage to property. Professionals in the health and pest management field are required to obtain re-certification training. The RCE Pest Control Operator and Health Officer Day program provides these professionals with updates on integrated pest management strategies for insect and other pest control and opportunities for pesticide, public health officer, and registered environmental health specialists continuing to obtain education credits. This program is a collaborative effort with Rutgers University, DEP Pesticide Control Program, and Fish and Wildlife units as partners in the planning and implementation.

Objectives of the program:

- Provide information on snake, termite, bed bug, and mosquito control.
- Promote Integrated Pest Management (IPM).
- Explain NJ School IPM regulations so that professionals can comply.
- Promote improved safety practices during pesticide applications.
- Provide re-certification credits for professionals.

Impact:

Program participants who completed a program evaluation survey indicated that they will use the information in the following ways: bed bug management, snake management, safer pesticide applications, and school IPM. Both health officials and pest control professionals indicated the information will be used to educate their clients.

Professionals who have attended the program in the past indicated that they have changed pest control practices as a result of this training. The most common example was practicing IPM. The professionals indicated that they use different surveillance and monitoring techniques, apply less pesticides (11-20% less) and promote IPM to their customers. Health Officers indicated they would provide more detailed information to the public as a result of the program.

Source of Federal Funds:

Smith Lever 3(b) & (c)

Scope of Impact:

State Specific

Goal 3

Key Theme:

Human Health
Animal Health

Activity:

NJAES coordinates the mosquito control activities in New Jersey as mandated in NJSA Title 26, Chapter 9 of the health codes. Coordination of mosquito control activities has been ongoing at NJAES since John B. Smith added a Rutgers mandate for mosquito control responsibilities in the NJ Health Statutes at the turn of the last century. The appearance of Eastern Equine Encephalitis (EEE) in southern NJ in 1959 underscored the public health importance of mosquitoes at that time. The appearance of West Nile virus (WNV) in 1999 re-established the need for statewide coordination of mosquito control activities for public health and economic reasons.

NJAES members serve on the Board of Trustees of the N.J. Mosquito Control Association providing direct input in association policy, participating in the Annual Meeting of the NJ Health Officer's Association by giving a presentation from NJAES, having 8 scientific papers presented from Mosquito Research & Control researchers at the 91st Annual Meeting of the N.J. Mosquito Control Association, presenting 3 scientific papers from Mosquito Research & Control program researchers at the 51st Annual Meeting of the Northeastern Mosquito Control Association, organizing 2 regional training sessions for NJ, NY and PA pesticide applicators for re-certification credits in category 8B, they also conduct an annual review of county mosquito agency plans and estimates according to NJS Statutes 26:9, 11-13 and provide comments to individual Boards of Chosen Freeholders on the quality of their mosquito control programs. Researchers conduct season-long surveys for the mosquito vectors of EEE & WNV and make the results available to NJ mosquito control workers on a weekly basis throughout the mosquito season. They establish a network of activities to protect New Jersey residents from WNV including: collecting mosquitoes for virus isolation attempts, training NJ Mosquito Control from county agencies in procedures related to arbovirus surveillance, collecting and bleeding wild birds for WNV and cooperating with the CDC and USGS in their studies on the role of migratory birds. We provide short courses in a variety of topics related to mosquito biology, surveillance and control for NJ's mosquito control community, publish the annual NJAES pesticide recommendations for mosquito control in the state of New Jersey, and organize pesticide efficacy tests of new products for possible inclusion in future NJAES pesticide recommendations.

Impact:

New Jersey is one of the primary leaders in the field of professional mosquito control. Control activities are conducted in a professional, environmentally sound manner. NJAES took a leadership role in the aftermath of West Nile Virus and assured that the most up-to-date technology was being used to prevent mosquito-borne disease agents from reaching the public. NJAES has also been at the forefront to create a cooperative working affiliation with the New Jersey Departments of Health, Agriculture and Environmental Protection to assure that residents of the state of New Jersey receive maximum protection from invasive mosquito-borne pathogens.

Scientific data are collected, evaluated and passed on to applied agencies in the state of New Jersey who must make rational decisions on implementing vector control activities. Information is being used by the NJ State Department of Health to alert residents of potential disease outbreaks and prepare them for the possibility of accelerated aerial applications of pesticides.

Source of Federal Funds:

Hatch

Scope of Impact:

State Specific

Goal 3

Key Theme:

Human Nutrition
Human Health

Activity:

Many limited-resource families in New Jersey experience food insecurity, poor dietary quality, substandard food safety and shopping/resource management practices. As a result, their health and well-being is at stake, and undue stress is placed on the medical community to meet their needs. To that end, our program provides nutrition education to adults and youth throughout the community aimed at achieving the following desired outcomes: improved diets and nutritional welfare; increased knowledge of the essentials of human nutrition; increased ability to select and buy food that satisfies nutritional needs; improved practices in food production, preparation, storage, safety and sanitation; and, increased ability to manage food budgets and related resources such as food stamps.

In fiscal year 2006, The New Jersey Expanded Food & Nutrition and Education Program (EFNEP) delivered behaviorally focused, outcome-based nutrition education classes to 4,037 adults and 8,371 youth. Racial breakdowns for adults and youth, respectively, were: 44% and 44% African American; 39% and 39% Hispanic; 13% and 13% Caucasian; 2% and 3% Asian or Pacific Islanders; and 1% Native American Indian adults.

Impact:

Program evaluation documented via the ERS federal reporting system reported the following behavioral changes:

- 39% more often planned meals in advance
- 36% more often compared prices when shopping
- 32% less often ran out of food at the end of the month
- 38% more often thought about healthy food choices when deciding what to feed their families
- 32% more often prepared food without adding salt
- 46% more often used the "Nutrition Facts" on food labels to make healthy choices
- 37% reported that their children ate breakfast more often

EFNEP educational outreach is making a difference for those families who participated, their diets improved. National data indicates that each dollar invested in EFNEP leads to $10.64 savings in future health care costs.

Sources of Federal Funds:

Smith-Lever 3(d)

Scope of Impact:

State Specific

Goal 4

Overview:

As the most densely populated state in the United States, New Jersey is experiencing environmental problems sooner and more severely than other states. We are challenged with land, water and air issues and attaining an efficient balance between production activities, the environment and human health. New Jersey is a microcosm of both the challenges faced at the agricultural/environmental interface and the mutually beneficial solutions that are possible. As such, it has the potential to serve as a model of how to achieve greater harmony between agriculture and the environment. The NJAES and Rutgers University recognized this potential very early in their history and thus created and environmental sciences department nearly 80 years ago.

Weed management in field and container ornamental production represents one of the largest economic inputs in terms of labor and herbicides for ornamental producers. Research at NJAES has assisted in the development and commercialization of the herbicide flumioxazon (Broadstar SureGuard) for use in field and container grown ornamentals.

Multi-state collaborative turfgrass research and extension efforts evaluate cultural management practices and fungicide chemistries that could be used to suppress gray leaf spot in the field.

A new integrated biorational program for management of peach rusty spot was presented/published for grower implementation in commercial NJ orchards and in other stone fruit producing areas of the United States.

Rutgers expands environmental volunteer force through and in depth Environmental Stewardship certificate program.

Goal 4

Allocated Resources:

Research

Hatch Funds:	$974K
All Funds:	$7066K
SY's:	22

Extension

Smith-Lever Funds:	$305K
All Funds:	$2,294K
FTE's:	29

Goal 4

Key Theme:

Natural Resource Management
Pesticide Application

Activity:

Weed management in field and container ornamental production represent one of the largest economic inputs in terms of labor and herbicides for ornamental producers. The development and integration of new, more effective herbicides will reduce these economic inputs and provide environmental benefits by decreasing herbicide use. Research has assisted in the development and commercialization of the herbicide flumioxazon (Broadstar, SureGuard) for use in field and container grown ornamentals. Comprehensive field and container studies were conducted over four years and recommendations delivered to the New Jersey ornamental production industry. In addition, 20 IR-4 studies were conducted to evaluate ornamental tolerance to flumioxazon. This research has demonstrated that flumioxazon provides equal and in many cases superior weed control of broadleaf weeds than currently used products. We have also determined that flumioxazon provides excellent control of marestail and Asiatic dayflower, two weeds that have become increasingly problematic in field ornamental production. The determination that flumioxazon controls marestail is especially critical since we have now confirmed the spread of glyphosate resistant marestail into New Jersey nursery operations. In addition, the use rate of flumioxazon is 0.25 to 0.38 lbs ai/A, while currently used herbicides are used at 1.0 to 2.0 lbs ai/A.

Impact:

The proper integration of flumioxazon into an overall weed management program will provide superior broadleaf weed control for New Jersey producers compared with existing products. In field ornamental production, the price for flumioxazon will average approximately $75 per treated acre, while currently used broadleaf weed herbicides average approximately $100 per treated acre. In container production, the granular formulation of flumioxazon will average approximately $180 per treated acre while granular formulations of herbicides which provide comparable weed control average $240 per treated acre. Additionally, The effective use rate of flumioxazon is approximately 20-25% of existing herbicides resulting in a significant decrease in the total pounds of active herbicide used in field and container ornamental production.

Source of Federal Funds:

Hatch, Smith-Lever 3(b) & (c)

Scope of Impact:

State Specific

Goal 4

Key Theme:

Natural Resource Management
Pesticide Application

Activity:

Turfgrass is a valuable and rapidly expanding component of our urban and rural landscape. Turfgrass covers 12 million hectares in the United States (Potter & Braman 1991) including over 60 million lawns and more than 16,000 golf courses (Emmons 2000). Golf courses are an important component of the turfgrass industry. They are a source of green space in the urban environment and offer recreation and enjoyment for approximately 36 million Americans. Golf courses also generate jobs, commerce, economic development, and tax revenues for communities throughout the country. A recent report by the World Golf Foundation stated that golf contributes $62.2 billion worth of goods and services each year to the national economy (www.golf2020.com). Since 1992, gray leaf spot disease, caused by the fungus Pyricularia grisea, has emerged as one of the most destructive diseases of perennial ryegrass turf in North America. Before the initiation of this project, little was known about the distribution and control of this disease. Due to its severity on golf and landscape turf, studies were initiated at Rutgers University, Penn State University, the University of Kentucky, and Purdue University to evaluate cultural management practices and fungicide chemistries that could be used to suppress gray leaf spot in the field. At the time, fungicides were providing only moderate control but cost turf managers an average of $9,800 per golf course per year to protect susceptible turf. Moreover, isolates of the pathogen resistant to several fungicide chemistries had been reported resulting in significant turf loss (e.g., 15 to 90% turf on affected golf course fairways and lawns). Since the early 1990s when the disease first reached epidemic proportions on golf course fairways and new landscape seedings in the northeastern and central United States, it became apparent that a more comprehensive and environmentally sound approach was required to improve disease control, reduce fungicide usage, and maintain adequate turfgrass quality. A team including three extension specialists, two graduate students, two county agents, and three faculty from other universities was assembled to plan, conduct and evaluate numerous field and laboratory studies and to extend results of an integrated disease control research program to turfgrass managers at the State, regional, and national level.

A collaborative research effort was undertaken among Rutgers Cooperative Research and Rutgers Cooperative Extension faculty(i.e., a management specialist, pathologist, breeder, and two county agents), two graduate students, and three scientists from other universities, Penn State University, University of Kentucky, and Purdue University, to determine the relationship between cultural, genetic, and chemical control strategies and the development of gray leaf spot on perennial ryegrass. Results have been published in professional journals, trade magazines, newsletters, proceedings, abstracts, and Extension publications. Findings were also disseminated at county, state, regional, and national meetings in 23 states over the past 10 years. County agents and turfgrass managers were informed of results via on-site research visits, field days, and frequent updates in the Rutgers Pest Advisory Newsletter which has a circulation of over 800 turfgrass professionals in the mid-Atlantic and northeast regions. The target audience included

turfgrass managers (e.g., landscape contractors and golf course superintendents) and the general public in New Jersey and throughout the United States where gray leaf spot occurs.

Impact:

The team that collaborated on this project found that gray leaf spot disease could be effectively controlled on golf courses and home lawns by reducing nitrogen applications, raising the mowing height, collecting infested leaf clippings, planting new disease resistant cultivars of perennial ryegrass developed at Rutgers University, and alternating fungicide chemistries to reduce the occurrence of resistant isolates of the fungal pathogen (Pyricularia grisea). Implementation of the cultural, genetic, and chemical disease control practices by turfgrass managers has resulted in significant economic savings attributed to an average 25 to 30% reduction in fungicide use. Based on surveys of participants at national golf management conferences and reports from golf industry representatives, it has been estimated that the program developed by this team has resulted in a total savings of $2,700,000 per year on golf courses in the US when gray leaf spot epidemics were most severe (e.g., 1998, 2001 and 2005). In addition to economic savings, the environmental benefits (e.g., reduced non-target effects on other organisms) from reduced fungicide applications were also apparent. Moreover, the reduced frequency of fungicide applications resulting from this program has decreased the potential for fungicide resistance.

Source of Federal Funds:

Smith Lever 3(b) & (c), Hatch

Scope of Impact:

State Specific, Multi State, IN, PA, KT

Goal 4

Key Theme:

Integrated Pest Management
Pesticide Application
Natural Resource Management

Activity:

Carrot weevil can be devastating to carrots (roots) and parsley, causing extensive tunneling and damage to roots which also allows disease organisms to enter. Either insect damage or disease damage will cause entire loads of processing carrots to be rejected. In 2003-2004, most carrot growers had excessive carrot damage caused by carrot weevils throughout southern New Jersey. Kelly Brothers farms suffered 99% loss of carrots due to weevil damage, and Ed Burns' farm reported a 40% loss. Because processing carrots are used by Campbell's for baby foods, pesticide use is limited and insect or disease contamination is not allowed. Growers sprayed fields according to the current carrot IPM guidelines, but losses still occurred. After meetings in 2002-2003 with carrot growers, County Agriculture agents, and IPM specialists, it was determined that a need exists to closely examine and improve, if necessary, carrot weevil control materials and pest management tactics.

A long-term, 3-5 year research program was initiated in 2003 to determine an effective pest management program for carrot weevils in carrots. Research was initiated at the request of NJ carrot growers to determine biology and life history of the weevil as it relates to damage, determined most effective control tactics, and to examine the efficacy of the currently labeled insecticides for carrot weevil control. Laboratory and field studies were conducted at Rutgers Agricultural Research and Extension Center, and field studies were also conducted at Ed Burns' farm, Pedricktown, NJ. The target audience includes NJ carrot growers, agricultural agents, Campbell's Soups Inc., and extension specialists in other carrot producing states (Michigan, Wisconsin, Texas, California).

A two-year field trial (2004-2005) demonstrated that spray equipment is as important, or more important, than the selected spray material. Results showed that two nozzles/row resulted in a significant decrease in weevil damage (20-30%) over a double nozzle (Ghidiu et al, 2006). A 30% reduction in marketable yields represents approximately $500 to growers. These trials also demonstrated that a single seed-treatment of fipronil was significantly more effective in protecting carrots from weevil damage than multiple foliar sprays (6 applications) of insecticides. This project is currently a Rutgers/Cornell/USDA/IR-4 Minor Use project.

Trials in 2006 showed that carrot weevils cause nearly 80% of the total damage between 1 July and 20 July. These data are critical to the grower's IPM program, indicating that spray programs for weevil control must be strictly adhered to, and the spray interval adjusted according to adult weevil activity, during the month of July for an effective management program.

Impact:

Although New Jersey produces carrots on only 1,000 acres, total dollar savings by improving sprayer efficiency (using two nozzles per row instead of one nozzle) and application timing could exceed $500,000. If growers eliminate just two sprays during the months of August and September, carrot growers could save a total of $40,000 in a single season.

Source of Federal Funds:

Smith Lever 3(b) & (c), Hatch

Scope of Impact:

State Specific

Goal 4

Key Theme:

Integrated Pest Management
Natural Resource Management

Activity:

Rusty spot of peach is a serious disease on fruit of many cultivars grown commercially in New Jersey and in other stone fruit producing areas of the United States. In recent years, incidence and severity of the disease has increased significantly in many regions, possibly due to warm climatic trends. If not controlled when conditions favor disease development, as much as 90% fruit loss can occur. No scientific information was available to indicate when infection was taking place. Thus, growers were applying as many as six to eight fungicide applications per season, costing $120 to $160/A. Furthermore, only more toxic conventional fungicides were being utilized, even though newer reduced-risk biorational fungicides had become available.

Initial research on the epidemiology of rusty spot showed that fruit develop ontogenetic resistance at endocarp sclerification (pit hardening). Further research showed that only four fungicide applications were necessary for effective management prior to resistance development. Subsequent research showed successful integration of biorational fungicides into the new disease management program, further reducing use of conventional fungicides. Field studies with three commercial growers demonstrated the efficacy and cost-effectiveness of the new integrated program. In 2006, this program was formally presented to growers at multiple meetings and in written communications (e.g., Plant & Pest Advisory Fruit Newsletter).

Impact:

A new integrated biorational program for management of peach rusty spot was presented and published for grower implementation in commercial New Jersey orchards. Results from the prior eight years of research on the epidemiology and control, as well as results from recent commercial demonstration studies were provided as proof of the program's efficacy and economic soundness.

Discussions with growers and RCE / IPM program agents indicated that grower adoption of some or all components of the integrated program was high. Specific impacts relate to improved disease control, increased grower profitability, environmental favorableness, and increased applicator and food safety:

- Improved application timing enhances disease control, resulting in less yield loss
- Less fungicide introduced into the environment due to 50% to 75% fewer applications:
    - Most growers now applying only four sprays per season for rusty spot control
    - Adoption of biocontrol component slower, but progressing as growers become familiar with handling the new biological control agents / biorational products
- Reduced applicator exposure to toxic fungicides (fewer applications, use of biocontrols)

- Improved grower profitability resulting from a $40 to $80 per acre cost savings
- Estimated statewide savings of $200,000 to $400,000 per year (60% acreage susceptible)
- Reduced risk of fungicide residues on harvested fruit, thereby improving food safety for the public (since fewer sprays and use of less toxic biocontrols)

Source of Federal Funds:

Smith Lever 3(b) & (c), Hatch

Scope of Impact:

State, Multi State, PA, WV, MI

Goal 4

Key Theme:

Natural Resource Management

Activity:

Environmental issues are among the most serious problems faced statewide and nationally. A six year NJDEP study concluded in March 2003 on comparative risk from environmental stressors concluded that the top four environmental issues in New Jersey were 1) land use change, 2) indoor pollution, 3) invasive species and 4) outdoor air pollution.

A comprehensive needs assessment of environmental issues on the local and state level, along with extensive interaction with nonprofit environmental groups in the state, showed that there was a distinct need for trained and experienced volunteers who could assume leadership roles. Extension's ability to address this need successfully was easy to envision given our successful history with Master Gardeners and other volunteer recruitment and training programs.

In this context it was determined that a structured volunteer training and management program focused on the environment would provide significant value-added to New Jersey, it is the Rutgers Environmental Stewards.

Objectives of the Program:

- Provide a grounding in environmentally related science and leadership for residents interested in environmental issues but without formal scientific education.
- Provide them an avenue to get involved making meaningful contributions to improving NJ's environment through the programs 60 hour volunteer internship, which compliments the 60 hours of classroom training and field trips.
- Graduates will be knowledgeable in the basic processes of earth, air, and water, and biological systems. They will be aware of the techniques and tools used to monitor and assess the health of the environment. They will have an understanding of the research and regulatory infrastructure of state and federal agencies operating in New Jersey that relate to environmental issues. They will have an introduction to group dynamics and community leadership. They will recognize the elements of sound science and public policy based on that science. They will have some sense of the limits of the current understanding of the environment.
- Graduates will use their knowledge to promote positive change in their community.

Rutgers Cooperative Extension formed a partnership with Duke Farms to create a statewide Environmental Stewardship certification program. An advisory council was formed to guide the Rutgers Environmental Stewards program which consisted of internal and external stakeholders. Regional instruction locations were established. To date regional classes have been conducted for three years providing 420 hours of training to 120 students.

To support promotion and management of the program a web site was created, http://www.rce.rutgers.edu/envirostewards/.

Impact:

As a result of the Extension Volunteer training and outreach project:

Completed Training	**70 of 78**	90.00%
Engaged in Intern Project	**47**	67.14%
Completed Intern Project	**19**	27.14%
On Environmental Commission	**10**	14.29%

Participants have rated overall lecture quality as 4.6 on a scale where 5 is perfect. Traffic at the website tripled between 2005 and 2006.

Science Knowledge

The group considers themselves to be moderately knowledgeable about environmental science. 97% in '05 and 96% in '06 report considerable gains in their environmental science knowledge

How to take action

The group believes they have moderate influence over how environmental problems/issues are resolved. 55% in '05 and 81% in '06 feel that the course has contributed to a moderate increase in the belief that they can influence environmental problem resolution.

The quality and measurable impact of the internship portion of the program is on track to equal or exceed these measures of training excellence. Here are some examples of impacts of specific intern projects:

- Chair of Environmental Commission in Clayton wrote a new conservation ordinance, and instituted paid re-cycling program in April 2006. Attracting national attention.
- Washington Twp. Environmental Commission, coordinated town Clean-Up Day, collecting 300 bags of trash, gathered business contributions to fund hats and vests for clean-up volunteers. Organized a storm water management seminar for Burlington towns, setup biennial stream sampling and a workshop on implementation of county storm water management plan and also initiated local school solar panel installation using information from the Environmental stewards training. The school has secured funding and is proceeding with the installation.

Source of Federal Funds:

Smith Lever 3(b) & (c)

Scope of Impact:

State Specific

Goal 4

Key Theme:

Water Quality
Riparian Management

Activity:

Nothing is more essential to life on earth than water. Every living animal and plant requires an adequate supply of high quality water, and throughout human history there has been a clear, direct relationship between the abundance of clean water, population density, and quality of life. On the other hand, water can kill. Witness the devastation caused by Hurricane Katrina or the deaths recently caused by the consumption of spinach irrigated with water contaminated with E. coli bacteria. New Jersey has historically been blessed with adequate surface and groundwater supplies, and this water has facilitated industrial, agricultural, and residential development throughout the State, resulting in the highest average population density in the United States. However, this population density and concomitant development has resulted in the contamination of water supplies, depletion of groundwater aquifers, and disruption of normal hydrologic cycles leading to an increase in both drought and flooding events. While nationally approximately 11% of water bodies are listed as impaired or failing to meet designated uses, in New Jersey over 40% of assessed water bodies are impaired for various pollutants. As human-induced climate change results in an intensification of the hydrologic cycle and continued rise in sea level, these problems will worsen unless solutions are developed rapidly. These solutions must be based on sound science and policy, and these solutions must be implementable, sustainable, and affordable. Rutgers Cooperative Extension is in a unique position to integrate research, education and extension activities to lead this effort to address the water resources problems of the State.

"Research Watersheds" across the State where we have received State and/or Federal funding to complete a research project have been established. This synergistic effort of integrating research, education and extension projects within a watershed has the best potential for truly making a difference in the quality of life of the residents in that watershed.

The RCE Water Resources Program prepared a Regional Stormwater Management Plan for the Robinsons Branch Watershed, a tributary to the Rahway River. This research project has a strong extension component that involves working with nine municipalities, two counties, and non-governmental organizations to develop a Regional Stormwater Management Plan. An Extension program entitled "Stormwater Management in Your Backyard" was launched. As part of this effort, 30 Master Gardeners were trained on how to build rain gardens, and five demonstration rain gardens were constructed. Today these rain gardens are being used as educational tools by Rutgers Cooperative Extension of Union County.

To complement this research and extension effort, two undergraduate student projects were developed in the watershed. The first was an independent study to analyze water reuse possibilities at the many golf courses in this watershed. The second was a

bioresource engineering senior design project to develop a stream restoration plan for Pumpkin Patch Brook, a tributary to the Robinson's Branch.

Impact:

Regional Stormwater Management Plans are being developed in the three watersheds identified above. These plans contain specific measures to reduce flooding, decrease nonpoint source pollution and promote groundwater recharge. These plans will serve as blue prints for restoration efforts in each of these watersheds. Additionally, once completed, these plans will become conduits for additional funding from the NJDEP 319(h) program to implement the recommended controls. These plans address flooding problems and water quality problems in over 20 municipalities in four counties covering over 50 square miles of watersheds in New Jersey. Each plan identifies educational components to be implemented within the watersheds. Many of the programs are implemented under the leadership of Rutgers Cooperative Extension. This will allow Rutgers to continue its effort in these watersheds to help the stakeholders move forward in implementing the plans and improving water quality.

Impacts that are expected when the recommendations are implemented for the Troy Brook include a 700 pound reduction in annual phosphorus load, a 7,000 pound reduction in annual nitrogen load, and over a 50,000 pound reduction in annual total suspended solids load. These stormwater management practices also will recharge an additional 485 million of gallons of stormwater on an annual basis in the Troy Brook Watershed, which will virtually eliminate flooding in the Troy Brook during the two year storm event (i.e., 3.5 inches of rain over 24 hours).

The Stormwater Management in Your Backyard has been replicated throughout New Jersey with demonstration rain gardens being built in public and elementary schools with the following results

In Union County, four public demonstration gardens treat and recharge water run-off from 17,000 square feet of impervious surface. Approximately 840,000 gallons of water have been treated.

Evaluations for the elementary school student program included a pre-test in which the students brainstormed ways to protect groundwater at the beginning of the program. The exercise was repeated at the end of the program as a post-test. At the end of the program, students could list 50% more ways to protect groundwater then they could at the beginning of the program. Responses at the end of the program included: using correct amounts of fertilizers, cleaning up after pets, maintaining cars, fixing discharge pipes, and planting rain gardens.

Fifty-six students completed a program evaluation. On a scale of 1 to 3, 3 indicating that they "learned a lot", students rated their learning about protecting water as 2.71 and rain gardens as 2.63. 68% of the students will tell someone what they learned about rain gardens and 96% would like to learn more about protecting groundwater.

In Gloucester County, the Program Evaluation Survey resulted in 21 of the 21 participants indicating they had a better understanding of rain gardens and a better

understanding of how to construct a rain garden. Eighteen of the 21 participants indicated they would install a rain garden at their school with the other three were undecided. All twenty-one indicated they would include the lessons presented into their existing curriculum and would recommend them to other teachers.

The long term outcome will be to improve water quality in the watershed. The immediate outcome will be the installation of at least 10 rain gardens throughout Gloucester County, and the participation in the rain garden educational sessions.

Source of Federal Funds:

Smith Lever 3(b) & (c)

Scope of Impact:

State Specific

Goal 4

Key Theme:

Forest Crops
Urban Forestry

Activity:

New Jersey, the most densely populated and urban state in the nation, with almost eighty-nine thousand landowners who own approximately 1.3 million acres of forestland, 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.

Additionally, trees make shade to protect against skin cancer, to help asthma as they filter particulate matter out of the air, and add beauty to communities and public grounds.

An RCE Extension Specialist has delivered short courses, field days and talks for woodland management, forest stewardship, riparian issues, invasive plants, deer management and alternative income strategies.

A County 4-H Agent developed the 4-H Master Tree Program. 4-H trains volunteer adults in tree biology and care. Once trained, the volunteers use a specially designed curriculum to teach grade school aged children about trees. In 2006 over 2,000 children in approximately 80 Union County schools participated in the program.

The Improving the Environment of School Grounds program trained 90 students from 70 different schools on how to plant and care for trees. These 90 students then proceeded to plant $2,000 worth of shade trees on their school property. In the process of planting and caring for the trees, they involved an additional 1,000 students.

Impact:

Land owners who attended Extension forest management programs are more likely to adopt and apply best management practices. With the average size of forestland ownership in New Jersey of 15 to 20 acres, some 2,250 to 3,400 acres have benefited from more knowledgeable landowners, subsequent better management, and a higher likelihood of remaining forested. If improved management activities increased timber values by ten dollars, per acre, the resulting economic benefit ranges from $22,500 to $34,000.

A sampling of 226 students who participated in the 4-H Master Tree Program revealed that:

- 71% were less likely to damage a tree
- 90% were more likely to take better care of trees around their house
- 86% were more likely to take better care of the trees that are around their schools
- 70% will observe trees more closely
- 69% are more likely to plant a tree
- 84% were more likely to stop others from damaging trees

- 78% want to learn more about tree care and planting

Source of Federal Funds:
Smith Lever 3(b) & (c)

Scope of Impact:
State Specific

Goal 4

Key Theme:

Integrated Pest Management
Pesticide Application
Natural Resources Management

Activity:

New Jersey tree fruit production is located in both southern and northern counties. Statewide in 2006, tree fruit was valued at $14 million for apples and $35.7 million for peaches. The industry in southern counties is heavily oriented towards wholesale markets and peach production, while the industry in northern counties is heavily dependent on direct markets and apple production. Fruit production in northern counties is valued at approx. $8-10 million, with the balance produced in southern counties.

New Jersey fruit growers produce commodities that are susceptible to more than two dozen arthropod and disease pests. Management of this pest complex can cost producers up to $500 or more per acre. Some large NJ growers may spend up to $350,000 for pesticides alone. Fertilizers also represent a major cost impact. Growers can experience depressed prices from foreign and west coast competition, often leading to deficits in the farming operation. Production costs are high due to labor, fertilizer and energy costs, and pesticide costs. Pest management costs have increased due to label restrictions on old products and the introduction of newer more expensive pesticides. The Food Quality Protection Act has led to restrictions and changes in the types of pesticides that may be used to produce many fruits. Many of the new pesticides are narrow spectrum, that control only one or a few pests and must be used with degree day phenology models and other integrated pest management (IPM) practices.

While customers continue to demand high quality clean fruit, they are also aware of pesticide use, and want an assurance of safe food with little to no pesticide residues. An IPM delivery program has been delivered to commercial growers, statewide.

Program objectives are to:

- Maintain or increase crop quality and yield, and marketing ability through modern integrated pest management practices.
- Develop new and novel techniques for pest management and pest detection, and employ new methods for tree fruit IPM delivery.
- Provide IPM information to tree fruit growers primarily in Gloucester, Salem, Cumberland, Camden, Atlantic, Hunterdon, Warren, Morris, Bergen, Sussex, Mercer, and Middlesex Counties. Program information also available statewide to all growers through meetings, demonstration trials, newsletters, and other training methods.
- Reduce the use of OP, carbamate and other toxic pesticides in favor or reduced risk technologies and alternate management strategies.
- Minimize non-point source pollution through the reduction of fertilizer and pesticide sources, and enhance water quality through similar means.
- Reduce farm worker exposure to pesticides.
- Reduce or minimize production costs.

An integrated crop management (ICM) program was delivered to commercial fruit growers who produced apples, peaches, and nectarines. The program reached both primary and secondary participants. Secondary participants attend extension update meetings, and receive other IPM/ICM information through personal visits, fax broadcasts, articles, newsletters and the Internet. Primary participants are those growers who access all the above information and participate in a field scouting program. While some primary participants do self-scouting, the majority contribute funding through acreage participation fees which fund seasonal field scouts, travel, supplies, and laboratory costs. Field scouting forms the program core and data source for newsletter articles, and from which pest management recommendations are made. While field scouting concentrates on insect and diseases, nutrition and nematode management is also included. Seasonal field scouts, growers and industry personnel are trained throughout the season and at several annual winter meetings. Primary participants included 22 growers in northern counties and 18 growers in southern counties. A broadcast fax service was used in Hunterdon and Gloucester Counties to advise of timely pest events and supplement the Plant and Pest Advisory Fruit Edition Newsletter. Grower meetings reached a total of 268 farmers. 22 weekly articles were written in a statewide newsletter, with a total circulation of 227 subscribers in NJ and 9 other states. Acreage impacted by primary participants totaled 70% of all state tree fruit acreage.

Impact:

The program demonstrated reduced risk methods that included the use of mating disruption and ground cover management as tools to replace insecticide use for Oriental fruit moth, tarnished plant bug and stink bugs and two species of peach tree borers. Degree-day pest phenology models were updated, and proper use was advised to growers. An IPM database was updated to record pests and pesticide use data. Pesticide use records were collected at the end of the season to measure the program impact on pesticide use. A demonstration research trial was conducted at the Rutgers Snyder Research and Extension Farm to demonstrate the effectiveness of mating disruption for oriental fruit moth (OFM) on both apples and peaches, and the same program was used on 9 commercial farms. The practice resulted in the control of OFM while eliminating 5-7 insecticide sprays after first cover on both apple and peach, with no loss to fruit quality. This is equal to an average savings of 12lb/acre of formulated insecticide, or $90/acre in pesticide costs, although offset by mating disruption costs.

On average, program participants reduced pesticide use by 26-80% compared to standard spray schedules, depending on the practices used. The program demonstrated reduced risk methods that included the use of mating disruption and ground cover management as tools to replace insecticide use for oriental fruit moth, tarnished plant bug and stink bugs and two species of peach tree borers. Grower use of degree day based pest models reduced insecticide use by 40% compared to standard calendar spray methods. Weekly pest management recommendations to growers led to pest free fruit valued at $50 million throughout the state.

Laboratory tests where completed in 2006 as part of the fertility component. Over 75% of areas sampled were shown have sufficient to excessive phosphorous levels, which led to decreased phosphorous use on those sites.

Source of Federal Funds:
Smith Lever 3(b) & (c), Hatch

Scope of Impact:
State Specific

Goal 4

Key Theme:

Natural Resource Management

Activity:

The turfgrass service industry contributed $400 million in payroll and benefits to the NJ economy in 2001, and generated $727 million dollars in revenues. (Rutgers Center for Turfgrass Science, 2006). Findings of a 2005 survey of the industry conducted by 2 agricultural agents showed that environmental and pesticide regulations were the major issues facing the industry. To address these critical issues, Extension County Agricultural and Resource Management Agents planned the North Jersey Ornamental Horticulture Conference's Turf Day program to keep professionals informed of environmentally sound turf management practices and regulations that affect their business.

The objectives of the program were to:

- Promote the practice of integrated pest management on landscape turf.
- Provide professionals with research-based information best management practices for turf management.
- Demonstrate safety practices, such as respirator use, when applying pesticides.
- Update professionals on regulations, such as pesticides, that affect their businesses.
- Provide pesticide re-certification credits so that applicators can maintain their licenses.

The North Jersey Ornamental Horticulture Conference has been offered to landscape professionals for 46 years. The three-day conference includes a turf, tree and landscape program. The target audience for Turf Day is private turf management companies, golf courses, and municipal and county employees responsible for turf on public property. Turf Day is attended by an average of 250 professionals. The program incorporates the expertise of Extension Specialists in turf management, pathology, entomology and weed science; industry representatives and speakers from state agencies.

Impact:

Results of program evaluation completed by 186 of the turf day participants found that 96% learned something that they will apply to their turf management practices. Specific examples of practices that over 100 of the respondents will apply to their practices were: proper use of respirators, pesticide equipment calibration, weed control on athletic fields, and turf disease management. Ninety percent of the respondents indicated that they will make more informed pest management decisions.

The conference had been attended by 122 professionals in the past, 83 of whom reported changing their pest management practices as a result of the program. Examples of changes were: making more field observations, pesticide application timing and safety, regulation adherence, and practicing IPM.

Eighty-two of the respondents who had attended the program in the past reported that they use fewer pesticides as a result of the Turf Day training. A decrease of up to 20% pesticide use was attributed to the program by 53 professionals.

The professionals who attended the program in previous years, when asked how the program affects their business or career, reported the following:

- 88% have been able to maintain their NJ DEP Pesticide Applicator License.
- 25% indicated their attendance helped them get a promotion.
- 42% experienced an increase in sales.
- 66% use the information to train employees.
- 67% see improved communication with their customers.
- 80% practice IPM.

Source of Federal Funds:

Smith Lever 3(b) & (c)

Scope of Impact:

State Specific

Goal 4

Key Theme:

Integrated Pest Management
Pesticide Application
Natural Resources Management

Activity:

Blueberries are a unique agricultural commodity, since they are one of only several native foods in commercial production in the US. In New Jersey most blueberries are grown in the ecologically sensitive 'New Jersey Pinelands', which is characterized by porous soils with high water tables, which are subject to vertical movement of a number of agricultural chemicals. This area is a source for much of the surface and shallow ground water found in the southern and central part of the State, and encompasses the Cape May, Rancocas, Great Egg Harbor, Mullica, and the Barnegat Bay watersheds, home to over 2.6 million people. The pest complex on blueberries is extensive, with pests attacking virtually all parts of the plant (e.g., fruit, buds, leaves, roots, stems, flowers) and pest management requiring up to 12 pesticide sprays per year. The vast majority of these sprays are high risk organophosphate and carbamate materials, which are likely to adversely affect the myriad number of farm workers present during harvest. At present the blueberry industry is seeing a per capita increase in consumption of fruit, often by children, which may in part be from the many health benefits derived from the antioxidants contained in the berries. Blueberries have developed into an international sensation, with many countries starting or increasing production. These facts mandate the implementation of pest management strategies that deliver high quality fruit with minimal insecticide residues.

Organophosphates and carbamates have been the cornerstone of insect pest management programs in blueberries for the past 40 years. Insecticide-use data collected by University IPM programs in NJ, MI, and ME indicated that ca. 90% of insecticide applications in these states are with broad-spectrum organophosphate and carbamate insecticides. In 2003, blueberry growers used 3.62 lb a.i. per acre of various insecticide products. With 7,500 acres of blueberries in NJ, this translates to about 27,150 lb a.i. statewide. Most of the a.i. was from organophosphates and carbamates (98.3% or 26,688 lb), with only 1.7% of all insecticide materials classified as reduced-risk.

Over 40 different insect and disease pests can attack highbush blueberries. Pest management costs continue to increase. The Food Quality Protection Act has led to restrictions and changes in the types of pesticides that may be used to produce blueberries. Many of the new pesticides are narrow spectrum, that control only one or a few pests and must be used with degree day phenology models and other integrated pest management (IPM) practices. As labels for older products are restricted, and newer more expensive products come on the market, production costs have increased. Some blueberry growers can spend up to $250,000 per year in pesticide materials.

Objectives of the program:

- Maintain or increase crop quality and yield, and marketing ability through modern integrated pest management practices.

- Develop new and novel techniques for pest management and pest detection, and employ new methods for blueberry IPM delivery.
- Provide IPM information to blueberry growers primarily in Atlantic and Burlington counties, but also statewide through demonstration trials, scouting, meetings and other training methods.
- Reduce the use of OP, carbamate and other toxic pesticides in favor or reduced risk technologies and alternate management strategies.
- Minimize non-point source pollution through the reduction of fertilizer and pesticides sources, and enhance water quality through similar means.
- Reduce farm worker exposure to pesticides.
- Reduce or minimize production costs.

An integrated pest management (IPM) program was delivered to commercial blueberry growers. The program employed seasonal field scouts who collected weekly pest management data. The program reached all blueberry growers in New Jersey, but collected farm specific data on those farms participating in the scouting program. Results of scouting data were summarized in 2 statewide newsletters (The Blueberry Bulletin and The Plant & Pest Advisory-Fruit Edition). Results were also transferred to growers with farm visits, seasonal update meetings, and a broadcast fax system. The program collected data on insect and disease pests as well as fertility levels through soil and plant tissue sampling. Based on the scouting results, pesticide recommendations were made to all growers, within the objectives listed above.

A research/demonstration component demonstrated and refined the use of alternative pest management practices such as the use of trapping methods for determining treatment timings for blueberry maggot, and mating disruption for Oriental beetle. A GIS based management program was started that demonstrated the effectiveness of farmwide spatial management for blueberry maggot.

Impact:

- Growers participated in an IPM program, and maintained high fruit quality while minimizing pesticide use. In 2006, this included 37 growers who grew 4375 acres of blueberries or about 60% of the state acreage, and about 65 to70% of the state production.
  Growers cooperated with the program in the use of new detection, monitoring and sampling methods that reliably predict pest levels.
- Growers were educated about novel management methods for a variety of pests in blueberries.
- Through demonstrations, articles, county reports and other outreach, public awareness on IPM was improved. Articles appeared in 2 newsletters with 42 editions and 369 subscribers. Newsletters were also Web –Based and recorded over 40,000 hits.
- New pest management programs were utilized using new reduced risk materials and practices. Growers managed pests with the use of intensive monitoring, GIS based data collection and pesticide use record keeping, and trapping methods for key pests like blueberry maggot. Growers managing blueberry maggot under IPM methods reduced insecticide use on average from 6 applications to 1-2 applications, or over 66%.
- Pesticide use for OP and carbamate pesticides was reduced. Overall pesticide use was minimized. After 4 years of working with reduced risk alternatives in a USDA RAMP

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

- Growers minimized on farm pest management costs. Some growers spent as much as $235/A for pesticides while the average IPM participant spent $132/A. The average grower using IPM practices saved about $100/A.
- New pest management practices such as mating disruption and whole farm GIS based monitoring were used. Small plot research/demonstration trials for Oriental beetle mating disruption showed that Oriental beetle could be managed with mating disruption in place of soil applied insecticide. Farmwide GIS based blueberry maggot management demonstrated that growers could use 25-33% the amount of insecticide used in standard practices.
- IPM training of students and farm employees created new IPM interns, professionals and researchers. The program trained 6 students and season workers, and 2 farm employees as IPM scouts, enabling the 60% of NJ blueberry acreage to be under IPM practices, and 16% of NJ acreage to be self scouted.
- Fertility monitoring leads to recommendations of lower fertilizer use. During 2006, 149 leaf tissue and 160 soil samples were taken to monitor fertility levels and manage fertilizer inputs. Soil and plant fertility tests demonstrated that about 75% of fields sampled had sufficient to high levels of soil phosphorous, thereby not needing phosphorous treatments.

Source of Federal Funds:

Smith Lever 3(b) & (c), Hatch

Scope of Impact:

State Specific

Goal 4

Key Theme:

Integrated Pest Management
Pesticide Application
Natural Resources Management

Activity:

New Jersey greenhouse growers produce millions of dollars of plants annually. The industry is growing and is among the largest agricultural sectors in the state. In 2006, a 15-acre greenhouse opened in Winslow Township, Camden County increasing demand for local Rutgers Cooperative Extension assistance. Crop health, including pest management, continues as one of the most important issues for producers and fits well with resources available from Rutgers and our Regional partner Cornell Cooperative Extension. Managing pests in the greenhouse, before plants are shipped, is critical. The greenhouse ICM program promotes the adoption of improved pest and crop management practices by growers to improve crop quality and profitability and minimize the spread of plant problems to NJ landscapes where they present greater environmental and health risks to unskilled pesticide applicators. Additionally the program is vital in detecting exotic pests whose risk of introduction has increased due to worldwide production and shipping of propagation stock.

Objectives of the program:

1. Improve recognition and management of new pest problems.
2. Improve grower awareness of real-time crop health and pest populations.
3. Improve selection and timeliness of pest management inputs.
4. Limit crop losses due to pests.
5. Reduce unnecessary application of pesticides.

Two Annual Grower Meetings were conducted in South and North Jersey. Nine issues of Greenhouse IPM Notes were published and mailed to 100 growers in NJ and NY and were also posted on RCE website: http://www.rcre.rutgers.edu/pubs/fipmnotes/. Greenhouse Crop Monitoring was accomplished through 5 newly trained Master Gardener volunteers to scout spring and fall crops. 20 acres of spring garden crops, 2 acres of Easter Lilies and 10 acres of fall poinsettias were enrolled in pest monitoring program. And the New Jersey Pest Management Recommendations were published for grower use.

Impact:

As a result of the Integrated Greenhouse Crop Management Program, the following was documented:

Spring program (20 acres): Grower evaluations indicate that pest detection and recommendations improved pest management, crop quality and prevented potential losses of 1.1 million dollars of spring garden crops. Also, Excel-based pest mapping improved grower awareness of pest locations, population levels and reduced pesticide use by 50%.

Fall poinsettias (10 acres): Grower evaluations indicated that pest detection and recommendations improved pest management, crop quality and reduced pesticide application costs by $5,000 on 5 acres.

Source of Federal Funds:
Smith Lever 3(b) & (c)

Scope of Impact:
State, Multi State, NY

Goal 5

Overview:

As noted previously, New Jersey has a culturally and economically diverse population. Demographic and socioeconomic factors such as poverty, indebtedness, changing employment conditions, and family structure create uncertain futures for individuals, families, communities, agricultural and food producers, and small business owners. Human and community development issues are the focus of many of our family and community health sciences and youth development programs which address problems associated with urbanization and economic development. To improve the quality of life and enhance economic opportunity educational programs have been planned and implemented resulting in the development of leadership skills, and workforce preparation.

New Jersey has nurtured its most valuable resource through the 4-H Youth Development Program. Providing youth with opportunities to develop knowledge, attitudes and skills which are needed to become competent, caring and contributing members of society. Volunteers who are the backbone of this program have contributed an investment in time and efforts which translate to over $11 million dollars in return.

Family Resource Management classes reach thousands who have taken positive steps to manage money matters and take control of their finances and long term needs for retirement and health care costs and needs.

4-H teens explore career opportunities and develop leadership skills through participation in 4-H Ambassador program and County Government Days.

Goal 5

Allocated Resources:

Research

Hatch Funds:	$124K
All Funds:	$2714K
SY's:	5

Extension

Smith-Lever Funds:	$270K
All Funds:	$1670K
FTE's:	26

Goal 5

Key Theme:

Youth Development / 4-H

Activity:

The youth of New Jersey continue to be our most valued resource. They are challenged in today's environment with making choices of withstanding peer pressure to deviate from the mass. Our future depends on providing opportunities for youth to develop knowledge attitudes and skills which they need to become competent, caring and contributing members of society. Using the knowledge and resources of the land grant university system, along with the involvement of caring adults, the 4-H Youth Development Program uses experiential learning methods to engage youth grades K-13 in educational programs focused on science literacy and environmental stewardship, character development, community youth development and healthy lifestyles. 4-H educators and caring adult volunteers and teen volunteers share their skills to make a difference in the lives of 55,836 youth who participate in the program.

Impact:

New Jersey 4-H youth were engaged in positive youth development which enabled them to acquire life skills necessary to meet the challenges of adolescence and adulthood in the following ways:

- 14,453 youth were members of 1020 organized 4-H clubs
- 21,109 youth were members of 1,177 4-H special interest/short-term programs
- 1,937 youth participated in 34 camping programs
- 28,8692 youth were involved in 1,931 4-H school enrichment programs
- 3 youth participated in 4-H individual study programs
- 987 youth participated in 53 SACC education programs

Volunteers are essential to the successful delivery of 4-H programs to youth. During FY 2006, 2,342 adult volunteers donated, on average, 220 hours per year preparing for club meetings and teaching youth. According to the Independent Sector, the value of volunteer time in New Jersey is $22.35/hour. This equates to more than $11 million in time being donated to New Jersey 4-H. There were also 176 4-H youth volunteers, teens who shared their skills with younger 4-H members and with other youth in their communities.

Source of Federal Funds:

Smith Lever 3(b) & (c)

Scope of Impact:

State Specific

Goal 5

Key Theme:

Family Resource Management
Retirement Planning

Activity:

High household debt, the high rate of bankruptcy, the lowest savings rate in history by Americans and the number of people who feel "clueless" about money matters are evidences of the need for financial educational programs provided by Rutgers Cooperative Extension. Educational programs included single session classes, multi-session courses, public forums, mass media outlets via newspaper, magazine, TV, radio and electronic communications were utilized to reach New Jersey residents. Programs covered a breadth of financial resource management topics such as Paying for College, Retirement Planning, Impact of Rising Health Care Costs, Debt Reduction, and Financial Planning for Young Adults and Women.

Impact:

Evaluations of participants in public forums in 2006 indicated that 88% planned meaningful behavior changes such as reducing consumer debt by 50%; boosting 401(K) savings by 1% a year; contributing to a Roth IRA; investigating Health Savings Accounts (HSAs); making a will and comparing long-term care policies.

More than 58% of the program participants indicated that they would alter or adopt at least one financial behavior that would improve their financial situations. Examples include:

- 54% completed a retirement spending plan
- 58% began or added to a tax deferred retirement account
- 46% compared long-term care policies
- 55% invested in mutual funds for the first time
- 35% drew up or revised a Will
- 40% drew up a Living Will and Health Care Proxy
- 66% reviewed their beneficiary forms on IRAs and other investment accounts
- 82% planned to continue their financial education

Participants in the Women's series reported positive behavior changes that influence how they manage their personal finances as a result of the course. In 2006:

- 95% of those returning evaluations completed at least 5 of the financial worksheets in their notebooks
- 83% completed more
- More than half of the participants continue to attend other financial education classes
- 93% started a financial notebook
- 88% established financial goals
- 75% developed or updated a net worth statement
- 74% identified leaks in their spending
- 71% sent for their credit reports and FICO scores
- 48% filed important financial records
- 60% started an investment program

- 77% participated in their employer's retirement plan
- 85% said they felt more secure about managing their money after taking the course.

Source of Federal Funds:

Smith Lever 3(b) & (c)

Scope of Impact:

State Specific

Goal 5

Key Theme:

Character/Ethics Education
Leadership Training and Development

Activity:

4-H Youth Development leadership opportunities for teens provide a venue for growth and development. 4-H Ambassador programs provide youth with the opportunity to participate in a special communication program developed to enhance communication skills that are necessary in directing public events. Ambassadors also serve in an advisory capacity where they help to identify and develop 4-H programs. A major focus is to promote adult/youth partnerships by fostering continual involvement between 4-H Ambassadors and staff, volunteer leaders and fair committee members.

4-H Youth also participate in County Government Days where they develop leadership skills, are provided with the opportunity to learn how to be a leader in their community and explore career options.

Impact:

The 4-H Ambassadors that completed a survey reported that they were actively involved in organizing, judging and emceeing county events. When asked what they liked about the 4-H Ambassador program, 100% of the Ambassadors responded that they liked being in charge, 83% reported that they liked serving as a role model for other 4-H members, 50% stated that they liked being involved in and representing the 4-H program and the county fair at a "higher" level, 30% reported that they liked the opportunity that being an Ambassador provided to promote the fair and 4-H by participating in radio programs.

When asked how serving as an Ambassador affected their feelings about the 4-H program, 100% stated that it increased their feeling of responsibility to promote the 4-H program in a positive manner, 83% stated that they felt it was a strong honor and an accomplishment to serve as an Ambassador, and 67% stated that it provided them with an increased level of respect for the club leaders.

When asked if serving as an Ambassador provided them with more confidence when speaking to a large group, 100% stated that the experience greatly enhanced their speaking skills, 100% stated that they were more confident in speaking to a large crowd. In addition, 83% stated that they felt more comfortable speaking to many types of audiences, 67% said that they learned to be more "entertaining" in their presentations and less "scripted", 50% said that they learned to prepare and present as a group and 20% said that they learned how to get over their fear of microphones.

78 % of youth who participated in County Government Days reported on an end of the program evaluation that they explored a possible career interest. 91% indicated that they plan to use or share what they learned. One student stated "I loved this trip!! It will have a big impact on my career choice." Three students indicated that the most important thing they learned during the program was that "everyone can be a leader". A county department head indicated on the end-of-program evaluation that they "found the

program beneficial in the aspect that it formed a bond between county offices and the community by inviting students to see how we operate and why we operate". Another county employee said that "young people need to be made aware of what county government does and how it works. This program provided that need".

Source of Federal Funds:

Smith Lever 3(b) & (c)

Scope of Impact:

State Specific

B. Stakeholder Input Process

As reported in previous years, Cook College and the New Jersey Agricultural Experiment Station (NJAES) engaged stakeholders in a strategic planning process. As we moved forward with the implementation of the strategic plan, stakeholders continued to be actively engaged. The Cook College/NJAES leadership team engaged stakeholders in sessions throughout the state sharing the vision for the future.

Annual county budget sessions were conducted in conjunction with stakeholder input meetings in countries throughout the state engaging a diverse cross section of residents, organizations, and collaborative partners encouraging their input into the budget, program planning, and development process for Rutgers Cooperative Extension. In addition, Rutgers Cooperative Extension actively engages stakeholders throughout the year through service on Extension advisory boards. Extension faculty and staff also work collaboratively with community leaders and agency and organization representatives to ensure that the diverse needs of county residents are addressed through appropriate Extension educational programs.

The state mandated NJAES Board of Managers is an advisory group appointed by the Rutgers University Board of Governors based on nomination by each county Board of Agriculture as well as representatives from six other major constituencies related to the Cook/NJAES mission: environment, biotechnology, marine science, food science, community resources and public policy. The Board of Managers has research, Extension and teaching committees that provide valuable input directly to respective deans, faculty and staff relative to defining initiatives, identifying resources, establishing linkages and proactively addressing critical issues essential to the successful development of NJAES/Cook College programs.

Faculty members at Cook College and the NJAES are eligible to apply for competitive funding for the McIntire-Stennis program., It is expected that these proposals will meet the goals of the McIntire-Stennis Cooperative Research Act of 1962, as well as abide by the mission of the NJAES. Proposals for McIntire-Stennis funding are evaluated by two separate reviewer groups to ensure selection of only those proposals which will provide the most impact to the field of forestry and that will result in the most benefit to the relevant stakeholder groups. These two groups are the Environmental and Natural Resources Council and the Forestry Advisory Council. To this end, proposals are evaluated by the Forestry Advisory Council, whose members consist of industry, government and faculty leaders in forestry. Also, they are reviewed by the Environmental and Natural Resources council, a group of faculty and staff dedicated to identifying and promoting the best scientific and outreach programs in the New Jersey Agricultural Experiment Station and Cook College.

NJAES/Cook College has various constituents and industry advisory boards to academic departments and centers. These advisory groups meet between one and four times a year, depending on the department or center. They provide valuable technical input and links with constituents.

C. Program Review Process

There have been no significant changes in the merit review or scientific peer review processes since the inception of the Plan of Work. Plans are underway to more actively engage the Research Committee of the New Jersey Agricultural Experiment Station Board of Managers in the merit review process.

D. Evaluation of the Success of Multi and Joint Activities

At Rutgers our process for the generation and transfer of knowledge and technologies is best viewed as a continuum in an integrated system. This dynamic research, education and outreach system anticipates and responds to issues and challenges in agriculture, food systems, environment and natural resources, and human community health and development in order to empower people to improve their lives, the lives of others and the environment on which they depend. Needs assessments occur at the grassroots level, through industry organizations, advisory boards, professional associations and the student body to identify critical issues of strategic importance. Multi-state, multi-institutional, and multi-disciplinary activities and joint research and extension activities have been implemented to address these identified issues that are representative of the concerns of the diverse population of our state including agricultural, environmental, industry, youth underserved, underrepresented, at-risk, urban and geographically isolated regions. Planned programs also address identified critical issues within the region where formal memoranda of understanding and collaboration agreements have been developed between states. These agreements have resulted in both improved program effectiveness and efficiencies as documented in the reports of the Extension multistate and integrated research and extension activities, states involved in these joint efforts have benefited greatly from the shared faculty, researchers and Extension specialists who have addressed critical programmatic needs that expand beyond the state.

E. Multistate Extension Activities

Penn Jersey Livestock/Crops Program

Agents from Pennsylvania and New Jersey on the northern borders of the Delaware River planned and conducted the Northeast Regional Small Farm and Rural Living Expo and Trade Show. The expo was geared to small farm operations which provide a significant impact on the economics, aesthetics and rural character of communities in the Northeast. During this two day event, over eighty workshops and demonstrations were presented to assist new farmers, farm managers and rural residents to make strategic linkages with support agencies, supplies and sound research based information. This event provided participants the opportunity to develop skills to assist in the management and marketing of their agricultural endeavors. Over 2,600 participants attended the event from nine states.

The Penn Jersey Extension Partnership delivered for the third year a Regional Crop Master Program for area crop producers. The two day intensive training session featured “weed management” as a focus for over thirty producers. The series improved grower concepts for weed identification, treatment, and control using cultural and chemical practices. The three year “Crop Master” Series was recognized at the 2001 National Association of County Agricultural

Agents meeting as the award winning entry in the Search for Excellence in Crop Production. The entry won the Northeast division and then was one of four national finalists and was selected as the national winning entry.

Coinciding with the Crop Masters Series, the Penn Jersey Extension Partnership designed and developed a user friendly crop web page entitled www.cropmaster-icm.org. The website to date has had over 50,000 hits and has received wide acceptance from growers and other colleagues. Penn State University has linked the website for their forage informational website. Additionally, the fact sheets developed for the web page, were awarded the northeast team fact sheet award for the 2001 NACAA entries. Weekly Crop Alerts/Reports are also hosted on the web page and feature current topics and happenings as reported by agents, specialists, farmers, and crop agencies.

Due to staffing changes, the Penn Jersey Livestock/Crops Program was disbanded as an official Multistate Extension Activity during FY03.

In 2004, The Penn Jersey collaborative programming resumed with educational programs on equine forage needs and forage quality. A series of twenty-two educational programs were offered.

In 2005, a survey of 1200 horse owners documented hay buying practices and prices.

(Mary Jane will update this section)

Mid-Atlantic Consortium (MAC), Pathways to a Better Trained Workforce

This regional project in NJ, NY, MD and DE continues its focus on systemic change in the educational systems of the region building extensive public and private partnerships, documenting multiple pathways which enable youth to enter productive careers in the food industry. Two of the five demonstration programs were developed in Burlington County, NJ. These are the Supermarket Experience, which is a fifth grade curriculum delivered by Junior Achievement of South Jersey and the Factory Floor Classroom which is a course on food processing offered on site at Ocean Spray Incorporated.

MAC – Food Policy Institute

The Food Policy Institute (FPI) is a unique partnership created to focus on policy issues and challenges facing the food industry and food consumers in the mid-Atlantic region. The Institute's mission is to develop timely and relevant research programs that address pressing food policy issues and to engage in outreach and education to industry, consumers, and policy makers. The objective is to maximize the quality of decision-making for industry executives and government regarding food production, distribution, quality, consumption and the nutritional and health implications.

Higher education partners participating in this regional program include: Rutgers University, Cornell University, University of Delaware, Delaware State University, Sussex County College, Mercer County College, University of Maryland – College Park, and University of Maryland –

Eastern Shore. In addition, there are numerous industry and trade associations, government agencies, and other public entities participating in FPI.

The FPI's supports research and outreach projects relating to the following food policy issues: 1) Consumer perceptions of food biotechnology, 2) Usage of alternative food delivery systems, 3) Nutraceutical industry development, 4) Blueberry industry development, 5) Food waste diversion, 6) receiving numerous grants including a "Consumer Acceptance of Food Biotechnology in the US" funded by USDA's IFAFS program and 7) BSE consumer survey.

During FY 2006, the Food Policy Institute faculty and staff continued to research and explore critical issues affecting agricultural policy and the food system. A comprehensive evaluation of the Extension Disaster Education Network (EDEN) website was conducted and shared with EDEN leadership, an Avian Influenza (Bird Flu) fact sheet was developed and shared to assist with increased public understanding of the issue and its impact on U.S. food.

MAC – Food Systems Web

The Mid-Atlantic Food Systems Web Site Project launched its initial product in March 2001 as "agri-culturehealth.com". It is a comprehensive, interactive source providing information to farmers on how-to direct market product to consumers looking for nutrition information relating to the health benefits of local fresh produce, general information on food safety and the interaction of agriculture and the environment specifically in the area of watershed management. Consumers and farmers are aided in finding each other by a local produce directory system that allows farmers to list their farms and products, and consumers to search for farms by area and product.

Working in collaboration with the Food Policy Institute, the food systems website was enhanced and upgraded to promote farm visits in New Jersey. This website has proven to be an effective tool in linking the industry and consumers and improving overall marketing of agricultural products.

Mid-Atlantic Fruit, Vegetable, Crop Manuals and Conferences

In FY 2002 New Jersey Extension specialists and agents again worked with colleagues in one or more of the neighboring states (PA, DE, MD, WV, VA) to produce "Commercial Vegetable Production Recommendations for New Jersey", "Tree Fruit Production Guide for New Jersey" and "Pest Management Recommendations for Field Crops". These are the leading handbooks for commercial agricultural producers and even small part time farmers in these states. More than 3,500 copies are sold each year. Recommended practices address economics, environment (IPM) and practical tools for everyday agricultural activities. The use of the recommendations enables growers to maintain their competitive efficiency and helps them to minimize pesticide use and adhere to pesticide use regulations.

In FY 02 the 32nd Annual Mid-Atlantic Vegetable Workers Conference was held. At this conference results from numerous field experiments were presented to share performance of the latest pest control measures, varieties, cultural practices and marketing strategies. In FY 2002

the multistate team also gave leadership to the Mid-Atlantic Crop Management School and Mid-Atlantic Pumpkin School.

Research at Rutgers Agricultural Research and Extension Center conducted in vegetable weed control in the early 1990's resulted in the first reports of safety in cucurbit crops treated with halosulfuron. Continued work to date has contributed significantly to the labels obtained in 2001 and 2002. The control of these tough weeds, especially yellow nutsedge, is perhaps the most significant contribution to vegetable production in the past decade. Continued research is under way to extend the label to watermelons and between the rows of summer squash grown on plastic mulch.

During FY 2006 we continued to provide leadership to the production & distribution of the "Commercial Vegetable Production Recommendation for New Jersey "Tree Fruit Production Guide for New Jersey" and the "Pest Management Recommendation for Field Crops". These publications are valuable to growers in the Mid-Atlantic Region and have proven to be excellent resources.

NJAES Researchers and Extension specialists have presented the results of their work at several grower meetings and national conferences. The New Jersey, Michigan, Pennsylvania, and West Virginia peach crop, grown on 18,650 acres, was valued at $73,185,000 in 2006. Multistate research efforts have found alternatives to main OP insecticides, azinphosemethye and phosmet, used in peach IPM programs. Alternatives for OP insecticides, when implemented, would eliminate up to 280,000 lbs. of OP insecticides used on peaches in these four states as growers adopt new peach IPM programs. This reduces human (farm workers, consumers, infants and children) and ecological risks on a large scale. Because of extensive outreach, at least 350 growers in these target eastern USA peach-producing states (New Jersey, Michigan, Pennsylvania and West Virginia) now have tools and information necessary to grow peaches without using toxic pesticides.

NJ/Delaware Weed Science Cooperative Agreement

New Jersey and Delaware work collaboratively to share specialist expertise in weed control. Delaware provides field and forage crop weed management expertise and New Jersey nursery/turf expertise to Delaware. In FY 2001, soybean herbicide demonstration plots were established in NJ. The plots were used to educate over 60 growers at an Extension twilight meeting about newly developed herbicide resistant soybeans and weed control management strategies. Specialists continued to deliver a strong multistate outreach program to a diverse clientele in weed management in turfgrass and ornamentals. The information was also presented at field crop growers meeting. Presentations in the form of seminars and workshops to commercial and public clientele (landscape contractors, golf course superintendents, parks and recreation) on integrated weed management in turfgrass and ornamentals were conducted in Delaware. There is also year round interaction with the Delaware Cooperative Extension in the form of published fact sheets, email and phone calls.

The Cooperative agreement has proved beneficial to both New Jersey and Delaware in an era of shrinking resources. Specialists' expertise has proven most effective in addressing weed

management in nursery, fruit, vegetable and turfgrass resulting in higher crop yield improved quality and positive impact on the environment.

Northeast and Mid-Atlantic Direct Marketing

This collaborative effort with states throughout the region (NJ, NY, PA, MD, VA) and direct marketing organizations is co-coordinated by New Jersey. The major event is an annual conference in which educational programs and exhibits are a major component. The FY01 conference was held in Virginia. The 3 day conference attracted 325 attendees.

Farmer to consumer marketing continues to be a major issue in the region. Farmers are looking for state-of-the-art resources during a time of declining resources devoted to marketing. Agriculturehealth.org a web-based multi-institutional collaborative educational system interlinking direct marketing resources, food systems and health was launched. This tool links consumers looking for fresh local product to the farmers that produce them.

This year's Mid-Atlantic Farmer's Direct Marketing Conference & Trade Show attracted 350 farmers and direct marketers.

The 2006 Mid-Atlantic Direct Marketing Conference: Where the Consumer and the Farmer Meet was hosted by Pennsylvania. This year's conference provided networking opportunities and enhanced educational program to share the latest innovations and technologies available for agricultural enterprises. As in past years, participants from New Jersey, Pennsylvania, Maryland, Delaware and Virginia took full advantage of this opportunity to exchange information and experience so that the farm retail marketing industry as a whole will be more successful.

Mid-Atlantic Equine Pasture Initiative

Previously scheduled on-farm training sessions were conducted during FY 2006 on best management practices and manure management and optimal use of nutrients on the farm. A nutrient management computer program was developed for use by livestock producers in New Jersey.

A state of the art equine best management practices (BMP) showcase is being developed at the Equine Science Center (ESC) at Rutgers, NJAES. Manure storage structures and BMPs have been designed, the first of two stages has been constructed, and a composting facility meeting Natural Resource Conservation Service (NRCS) standards is being developed. One of the primary goals of this project is the demonstration of appropriate manure management practices. All New Jersey and beyond equine producers will benefit from the research and demonstration conducted at this showplace.

4-H Juried Curriculum and Related Educational Product Development

The National 4-H Experimental Learning Design Team oversees the efforts of the 4-H juried curriculum. The affiliate Extension Specialist in Educational Design serves on this national team

and provides guidance to youth curriculum for the state. Guidance is provided for the development of all youth curriculum to ensure that they conform to the 4-H experimental learning criteria and standards. Over 50% of the materials used to support the New Jersey 4-H Youth Development program are national juried pieces. In addition to serving on the jury the NJ specialist is a member of the Experimental Learning Design Team which coordinates experimental learning curriculum development and other supporting activities.

The Somerset County 4-H Agent serves the liaison to NASA Education and Public Outreach Forum. In this role she assisted in the development of national educational materials for youth.

Regional Research Projects

As a part of regional projects NE-183 and NC-140 a New Jersey County Ag Agent contributes to the demonstration and outreach of results from apple, semi-dwarf apple, apricot, sweet cherry, variety and rootstock trials. This is done through several field days to various clientele each year and via websites. This team continues to make significant progress in meeting the needs of apple growers.

Cumulative state and federal investment in NC-140 for the last 5 years was approximately $5 million. Cumulative, measurable benefits to the US temperate tree-fruit industries were more than $300 million. Less easily measured benefits, such as averted losses and enhanced environmental quality, certainly increase the financial value of NC-140 to well beyond $300 million in the last 5 years.

NC-140 output guided propagation of fruit trees in nurseries, allowing them to better tailor their output to grower demands and to avoid problematic rootstocks. As an example, a series of cherry rootstocks from Russia were gaining a great deal of interest, but NC-140 work found them to be hypersensitive to Prunus Necrotic Ringspot virus, reducing their suitability for U.S. production.

NC-140 continues to develop advanced experimental design approaches to reduce the costs of rootstock research.

F. Integrated Research and Extension Activities

Animal Production Efficiency

The New Jersey Agricultural Experiment Station reported on projects investigating strategies for detecting, maintaining and improving immune function in exercising aged horses, examining the effects of performance enhancing drugs on horses, preventing insulin/glucose-related metabolic diseases of younger horses. Ongoing research on antioxidant supplementation in horses provides information to trainer, owners and breeders of performance horses a better idea of the effect of type and levels of antioxidant supplementation needed to decrease this oxidative stress without over-supplementation. There are continued integrative studies on the reproductive efficiency of goats and sheep, and also the effect of exercise on immune health in horses. New research is being done on how goats and sheep respond to pain and stress, which will improve knowledge on how farm animals express and experience fear and pain which will improve animal welfare and enhance animal production.

Field and Forage Crops

Ongoing studies integrate cultural weed control techniques into orchard weed management programs to improve orchard weed control, reduce the need for herbicide inputs, improve tree growth and yield, reduce soil erosion, improve soil tilth, and provide rodent damage information. Recently, new research on how chlorine nutrition helps corn producers learn about how adequate chlorine supply can reduce incidence of stalk rot disease. New information about phosphorous tests help soil testing laboratories provide more accurate fertilizer recommendations. New, all-male asparagus hybrids that posess high resistance to major asparagus diseases and produce high yields will benefit growers and consumers, by reducing fungicides resulting in lowering production costs and reducing health risks. NJAES research helped determine that fungicide resistance was developing to a commonly used fungicide in cucurbit powdery mildew control in New Jersey, and that the use of certain fungicides should no longer be used, and new control recommendation guidelines and in reducing ineffective fungicide applications for powdery mildew control were developed. Also, new uses of traditional fruits, vegetables and herbs are being identified and developed as specialty crops for New Jersey's agriculture.

Turfgrass Breeding and Management

NJAES turfgrass researchers and specialists continue to focus on the issues of new methods for pest control, new disease-resistant cultivars, and to explore and communicate best management practices. Improved information on post-emergence herbicides demonstrate that the herbicide Velocity, applied during early summer in New Jersey effectively controls Poa annua. Field trials using entomopathogenic nematodes that high levels of annual bluegrass weevil control can be achieved with well-timed applications. New work on synthetic insecticides demonstrated the effectiveness of annual bluegrass weevil control by anthranilic diamide is comparable to the pyrethroid standard bifenthrin, around 93%. By using traditional and molecular breeding methods, recently developed several new creeping bentgrass cultivars with improved dollar spot resistance through conventional breeding are now commercially available. Over 80% of the best

performing cool-season lawn turf open-pollinated cultivars in the past 10 years of National Turfgrass Evaluation Program (NTEP) trials were from Rutgers University sources , and in 2006, an additional 50 were made available. These cultivars exhibited improved disease resistance and turf performance as published by NTEP (www.ntep.org). The use of entomopathonogenic nematodes for turf pests, such as white grubs, has proven useful for biological control of these pests. Due to its exceptionally high pathogenicity against a wide range of white grubs, the nematode S. scarabaei will allow the development of an effective and much needed biological control agent. S. scarabaei also has good potential for long term white grub management. To improve creeping bentgrass heat tolerance, recent research demonstrated that cytokinins can be used in delaying leaf senescence when plants are exposed to heat stress, and thus improve heat tolerance.

Plant Pest Management

Several projects have been focused on developing and testing integrated pest management for economically important plants, including vegetable crops and fruit trees. New new potato varieties with heat stress tolerance and disease resistance give chip growers an alternative to current varieties without the tolerance and disease resistance qualities. Increasing the number of varieties available for the direct marketers increases the volume and price of potatoes, and thus their profits. For carrot growers, seed treatments of fipronil are significantly more effective in controlling carrot weevil on carrots than other labeled insecticides. Growers using foliar sprays of labeled insecticides will obtain significantly greater control of carrot weevils in carrots, and subsequently significantly higher marketable yields in blueberries, reduced-risk insect management were tested. The use of baits in an attract and kill approach was tested against a calendar-based spray grower's standard protocol, with no differences. Oriental beetle mating disruption using pheromones was demonstrated in blueberries and cranberries. Similar results occurred in peach trees, where a peach tree borer mating disruption product performed as well as the growers standard hand-gun chlorpyrofos sprays.

The brown marmorated stink bug (BMS), is an exotic stink bug that is devastating U.S. crops. The NJAES has been able to track the spread of BMS and confirm the presence in several Mid-Atlantic states. The creation of a pheromone blacklight trap network demonstrated that higher trap catches were observed in pyramid traps, and a 25 mg/septum attractant loading rates. Although not present in New Jersey, monitoring efforts for Plum Pox Virus (PPV) continues, which leads to sustained grower awareness on the biology, detection, diagnostics, resistance, and methods to avoid or reduce the risk of importing PPV contaminated nursery stock into the state. Other work focuses on developing a better understanding of the use of flowering plants as a means to attract natural enemies of important landscape pests in order to reduce their impact. This information can be used to design landscape pest management programs that reduce reliance on pesticides and therefore reduce the potential for environmental contamination.

Plant Production Systems

Research and outreach efforts have been conducted in support of the New Jersey greenhouse industry, especially related to design, construction, and operation of controlled environment plant production facilities. The knowledge gained from designing and operating an entirely closed

plant production system, as needed for example for NASA's long duration manned space missions, can be directly applied to the commercial greenhouse industry. In addition, the finding that ADP-glucose pyrophosphorylase is the critical enzyme in starch synthesis, and that the amount of starch synthesized by the tomato during its early developmental determines the amount of reducing sugar present and harvest, is of interest to the greenhouse industry. Work using growth chamber trials demonstrate the impact of short-term temperature perturbations during flowering on harvestable fruit yield and quality of tomatoes. An energy audit checklist was developed for commercial greenhouse operations, and was distributed throughout the northeast and beyond. Growers who implemented the information resulting from the research and the various presentations and publications have been able to (conservatively) realize energy savings between 5 and 30%. By reducing labor intensive practices, researchers can help greenhouses achieve this goal. The use of fatty acid methyl esters to inhibit lateral shoot growths on tomato plants decreases the need to manually remove these fruit-limiting growths, and may actually increase the yield, as well as reduce susceptibility to disease as compared to manual removal. Another faculty member tested heating methods and reports that for ornamental plants, applying heat directly to the root zone saves 10-30% in fuel costs than heating the entire greenhouse volume. Other research used a simulation with hourly weather data set for a well insulated greenhouse, and indicated that by using a heat pump delivering only 10 percent of peak heat requirement can provide 38 percent of annual heat requirements when drawing heat from the greenhouse when it requires cooling and from a ground source at other times. A commercial greenhouse was constructed based on this design concept.

Food Safety

New Jersey Agricultural Experiment Station faculty remedied the problem that no user-friendly computer models were currently available to assist meat processors or retail operators in cooling foods properly to control risks from Clostridium perfringens and C. botulinum. By offering workshops, lectures, computer programs and educational websites, processors can now easily use a computer program that predicts the risk of foodborne illness during changing temperature conditions and this has been used in a variety of situations to assist food processors. The technical expertise developed as a result of this project has saved meat processors product recall costs in excess of $1,000,000. Recent information generated by researchers working with anthrax spores is being used by threat assessors to determine if current pasteurization practices are sufficient to neutralize this biothreat, and if not, to what degree they should be adjusted. The data also indicates that while Bacillus anthracis is not unusually heat resistant, not all Bacillus species can be used in threat assessments. Sprouted seeds can carry Salmonella and have been the source of many foodborne illness outbreaks. Work with alfalfa sprouts provides important information to control the organism and future outbreaks. Recently, researchers have shown that mature, 3-day old, sprouts that have become contaminated with Salmonella do not support significant growth of this pathogen, a number of physiological aspects of Salmonella that control its growth and the colonization of sprouts have been identified. Finding naturally occurring antimicrobials is the focus of a researcher using pleurocidin, found in fish. Results reveal that pleurocidin is not only effective against foodborne pathogens in broth culture, but also in actual food matrices and its use is not limited to seafood but extends to other types of foods/beverages, thus providing the food industry another tool to combat foodborne illness. Researchers regularly survey how many consumers respond to food safety issues such as avian flu, E. Coli and perceptions of argoterrorism are being used by state and federal agencies. Food handling is an important area of concern for researchers. An analysis of survey, observational, and audit data

identified the most common food handling errors made by young adults with education beyond high school. Focus groups with young adults yielded insight regarding how to reach this audience with food safety messages and develop new, more effective, audience specific food safety educational interventions that compel these consumers to adopt behaviors and attitudes that protect themselves and those for whom they serve as caregivers from foodborne disease.

Nutrient Management and Recycling

Research and extension teams are working on developing methods and management practices for economically and ecologically sound use of nutrients for agriculture. Projects include investigating the effect of land application of municipal collected shade tree leave on soil quality and crop production, and the environmental and economic impacts of nutrient management on dairy forage systems. As part of a multistate project, Extension agents are creating a nutrient management self-certification computer-program for livestock producers in New Jersey, to assist farmers in barnyard runoff and management, manure storage, manure spreading practices, manure disposal if off-farm, stream access and control, erosion control, and animal diet. Research in dairy farm management found that using recycled newspaper, based on bedding properties and cost was an excellent bedding source compared to straw. In addition, dairy farmers will benefit from the newly established nutrient profile data base for wet grains, and allows for diet formulations for meeting the protein requirements of lactating dairy cows and growing heifers. Recently, this program has resulted in the publishing of a handbook, numerous scientific and popular articles, national symposia, numerous invited presentations, and the creation of the Food Recovery and Recycling Association of North America. Partnerships between agents and specialists reported that for sewage biosolids, there are plant-available nutrients and organic matter useful in improving soil structure, recycling these materials through land application is increasingly being viewed as desirable. Best management practices for non-traditional organic wastes provide agricultural extension agents, the Natural Resources Conservation Service, and farmers with the information they need to effectively use non-traditional wastes without contributing to non-point source pollution. Nutrients found in water can potentially diminish water quality, so researchers and extension agents developed a water quality trading project for a river basin in the state. Approximately two million people live in the watershed, and the improved water quality that is created by the trading program will directly impact the drinking water supply of these people. Additionally, a biofiltration swale has been designed for treating runoff from pastures on a horse farm. For nursery farms, ongoing studies demonstrate the effectiveness of using alternative growing substrates in reducing nutrient runoff, as well as providing scientific support for the beneficial effect of natural riparian forests on nursery farms in dentrifying runoff water.

Agricultural Financial Management

The Greenhouse Cost Accounting software program allows greenhouse managers to allocate costs to specific crops. It enables users to easily make decisions about pricing, reducing unprofitable production, controlling costs, and increasing sales of profitable crops. While the industry on the whole is profitable, producers rarely know the profit margins of individual crops. Modifications to the cost accounting program allows clientele to monitor labor costs more closely, calculate break-even costs, use more cost categories, and calculate the costs of producing

plants outdoors. An Extension specialist created a national fact sheet upon request of the USDA Risk Management Agency to explain the risk management options to greenhouse nursery producers. Other new research focuses on the financial risk associated with pest damage, by identifying new ways growers can limit, and even eliminate, the remaining financial risk by transferring it to others through market traded instruments known as insect derivatives.

This is a multifaceted program with the New Jersey Farm Management Program as its centerpiece. The latter program funded through a multi-year grant from the New Jersey Department of Agriculture provided formal training to over 4,000 producers in the areas of management, marketing, finance and investment. Another component of this overall program is participation in the Northeast Farm Management Working Group focusing on risk management. As a part of a Northeast Sustainable Agriculture Research and Extension project, 80 budgets were developed for conventional, IPM and organic production systems, A series of budgets for conventional, UCM and organic production methods were available online for crop and livestock budgets in New Jersey. Related activities include participation in two additional multi-state research projects focusing on the marketing and production of (1) fruits and vegetables and (2) environmental plants. The Risk Management Education Grant funded two hands-on workshops targeted at greenhouse owners.

U.S. Department of Agriculture
Cooperative State Research, Education, and Extension Service
Supplement to the Annual Report of Accomplishments and Results
Actual Expenditures of Federal Funding for Multistate Extension and Integrated Activities
(Attach Brief Summaries)
Fiscal Year: 2006

Select One: ☐ **Interim** ☒ **Final**

Institution: New Jersey Agricultural Experiment Station/Rutgers Cooperative Extension

State: New Jersey

	Integrated Activities (Hatch)	%	Multistate Extension Activities (Smith-Lever)	%	Integrated Activities (Smith-Lever)	%
Established Target %	12	%		%		%
This FY Allocation (from 1088)	1,441,979					
This FY Target Amount						
Title of Planned Program Activity						
Animal Production Efficiency	36,154					
Field and Forage Crops	418					
Turfgrass Breeding and Management	83,451					
Plant Pest Management	54,135					
Plant Production Systems	101,499					
Food Safety	4,000					
Food Security	-					
Human Nutrition	10,544					
Nutrient Management/Recycling	21,718					
Agricultural Financial Management	35,853					
Total	$347,772					
Carryover						

Certification: I certify to the best of my knowledge and belief that this report is correct and complete and that all outlays represented here accurately reflect allowable expenditures of Federal funds only in satisfying AREERA requirements.

Karyn Malinowski	May 2007
Director	**Date**

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Select One: ☐ **Interim** ☒ **Final**

Institution: New Jersey Agricultural Experiment Station/Rutgers Cooperative Extension

D **State:** New Jersey

	Integrated Activities (Hatch)	%	Multistate Extension Activities (Smith-Lever)	%	Integrated Activities (Smith-Lever)	%
Established Target %		%	4	%		%
This FY Allocation (from 1088)			2,372,809			
This FY Target Amount						
Title of Planned Program Activity						
PENN-JERSEY Livestock/Crops			66,458			
MAC-PATHWAYS/Food Policy & Food Systems Web			35,000			
Mid-Atlantic Fruit, Veg., Crop Manuals/Conference			55,661			
Weed Science - NJ/Delaware			25,065			
Northeast Direct Marketing			3,500			
EPA-2/Cornell & Rutgers			-			
4-H Jury Curriculum & Related			22,088			
Regional Research Projects			-			
Other			-			
Total			$207,772			
Carryover						

Certification: I certify to the best of my knowledge and belief that this report is correct and complete and that all outlays represented here accurately reflect allowable expenditures of Federal funds only in satisfying AREERA requirements.

Karyn Malinowski	May 2007
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Institution: New Jersey Agricultural Experiment Station/Rutgers Cooperative Extension

State: New Jersey

	Integrated Activities (Hatch)		**Multistate Extension Activities (Smith-Lever)**		**Integrated Activities (Smith-Lever)**	
Established Target %		**%**		**%**	12	**%**
This FY Allocation (from 1088)					2,372,809	
This FY Target Amount						
Title of Planned Program Activity						
Field and Forage Crops Management					-	
Turfgrass Breeding and Management					113,855	
Plant Pest Management					-	
Plant Production Systems					122,546	
Food Safety					52,515	
Nutrient Management/Recycling					129,253	
Agricultural Financial Management					41,250	
Animal Production Efficiency					-	
Total					$459,419	
Carryover						

Certification: I certify to the best of my knowledge and belief that this report is correct and complete and that all outlays represented here accurately reflect allowable expenditures of Federal funds only in satisfying AREERA requirements.

Karyn Malinowski	May 2007
Director	**Date**