Certification
Of New Jersey Annual
Report of Accomplishments and
Results (FY 2003)

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New Jersey Annual Report of Accomplishments and Results (FY 2003)

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Introduction:

New Jersey has been actively involved in the implementation of the integrated research/extension 5-Year Plan of Work for fiscal years 2000-2004. The implementation of this plan has engaged New Jersey Agricultural Experiment Station researchers and Rutgers Cooperative Extension 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.

We have engaged the residents of the state in a Visioning and Planning process which has resulted in a strategic plan for Cook College and the New Jersey Agricultural Experiment Station which is providing 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 thriving agricultural, 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 proved beneficial to the state while at the same time achieving the goal of improved program efficiencies and effectiveness.

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 U. S. 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
- Developing new products and commercial opportunities
- Increasing production efficiency and reducing costs

New Jersey Agricultural Experiment Station (NJAES) created Food Industry Research and Extension (FIRE) to provide solutions to the challenge of remaining viable in the future. Through educational seminars and its Food Business Incubator, this center provides farmers with an opportunity to create new businesses based on value added agricultural products, developing new products and commercial opportunities. It is anticipated that well over 250 companies will benefit from this Center by its fifth year in operation, and over 1,000 new jobs will be created in the region by its eighth year of operation. Services offered by the Center are expected to translate into considerable economic development in the region. It is estimated that the return on public investment will be at least $5 for every $1 invested.

New Jersey has $3.2 billion horse-related industry. The Equine Science Center was created to serve as the docking station for equine research and provides educational and outreach services to the equine industry and horse owners. Researchers are working on the problem of early termination of pregnancy in mares and detection of illicit drug use in race horses.

The cost of doing farming in New Jersey is high, for many reasons. To stay viable, farmers in New Jersey need value-added products. The New Use Agriculture and Natural Products Program (NUAANP) and Phytomedics, Inc. endeavor to find new uses for plants or plant derived compounds that serve as value-added products. NUAANP was created to investigate and use organic compounds and products that have flavor, aroma, and medicinal activity. This program includes a substantial international collaboration. Phytomedics, Inc. researchers investigate methods and types of plants that can produce high value, plant-based pharmaceuticals.

Increasing production efficiency and reducing costs has long been the goal of Rutgers Research and Extension personnel. *The Garden State Agricultural Re-Engineering Initiative* provided farmers the opportunity to (1) conduct in-depth financial analysis of farm operations; (2) take a deliberate and knowledgeable approach to risk management; and (3) participate in regularly scheduled multidisciplinary team meetings. As a result participants have developed commodity budgets, balance sheets and flow plans.

Agricultural enterprises were maintained an able to generate combined cash flow $5.7 million in net farm income. Additionally the program was approved by USDA Farm Service Agency to meet new loan borrower requirements.

Goal 1

Allocated Resources:

Research

Hatch Funds: $1,403K
All Funds: $16,659K
SY's: 30

Extension

Smith-Lever Funds: $570K
All Funds: $5,950K
FTE's: 92

Goal 1

Key Themes: **Agricultural Competitiveness**
Agricultural Profitability

Activity: Farmers' markets play a vital role in supporting the agriculture in New Jersey and other northeastern states. These markets provide an excellent marketing channel for small producers to sell directly to consumers and realize more favorable prices for their products compared to traditional wholesale market. Further, these markets allow small volume producers to directly serve specialized and niche market segments (e.g., customers for organic products) for which the volume is not large enough to support a wholesale market. Consumers also find these markets as convenient places to purchase produce fresh from the growers.

Researchers identified the farmer characteristics and farm activities associated with higher profitability and farmer satisfaction from farmers' market operations. The results of this study suggested that farmers' profitability is enhanced through catering to niche markets such as that for organic products. Similarly, greater utilization of the direct marketing (e.g., via farmers markets) also help increase profit margin and hence farmer satisfaction. Although the survey found the majority of the farmers participating at farmers' markets to be satisfied with the profit margin, direct retailing to consumers through these off-farm outlets involve considerable investment in terms of labor, time, and equipment.

Impact: Over 61% of farmers who sell agricultural products through farmers' markets are satisfied with the returns they generate. Producers who retail at least 70 % of the dollar value of the products are more likely to be highly satisfied with their profit margin from farmers' markets. A strong positive relationship is documented between profit margin satisfaction and growers who offer organic produce for sale. Furthermore, the results suggest that producers with farmers' market businesses in the growing stage are more likely to be highly satisfied with profit margins. The documentation of these characteristics will help identify farmers who are likely to participate in community farmers' markets. Participation in the community farmers' markets leads to diversification of income base for farmers.

Sources of Federal Funds: Hatch

Scope of Impact: State Specific

Goal 1

Key Themes: Agricultural Competitiveness
Agricultural Profitability

Activity: Considering the high cost of doing business, New Jersey farmers cannot grow the same commodities as farmers in the Mid-West and still remain competitive. The Food Innovation Research and Extension (FIRE) Center is located in Bridgeton, Cumberland County, and in the hub of New Jersey's food processing and agricultural products industry. Bridgeton and the surrounding area are in a Federal Empowerment Zone and a New Jersey Urban Empowerment Zone. Cumberland County has the highest unemployment rate (9.3%) and the lowest per capita income in the state ($17,376, versus the NJ average of $27,006, and the US average of $21,587). The Center is a catalyst for creating new jobs in the region, and is the first "community-university" incubator model to exist in the United States. It has already become a template for similar programs throughout the United States.

Impact: New Jersey has realized $4 million in additional tax revenues, and over 1,000 full time jobs as a result of employment and sales by companies nurtured at the FIRE Center. In addition, these companies have generated income for state government. Services offered by the Center are expected to translate into considerable economic development in the region. It is estimated that the return on public investment will be at least $5 for every $1 invested. The FIRE Center was the recipient of a $1 million USDA Agricultural Innovation Center grant.

Sources of Federal Funds: USDA Competitive Funds

Scope of Impact: State Specific

Goal 1

Key Themes: Agricultural Profitability
Animal Health

Activity: The inability to accurately predict, and thus prevent, the adverse effects of equine placental dysfunction and spontaneous abortion results in considerable loss to the equine industry worldwide. The U.S. Department of Agriculture estimates that approximately 9.0 percent of fetal/neonatal foal deaths are due to problems during pregnancy such as placental insufficiency. An episode of mare reproductive loss in Kentucky and neighboring states in 2001, which affected more than 18 breeds, translated into a negative economic impact in excess of $225 million with a ripple effect of up to $4 billion. Researchers at the Equine Science Center at Rutgers' Cook College have identified a correlation between low levels of the hormone relaxin and spontaneous abortion in horses. The scientists were able to show that relaxin is useful in determining whether treatment of an at-risk pregnancy is effective, and they have filed a patent application in connection with this finding. Their goal is to develop an equine relaxin diagnostic test to provide veterinarians with a valuable tool to identify at-risk pregnant mares and to monitor placental function.

Impact: It is estimated that in New Jersey, mare reproductive loss causes a negative economic impact of more than $5.6 million annually, based on an estimate of 340 foal deaths annually, including veterinary and stabling care for mares (the figure does not include the high cost of post-natal care for premature foals that survive, ranging from $2,500 to $9,000 per case in New Jersey). This loss does not take into account unearned revenues, such as proceeds from the sale of foals as yearlings or the horses' lifetime earnings, or the income derived by service-providers. In the Kentucky episode, it was estimated that the overall economic impact was 17 times the direct dollar loss of foals. This means the potential economic loss for New Jersey could be as great as $69 million annually. The development of the equine relaxin diagnostic test would significantly decrease this loss.

Sources of Federal Funds: Hatch, NJAES

Scope of Impact: State Specific

Goal 1

Key Themes: Agricultural Profitability
Animal Health

Activity: Unscrupulous racehorse owners or trainers have used performance-enhancing substances in an effort to gain an edge over competitors. In a sport in which outcomes are measured in fifths of seconds, a second or two difference in the performance of a racehorse can mean the difference between the winner's circle and last place. Scientists at the Equine Science Center at Rutgers' Cook College have developed tests to detect use of these substances, and a faculty member has served as an expert witness in litigation involving use of performance-enhancing substances. One area among many research projects involves the use of performance-enhancing substances in racehorses. Examples are alkalinizing agents (bicarbonate "milkshakes") and Epogen® ("blood-doping"). Another of his team's efforts has resulted in new drug detection tests for blood-boosting substances. They found that these substances not only alter the performance of the racehorse and thus threaten the integrity of racing, but also threaten the life of the horse.

Impact: Recent Equine Science Center data and analysis on methods used to detect the practice of giving horses alkalinizing agents was key to the success of a test case argued before the New Jersey Supreme Court. The case supported one of the key testing programs in New Jersey, which will have impact across the country. In New Jersey alone, more than 50 pending cases have been settled without going to trial, saving New Jersey an estimated $1.25 million in litigation costs.

Sources of Federal Funds: Hatch

Scope of Impact: State Specific

Goal 1

Key Theme: Adding Value to New and Old Agricultural Products

Activity: The New Use Agriculture and Natural Products Program (NUANPP) was created to develop new crops and domesticate aromatic and medicinal plants, particularly those containing extractable chemicals in interest for flavor, aroma, and medicinal activity. Scientists are using powerful state-of-the-art analytic equipment to isolate bioactive compounds and standardize natural products in plants including grapes, green tea and Echinacea, soybeans, red clover, and basil. The program works cooperatively with research groups around the world examining the essential oils from aromatic plants and germplasm collections.

Impact: Research has produced data that is being used by the industry to verify and standardize the claims of nutraceutical products. For example, recent work with hydrosol is supporting a request by the Organic Consumers Association for U.S. Department of Agriculture's National Organic Program to more closely regulate the claim that the essential oil component called hydrosol (also known as distillate water) be called an organic component. The expertise of the NUANPP faculty has significantly influenced guidelines for the quality control of medicinal plants around the world with the recent publication, *WHO guidelines on good agricultural and collection practices for medicinal plants.* On the international front, NUANPP is also leading an initiative to establish mutually beneficial relationships between West African exporters of botanicals and other natural plant products and nutraceuticals manufacturers in the U.S.

Sources of Federal Funds: Hatch, USAID, National Organic Program

Scope of Impact: State Specific

Goal 1

Key Theme: Adding Value to New and Old Agricultural Products

Activity: The market for nutraceutical products is expanding worldwide. In 2000, the global market was estimated at $138 billion, a 7 percent increase over the previous year. Growing pharmaceuticals in plants rather than making them in polluting and energy inefficient chemical factories provides a satisfactory solution for consumers and a potentially profitable alternative for New Jersey farmers.

Phytomedics, a “spin-off” biopharmaceutical company at Rutgers, focuses on human health care and plant biotechnology with the goal of discovering, developing and manufacturing new plant-based pharmaceuticals, such as botanical drugs, nutraceuticals and functional foods. Selected New Jersey farmers are growing plants containing botanical therapeutics to provide compounds used in product development by Phytomedics, Inc. Another core area of Phytomedics' business is the plant-based production of recombinant proteins, such as antibodies, cytokines and vaccines. REPOST technology, one of the tools licensed from Rutgers, uses greenhouse-grown plants to synthesize and continuously secrete large quantities of biopharmaceutical proteins from their roots into a hydroponic solution.

Impact: Phytomedics' two most advanced botanical drug products are currently in the Phase II stage of clinical development for the treatment of rheumatoid arthritis and diabetes. Rutgers economists estimate that New Jersey’s total farm income could increase by as much as $30 million per year if the industry is able to capitalize on growing consumer interest in nutraceuticals and ‘health’ foods and new uses of farm products. Through the proprietary technology platform REPOST, the company has produced a formidable pipeline of pharmaceutical and nutraceutical product candidates. Phytomedics has just closed $7.5 M round of financing that makes it one of the most successful and fastest growing botanical therapeutics companies in the world.

Sources of Federal Funds: Hatch, NRI

Scope of Impact: State Specific
Global

Goal 1

Key Themes: Risk Management
Small Farm Viability

Activity: The New Jersey Farm Management Program addressed a clear and pressing need for superior management, marketing, financial and investment skills and served as a framework and support base to address the critical issue of farm viability. Agricultural Agents developed the Garden State Agricultural Re-Engineering Initiative program provides agricultural producers with the opportunity to (1) conduct in-depth financial analyses of their farming operations, (2) take a deliberate and knowledgeable approach to risk management, and (3) participate in regularly scheduled advisory team meetings.

The program offers:

- Training in the use of Finpack, the most comprehensive farm financial planning and analysis software available
- Crisis-intervention strategies for financially distressed farms
- Small group workshops and/or one on-on-one consultations on a continually scheduled basis
- Unlimited access to computers
- Flexibility to meet individual needs
- Complete confidentiality

Over 80 farmers were trained in using computerized farm the financial management program. Over 150 farmers attended three Risk Management seminars on labor issues.

Many participants expressed interest in purchasing the software utilized by the program, and several producers purchased computers for home-farm usage. A number of farm families utilized the program's output (an organized set of financial statements) to successfully solicit loans. Several farms underwent expansion plans based on an analysis of alternatives provided during the workshops or during follow-up visits. Agricultural businesses have been involved representing the following commodities: dairy, vegetables, grain/hay, fruit, nursery, and livestock.

Impact: Program participants have developed individual commodity budgets in addition to their balance sheets and cash flow plans. Producers have conducted complete analyses of their farm's financial situation, which has enabled them to plan for the future. Databases have been developed that are used for benchmarks for costs of production, rates of return, and financial performance standards. Other positive outcomes or impacts of the program have been to increase understanding of financial terms, improve understanding of the interrelationships among financial statements, and also to decrease anxiety associated with computer usage. Approximately 70 farmers were eligible to receive computers at low cost.

Analyses of participant data have revealed significant improvements for local producers being more efficient and saving dollars as well as numerous farms being saved. Tour farms were saved from bankruptcy. Approximately 20,000 acres with an agriculture value of $1,000/acre and development value of approximately $25,000/acre. This equates to about $20 million in agricultural value and $500 million in development value.

Twelve producers were able to maintain their agricultural enterprises and generated a combined cash flow of $5.7 million in net farm income.

Seven producers were able to maintain agricultural loans with USDA Farm Service Agency as a result of generating and analyzing a farm balance sheet and projected cash flow statement.

One of the most significant impacts of the Agricultural Re-Engineering Initiative is that the program has been approved by USDA Farm Service Agency to meet the borrower training requirements for new loan recipients. Prior to this approval, no programs were available to New Jersey producers for meeting loan requirements.

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

Scope of Impact: State Specific

Goal 1

Key Theme: Agricultural Profitability

Activity: Extension Specialists research and Extension educational programs were instrumental in extending the use of soil nitrate testing beyond field corn to many annual vegetable crops. The PSNT soil test is now widely used on selected vegetable crops across the USA. This soil test is not appropriate for all vegetable cropping situations but when properly targeted to the appropriate soil types, it results in lowering the average nitrogen fertilizer application rate by an estimated 30% (based on experiences with field corn) compared to the traditional practice.

Impact: The PSNT is now used on a wide range of vegetable crops including but not limited to sweet corn, cabbage, broccoli, cauliflower, tomato, peppers, lettuce, celery, pumpkin, and squash. Where Cole crops are gown in double cropping systems, such as following early sweet corn, peas, lettuce, or snap beans, the PSNT helps to give credit to the residual nitrogen in the soil from the previous crop. The PSNT is also used on vegetable crops I many states outside of the northeast USA, including Oregon, and California. The PSNT is appropriate for all vegetable crop acreage, but when used on the targeted fields it lowers the average nitrogen fertilizer application rate by an estimated 30% (40 lbs N/acre) compared to the traditional practice. The PSNT is also now used by both conventional and organic farmers. Use of the PSNT reduces the amount of nitrogen fertilizer applied to vegetable crop land, reduces the farmers cost of production, saves on fossil fuel energy needed to produce nitrogen fertilizer, and decreases the potential for nitrate pollution of ground water. Research in New Jersey on use of the PSNT for double-crop cabbage indicates estimated average savings 40 lbs N/acre. It is estimated that 400 acres of double crop cabbage grown in NJ could benefit from this practice resulting in a potential savings of $4800 in reduced fertilizer costs and a savings of 268 MMBTU's in natural gas used to produce the save nitrogen fertilizer and a potential for 16,000 lbs of nitrate-nitrogen to be saved from leaching into ground water. The impact would be significantly greater as the savings are extended to other vegetable crops and to other states.

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

Scope of Impact: Multistate – PA, DE, OR, CA

Goal 1

Key Theme: Home Lawn and Gardening

Activity: Environmental stewardship, community beautification and food security are concerns for suburban and city dwellings. Homeowners spend a great deal of their income and time establishing and maintaining landscapes. In urban areas gardening provides an avenue for community development and enhancing food security. Home lawn, gardening information and related environmental stewardship issues have been addressed by a volunteer force of Rutgers Master Gardeners in 15 counties throughout the state. Volunteers address public health and safety concerns through tick identification and educational programs on controlling mosquitoes. Adults and youths have become better stewards of the land learning the value of water conservation and quality, beneficial insects, solid waste management, composting, and natural resource management.

Impact: Since the inception of the Master Gardener's program in New Jersey, nearly 3,000 have completed the training program. Of this number, 1,200 are actually serving as environmental and horticulture educators. They staff "Garden Helplines", conduct garden clinics, horticulture therapy projects, schoolyard habitat projects and glean fields for food banks. Many collaborate with local park departments, county and state facilities to enhance environmental awareness and stewardship while at the same time building a strong sense of community with diverse people working towards a common goal. Over 600,000 hours of volunteer efforts have expanded the outreach mission of Rutgers Cooperative Extension. This volunteer investment of time and effort translates into over $9 million dollars in return since the inception of the program.

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

Scope of Impact: State Specific

Goal 2

Overview: New Jersey has one of the most culturally diverse populations in the United States. At the same time, a significant proportion of our residents lives at or below the poverty line and do not attain even the most basic daily nutritional requirements. New Jersey farmers also have attempted to capture increased value by moving into small scale processing. Added to these are a large number of small food processors attempting to meet the needs of local consumer markets. In addition, 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. Due to recent events, biosecurity is of increasing importance to agriculture. In total, there is a great need to design and deliver 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 and technological needs of the agricultural and food system within the State.

Fruit and vegetable buyers have concerns about microbial contamination which could threaten the market. Extension specialists and agents have developed educational programs and strategic collaborations to address this threat to the fresh produce chain.

Another program relating to food safety and quality involves researchers providing technical assistance to a quality audit of foods based on federal surplus commodities distributed in schools and other community programs. The newest aspect of the program involves participation in the USDA/NJDA New Jersey Chicken Pilot Project, which has the goal of determining how such factors as Standard Yields, Commercial Labeling, Seamless Distribution, and encouraging Buying Cooperatives affects service, pricing, competition, the timeliness of deliveries, accountability and quality. Extension educators continue to provide consumers with food safety educational program resulting in reduced instances of food borne illnesses.

NJAES delivers a multi-faceted food security program targeted to underserved and underrepresented audiences to meet the diverse needs of N. J. consumers. This program includes activities to link N. J. growers with school lunch and summer feeding programs, youth farmstands which bring fresh produce to urban areas while at the same time providing workplace skills to urban youth, and the production of produce in community based gardens and greenhouse operations.

NJAES is prepared for any threat to biosecurity. We are poised to provide agricultural information, such as farm locations and crop status; emergency measures to insure survival of plants and animals and emergency management and information dissemination.

Goal 2

Allocated Resources:

Research

Hatch Funds: $147K
All Funds: $2,777K
SY's: 4

Extension

Smith-Lever Funds: $10K
All Funds: $740K
FTE's: 12

Goal 2

Key Theme: Food Safety
Foodborne Pathogen Protection

Activity: Biosecurity is a critical concern in New Jersey. The state imports the majority of its food and relies on a network of roads, bridges and warehouses. If interrupted, the food supply would last three days. Intentional introduction of exotic pests or pathogens could cause grave damage to the agricultural economy, with the possibility of forcing farmers to abandon their land.

Cook College & NJAES has launched a Food and Agriculture Biosecurity Initiative (FABI) to study and make recommendations for prevention and response to bioterrorism. The group coordinates and builds collaborations at Cook College & NJAES and among private, government and academic institutions that are contributing to efforts to anticipate, prevent and better understand bioterrorism. They sponsored three satellite conferences to help the food industry comply with the Bioterrorism Preparedness and Response Act of 2002 and a statewide conference on biosecurity that addressed first and emergency response systems for farm and domestic animals. FABI has also identified more than 50 Cook College & NJAES researchers who are developing technology related to biosecurity, such as tamper proof and traceable food packaging, economic impact models of food system disruptions, and methods for the detection and identification of food pathogens.

The RCE Plant Diagnostic Lab participates in a coordinated network of plant diagnostic laboratories and proactive agricultural education programs that protect agriculture from intentional introduction of pathogens and pests.

Impact: The preparations at Cook College & NJAES have ensured that the college and station are poised to play a critical role in the event of a terrorist attach. RCE is the only statewide network with a capacity for both top down and bottom up communication with communities and citizens. During a direct threat to New Jersey's biosecurity, Cook College & NJAES are prepared to provide agricultural information, such as farm locations and crop status; emergency measures to ensure survival of plants and animals and emergency management and information dissemination. Because of their collaborations with other state agencies and businesses, the state as a whole is better prepared for any threat to biosecurity.

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

Scope of Impact: State Specific

Goal 2

Key Theme: Foodborne Illness

Activity: Food born illness is a critical issue nation-wide costing billions of dollars in lost productivity, hospitalization and in many cases resulting in death. Extension agricultural agents and specialists addressed fruit and vegetable grower concerns about microbial contamination threats to the wholesale market channels.

The Food and Drug Administration (FDA) reported 76 million cases of food borne illnesses in 1998 with 5,000 deaths. Approximately 5% of total illnesses were traced to fruits and vegetables. The FDA developed guidelines to minimize microbial food safety hazards from production through sales. At the same time, the supermarkets were concerned that microbial food borne illnesses would enter the food chain from fresh produce. They are requiring independent third party verification of the use of Good Agricultural Practices by all fess produce suppliers. These concerns directly impact New Jersey growers since they could lose $50-60 million in sales. The Extension team developed training materials and gave 17 training sessions (11.32 hours) to 862 participants during (2000-2001) focused on food safety on the farm.

Impact: A third party audit system for food safety was developed in coordination with the New Jersey Department of Agriculture Division of Dairy and Commodity Regulations. This is the first and only Department of Agriculture in the United States to be recognized as a third party auditor by the supermarket chains. States such as Alaska, Hawaii, Maine and Wisconsin have requested information on how to develop a similar system. Private audit firms charge a minimum of $1,000 per farm per visit to perform audits. This would cost vegetable, herb and fruit growers in Cumberland County conservatively $300,000 dollars to continue to sell produce. The Department of Agriculture can now do the same inspections for $45,000, a savings of 85%. The audit system is now under review to be the basis for a national third party audit system for the United States Department of Agriculture. The county agricultural agent has reviewed the national standards and made modifications for implementation. He continues to be a major participant in the “Reducing Microbial Risks in Fruits and Vegetables with Good Agricultural Practices in the Northeastern United States” USDA project administered at Cornell University.

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

Scope of Impact: NJ, NY

Goal 2

Key Themes: Food Quality
Food Safety

Activity: Since 1979, The Rutgers Food Science Department has conducted systemic, scientifically based, quality audits of donated goods, and provided technical guidance wherever necessary. The Food Science Department assisted in developing procedures for food manufacturers to submit samples of their product before being awarded a USDA contract. The Child Nutrition Commodity Support Program, which includes the National School Lunch Program, the School Breakfast Program, the Summer Food Service Program, and Child and Adult Care Food Program, all receive donated commodities to supply their efforts in New Jersey school districts, state institutions, food banks, and giveaway outlets for the needy. These commodities must be sampled to assure they are in accordance with USDA specifications. USDA has determined nutritional guidelines for foods included in the school lunch program, and manufacturers of donated foods must meet these requirements. There also must be a system to follow up on user complaints about donated foods. Many of the food manufacturers who contract with the state of New Jersey are relatively small operators who lack the technical background and adequate staff for problem solving and product development.

Impact: We are proud to have an impact on quality of food products consumed on daily basis by children and adults throughout the State of New Jersey. Fat and salt content of distributed products are being reduced, in accordance with USDA guidelines. Another recent development is the maintenance of a computerized data file on pre-approved food samples and those that have received complaints. The newest aspect of the program involves participation in the USDA/NJDA New Jersey Chicken Pilot Project, which has the goal of determining how such factors as Standard Yields, Commercial Labeling, Seamless Distribution, and encouraging Buying Cooperatives affects service, pricing, competition, the timeliness of deliveries, accountability and quality. The Special Audits generated compare the quality characteristics of a product line for distribution against name brand consumer versions. The Food Science Department works in conjunction with processors using USDA commodities to develop products that meet the latest USDA nutritional guidelines. The project continues to improve the safety, nutrition, and eating quality of the food products served in New Jersey's Food Distribution Program.

Sources of Federal Funds: USDA Contract

Scope of Impact: State Specific

Goal 2

Key Theme: Food Accessibility and Affordability

Activity: Small scale, family-labor farms have declined substantially in number in recent times, and to some extent they have been replaced by industrial-like operations. Agricultural production has also become regionalized as areas exploit their comparative advantage. The relationships between large scale, regionally concentrated producers, national and multinational food processors and distributors, and the structure of local food systems are complex, geographically complicated, and heavily influenced by policy. Yet they are poorly understood. This multistate project (NE-185) provides critical information about farmers, food and agricultural firms, families, communities and consumers in different locales and with different resources respond to and manage these dynamic changes. The project has developed and refined protocols for studying food systems of individual counties or regions within our participating states. The methodologies employ both quantitative and qualitative tools for gathering information about trends in the production, processing, distribution, access, and policy dynamics of the food system. Work is progressing on the selection of common "food system indicators" so that all participating states might gather the same data so that it can be compared and contrasted. Studies are also analyzing attitudes and relationships among a variety of food system stakeholders.

Impact: Research parameters were developed to measure the impact of community initiatives to create more localized food systems because these initiatives often include social and environmental risks as well as benefits and such strategies. NJAES researchers also collaborated with a number of community-based programs to begin moving this analytical framework into practice. This included collaborating with the New Brunswick Community Health and Environmental Coalition (CHEC) to promote improved understanding and relationships between community stakeholders on issues of sustainable urban food systems; collaborating with the Rutgers Urban Ecology Program's Farm-to-School Initiative to conduct research, education, and professional development for and with stakeholders; collaborating with the Rutgers Urban Ecology Program's Youth Farmstand Project to educate at-risk youth in 7 locations in New Jersey in the entrepreneurial skills necessary to run a farmstand that sells New Jersey Fresh produce; and collaborating with the Rutgers Urban Ecology Program's School Yard Ecology Program to: a) introduce sustainable food, agriculture, and diet lessons to teachers and students of primary and secondary classrooms in 8 schools in New Jersey; b) train 15 nutrition education student interns in teaching this program; c) test the educational value of the lessons, revise them, and develop a workbook entitled the School Yard Ecology Program that was posted in full on the web in 2001. A statewide mapping project to GIS map several sectors of the food system throughout the state was developed.

Sources of Federal Funds: Hatch

Scope of Impact: Multistate Research (ME, NJ, NY-C, PA, WV, CA, IA, KS, LA, MI, MO, NC, PR, TX, WA, WI, Wallace Institute for Alternative Agriculture)

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, NJAES 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 Consumer Sciences, Agricultural, Food and Resource Economics Departments, in cooperation with other units within Rutgers and other institutions within the region, are working on this initiative.

The NJAES funded the New Jersey Obesity Group (NJOG), a collaborative program that coordinates obesity research and outreach with faculty from Cook/NJAES-Rutgers University departments and the University of Medicine & Dentistry of New Jersey to address the serious health issues related to obesity.

Antibiotic resistance has grown more problematic in recent years. Rutgers researchers identified compounds in cranberries that are effective in treating urinary tract infections, even when the responsible bacteria show antibiotic resistance.

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 pathogen and collection surveillance data.

Extension educators planned and conducted a tri-state conference for nutrition and health professionals which focused on the compounds in fruits and vegetables that improve and maintain health.

Scientists continue their work on health promoting properties of food. Educational programs developed and implemented by Extension educators address consumer health concerns about issues such as obesity, osteoporosis and the safety and effectiveness herbs and health. Participants in Extension educational programs reported that they learned about the safety and effectiveness of herbal supplements, factors influencing the quality of herbal supplements, common uses and precautions that need to be taken. These programs have resulted in increased awareness and behavior changes which have impacted the health status of New Jerseyans.

Goal 3

Allocated Resources:
Research

Hatch Funds: $139K
All Funds: $4,045K
SY's: 5

Extension

Smith-Lever Funds: $205K
All Funds: $ 1,000K
FTE's: 19

Goal 3

Key Themes: Human Health
Human Nutrition

Activity: Obesity can have serious consequences, including premature death, cardiovascular disease, diabetes, hypertension, osteoarthritis, and certain cancers. These nutrition related diseases cost New Jersey more than $2.1 billion per year. At Rutgers, The State University of New Jersey, 23 percent of students are overweight or obese, compared to 14 percent of college students nationwide. The New Jersey Agricultural Experiment Station at Rutgers funded the New Jersey Obesity Group (NJOG), based in the Nutritional Sciences Department at Cook College. NJOG is a collaborative program that coordinates obesity research and outreach with faculty from the Cook College Departments of Nutritional Sciences, Food Science, Family and Consumer Sciences and Human Ecology; Rutgers' School of Pharmacy and Department of Psychology; and The University of Medicine and Dentistry of New Jersey.

Extension educators have also engaged over two-thousand adults and youth in programs to increase physical activity to improve weight. The "Step Out Hunterdon" and "Hunterdon Kids Step Out" has resulted in motivating participants to walk regularly and make positive changes in their eating habits and food choices.

The Expanded Food and Nutrition Education Program and the Food Stamp Nutrition Education Program, delivered nutrition education with curriculum that addresses food security and associated obesity issues to more than 5,500 limited resource youth and 4,500 limited resource adults.

As a result of the training provided by the New Jersey Team Nutrition Project youth participating in NJ's school meal programs are receiving a safer more nutritious, appealing, tastier meal. Entire school communities are engaged in creating a healthy meal environment at school. In addition, the NJ Food Stamp Nutrition Education Programs is delivering nutrition educational programs in the classroom as part of the core curriculum in many schools throughout the state where 50% percent or more of the youth receive free or reduced rate meals. This has resulted in youth making healthy food choices and increased consumption of fruits and vegetables.

Impact: Basic research into the mechanisms of lipid transport and the role of newly discovered fat cell proteins that regulate fat storage may provide promising leads for the development of new anti-obesity drugs;, and data about how calorie restriction and diabetes affects the rate of bone turnover in overweight women is showing that premenopausal women (unlike postmenopausal women) do not lose bone mass due to moderate weight loss and that calcium supplementation is beneficial in both groups of women. In addition, new insights are helping scientists understand how early nutrition is related to later risk for obesity and diabetes, and may lead to new methods for treating children who have suffered undernutition in early childhood. explorations into how diabetes affects sweet taste, food cravings and dietary compliance is improving the treatment for gestational diabetes, which creates greater risk for poor fetal outcome and for developing Type 2 diabetes later in life.

Eighty-six percent of the participants who attended a regional Children's Health Summit – Fighting Back Against Childhood Obesity reported that they had a better understanding of the causes, consequences and solutions surrounding the childhood obesity problem. In addition, 95 percent indicated that they would share conference materials, 75 percent reported that they would more carefully

select snack foods served at meetings and youth events; 87 percent said they would encourage children to eat a balanced diet and 89 percent said they would set a good example by eating a balanced diet; 87 percent would encourage children to be physically active; 77 percent were willing to stay involved with the RCE's Building Healthy Kids coalition.

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

Scope of Impact: State-Specific, National

Goal 3

Key Theme: Human Health
Medicinal Plants
Nutraceuticals

Activity: The Technology Transfer and Commercialization in New Jersey Research Project, based at Cook College's Center for Advanced Food Technology (CAFT), was created to establish a sound scientific basis for the use of foods and food compounds in disease prevention, in order to accelerate the growth of the emerging nutraceuticals market and to position New Jersey as the global leader in that market. A nutragenomics laboratory was also recently established in the Department of Food Science to develop nutraceuticals from medicinal plants, dietary supplements, herbal products, nuts, grains and oils. Researchers there have been granted patents on licorice root and Inula Britannica (a member of the sunflower family). Researchers from the CAFT project and the nutragenomics lab compile information about the complex networks of interactions in the body that trigger genes and cause certain health problems. Their research includes investigations of compounds that may prevent or treat prostate and breast cancers, which are the leading cancers affecting men and women respectively. Having identified genes that play a role in certain diseases, the researchers test the effects of scores of different fruits, vegetables and herbs in hopes of finding one that has therapeutic potential. After finding a food with healing potential, scientists break the product into its component chemicals and determine which of those chemicals is having the desired effect. Then, the chemicals identified are analyzed to determine how they affect the entire body (eg., possible side effects are identified) and what the optimal dosage would be. Finally, the compounds are tested on animals and then humans. The CAFT program is the first in the U.S. to use this innovative approach to identifying compounds in food that can be used to prevent disease. In addition to research, Cook College is training students in the emerging field of nutragenomics by offering the world's first graduate course in nutragenomics and nutraceuticals in Spring 2003 and the first long distance course in Nutragenomics and nutraceuticals to Pepsi-Cola employees during the Spring 2004 semester.

Family and Consumers Sciences educators planned and conducted a tristate conference on nutraceuticals for nutrition and health professionals. "Phytochemicals: Nutrients of the Future Symposium" focused on the compounds in fruits and vegetables that improve and maintain health. The symposium brought together researchers from Rutgers, USDA and other experts in the field to share this cutting edge research with practitioners in the field.

Impact: The nutragenomics lab has produced the first scientific evidence of the anti-cancer mechanisms of compounds found in myrrh and licorice root. The compound identified in myrrh, which kills cancer cells in the laboratory (it will be tested on animals in the near future), shows particular promise for the prevention and treatment of breast and prostate cancer. Because this compound comes from food, it is unlikely to be toxic to healthy cells, which could mean fewer side effects than a chemotherapy agent. In another finding in the lab, researchers have discovered a new molecule found in common dietary supplements made form licorice root that also stops the growth of cancer cells in prostate and breast cancers. Licorice root is currently in clinical trials. Building on the research of the Technology Transfer and Commercialization in New Jersey Research Project and the nutragenomics laboratory, CAFT offers services to companies interested in commercializing new nutraceutical products or improving production efficiency of existing products. Research from CAFT and the nutragenomics laboratory has helped several companies in New Jersey to standardize tea extract, garlic and ginger-

related products. The CAFT group also develops prototype products for clinical trials, such as throat lozenges containing tea extracts (which this group had previously identified as having anti-cancer potential), that are being used in clinical trials at the Cancer Institute of New Jersey. WellGen, Inc., a "spin-off" company of the project, has licensed nearly a dozen innovations for the human food, therapeutics, and dietary supplement markets including orange peel and black tea products with anti-inflammatory and cancer prevention properties that are in or close to clinical trials; licorice related products with anti-cancer properties; and Hawaiian noni products also with anti-cancer properties. WellGen has secured $3 million in a first round of financing and has high expectations for growth. Cook College has launched the world's first graduate-level course in nutragenomics and nutraceuticals, which is ensuring that there will be well-qualified researchers to enter this emerging field of research. The college is training tomorrow's experts in such areas as the role of nutraceuticals in cell and tumor biology, bioavailability of nutraceuticals, role of nutraceuticals in immune response, role of nutraceuticals in inflammation, nutraceuticals from food and herbs, discovery of nutraceuticals, and the isolation and identification of nutraceuticals.
Over 180 professionals and students participated in the "Phytochemicals: Nutrients of the Future Symposium". These newly trained professionals armed with the latest research are equipped to transfer the findings in science to their many publics. This rapid transfer of knowledge will have a positive impact on overall health status. Recipients of nutrition education programs will make choices relative to fruit and vegetable and other food consumption based on their beneficial effects.

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

Scope of Impact: State Specific

Goal 3

Key Themes: Human Health
Nutraceuticals

Activity: Public health officials are concerned about the rising problem of antibiotic resistance in urinary tract infections, due mainly to overuse of antibiotics. The Institute of Medicine, a part of the National Academy of Sciences, has estimated that the annual cost of treating all antibiotic resistant infections in the United States may be as high as $3 billion. Moreover, there is a great deal of interest in developing alternative methods (eg., with nutraceuticals and functional foods) for preventing and treating bacterial infections to avoid the use of antibiotics. Scientists have discovered that regular consumption of cranberry juice may offer protection against certain antibiotic resistant bacteria that cause urinary tract infections (UTIs). This study is also the first to look at the duration of the effect from cranberry juice on the urinary tract. This research found that cranberry juice's beneficial effect may start within two hours and can last for up to 10 hours in the urine, which suggests that consuming a serving in the morning and one in the evening may provide more effective anti-adhesion protection than consuming one serving a day.

Impact: Each year, urinary tract infections (UTI's) account for about 8 million doctor visits. Annual health costs for UTI exceed $1 billion. account This latest research, conducted jointly between Rutgers and the University of Michigan, suggests that regular consumption of cranberry juice could reduce the potential for development of urinary tract infections caused by either antibiotic resistant or susceptible bacteria, thus decreasing the need for antibiotics and potentially reducing the rate of resistance development. This could have global implications, especially in Third World countries where resistance to first-line antibiotics used to treat UTIs is close to 100%. As a result of Rutgers' research and publicity more women and health professionals are aware of the benefits of consuming cranberry juice to combat UTIs. International cranberry sales are increasing. This cutting edge research and resulting changed behavior could potentially impact a reduction in annual health care costs for UTI.

Sources of Federal Funds: NIH, NJAES

Scope of Impact: National, State-Specific

Goal 3

Key Theme: Human Health
Human Nutrition

Activity: Osteoporosis affects up to 33% of the female population over 65 years, and the estimated in-patient hospital cost of fractures caused by osteoporosis is over 2.8 billion dollars per year. Unfortunately, the risk of osteoporosis increases in women of low body weight or in those who have a history of successful weight loss. Moreover, recent studies have shown that bone mineral density is reduced with weight loss and the incidence of fracture is increased. Due to the large number of American women (up to 40 percent) who are following a weight loss regimen, or the increasing number of women undergoing the Roux-en-Y gastric bypass (RYGB) surgery, the potential impact on bone during dieting is of concern. Clinical trials examining whether weight loss has a detrimental effect on bone in obese premenopausal and postmenopausal women have been completed. In addition, researchers used supplemental calcium to determine whether this intervention can reduce bone loss. In these studies, it was found that obese postmenopausal women who were following a low-calorie diet showed an increased loss of bone over the 6-month study period.

Impact: Our new data in postmenopausal women suggest that even when consuming normal intakes of calcium (about one gram a day) during caloric restriction there may be inadequate total Ca absorbed, that may ultimately compromise Ca balance and bone mass. In addition, we have found that after gastric bypass surgery there is a slow, but greater than normal rate of bone loss, and that these patients may benefit from a higher intake of calcium and vitamin D. The recommendation to include adequate calcium during weight reduction diets was added to the First Federal Obesity Clinical Guidelines released by the NIH-NHLBI and NIH-NIDDK in 1998.

Sources of Federal Funds: NIH, Special Research Grants, Hatch

Scope of Impact: National

Goal 3

Key Theme: Human Health

Activity: The threat of West Nile Virus has spread to most of the country, jeopardizing human health as well as the nation's equine industry. In New Jersey, mosquito populations directly impact the public health and welfare of the residents and visitors in addition to influencing the economy of the state. Diseases transmitted by mosquitoes in New Jersey include Eastern Equine Encephalitis (EEE) and West Nile Virus (WNV). EEE poses a serious economic threat to New Jersey's equine industry revenue. The case mortality rate in New Jersey was 29%. The New Jersey Agricultural Experiment Station, in cooperation with the New Jersey Department of Health laboratories, has been studying EEE at five study sites for more than a decade. The researchers monitor the seasonal progression of virus activity in the bird feeding mosquito, Culiseta melanura. This research enables New Jersey to target the most important mammal-biting species that transmit EEE from birds to humans and horses. When WNV first appeared in the New York metropolitan area in 1999, researchers applied a similar approach to the method used to combat EEE.

Impact: Because science has been applied to mosquito control, human cases of WNV and EEE in New Jersey have been minimal and equine cases are much lower than other states that do not have a viable surveillance program in place. In addition to successfully guarding humans and horses against these two diseases, New Jersey's monitoring programs are successfully protecting humans from the health risks associated with the excess use of pesticides. Fewer pesticides are needed because County Mosquito Control Commissions are able to focus on the control of larval mosquitoes using source reduction and biorational mosquito control products. Decisions to spray pesticides to reduce adult mosquito populations are made on the basis of sound scientific research.

Sources of Federal Funds: Hatch, Center for Disease Control, and N.J. Department of Environmental Protection

Scope of Impact: State Specific

Goal 3

Key Theme: Human Nutrition
Human Health

Activity: Food insecurity and hunger are concerns for limited resource families. People living in poverty in urban areas and those in isolated communities are at great risk for inadequate diets. The Expanded Food and Nutrition Education Program (EFNEP) makes nutrition education accessible to limited resource families with children providing a path to improve their health and quality of life through nutrition education. Fiscal year 2002 data indicates that 5,897 youth and 4,592 adult participants learned to stretch the food dollar, make wise nutrition choices, handle food safely and access other resources to improve food security.

Impact: 85% of families who participate in EFNEP improved at least one nutrition practice. 80% improved at least one food resource management practice and 61% improved at least one food safety practice. In addition the following behavioral changes were reported:

- 38% fewer families ran out of food by month's end
- 52% used nutrition facts on food packaging to make healthy food choices
- 45% are planning meals in advance
- 36% report that their children ate breakfast more often

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

Source of Federal Funds: Smith Lever 3(d)

Scope of Impact: State Specific

Goal 4

Overview: As the most densely populated state in the U. S., 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 recognized this potential very early in their history and thus created an environmental sciences department nearly 80 years ago. The College of Agriculture was also renamed the College of Agriculture and Environmental Sciences in 1965. As a result, we have very broad and extensive research and Extension programming in this general area.

Impaired waterways and safe drinking water are major issues facing New Jersey. Extension research and educational water resources programs are addressing water quantity and quality concerns. A new set of stormwater management rules were signed into law this year. These best management practices will result in administrative efficiencies and tax dollar savings and reduce the number of impaired waterways.

Caring for the environment continues to be one of the most critical challenges facing youth. NJ 4-H Youth Development faculty have harnessed their environmental science capacity to plan and implement extension environmental programs for youth. The “Caring Keepers of Our Planet Earth” 4-H Environmental Ambassadors Program bring waste management and environmental issues to life. As a result, youth practice the 3 R’s – reduce, reuse, recycle to help the environment.

Goal 4

Resources Allocated:

Research

Hatch Funds: $632K
All Funds: $6,815K
SY's: 4

Extension

Smith-Lever Funds: $163K
All Funds: $2,835K
FTE's: 45

Goal 4

Key Themes: Forest Resource Management
Natural Resource Management
Biodiversity

Activity: In September, 2003, Mayor Michael R. Bloomberg announced a $3.38-million Master Plan process to map out the future use of the 2,200-acre Fresh Kills site on Staten Island, which was officially closed as a landfill in 2001. The plan is creating a blueprint for reclaiming Fresh Kills Landfill in Staten Island, a borough of New York City, the largest landfill in the country. The project will bring biodiversity, ecological vitality and new green spaces to this urban area. Typically, "landfill reclamations" consist of planting of a quick cover crop, with no consideration given to the ecological balance at the site. Beginning in 1993, scientists from the Center for Urban Restoration Ecology (a collaborative center of Rutgers and the Brooklyn Botanic Garden) have been using the Fresh Kills Landfill as a demonstration site for how to best restore native vegetation to degraded public land. Currently, they are testing the ability of different plants to support invertebrates and other animal life at the site.

Impact: As it is transformed from a landfill to an accessible landscape, Fresh Kills is setting a new standard for the transformation of former landfills into beautifully landscaped public parks. This project, which will be monitored indefinitely, has been successful in creating biodiversity at the site. To date, trees and shrubs planted there have attracted birds that have brought in seeds, resulting in more than 2 dozen species of native woody plants, more than 60 species of wild bees, which have pollinated the flowers and ensured seeds for future years, and dozens of ant and beetle species, Monarch butterflies, dragon and damsel flies, grasshoppers, voles, mice, shrews, rabbits, garter snakes, kestrels, red-tailed hawks, and red-wing blackbirds.

The pilot study is now being used as a model throughout the country to improve engineered lands and the urban environment. The approach is being used at a 300-acre landfill on Jamaica Bay, NY and at a 35-acre landfill at Walden Pond, a Concord, Massachusetts reserve. In addition, a New Jersey state government brownfield revitalization group is planning to use CURE's restoration schemes in their work.

Sources of Federal Funds: NJAES

Scope of Impact: State Specific

Goal 4

Key Themes: Natural Resource Management
Water Quality
Wetlands Restoration and Protection

Activity: Sediment is a serious problem in New Jersey. In Newark Bay, sediment is so bad that it is clogging shipping lanes. About 50 percent of the sediment in New Jersey's waterways comes from eroding stream banks. In suburban areas, stream banks are more likely to erode because dense development upstream leads to frequent flooding downstream. In addition to problems caused by erosion, there are concerns that dense development upstream causes more pollutants to remain in the downstream water supply. That water, which is likely to be heavily polluted because of dense development upstream, does not remain in the basins long enough for the pollutants to be removed from the water. Cook College & NJAES strategically hired an extension specialist in water quality to tackle the numerous water quality issues in the state. He identifies problems, designs solutions, finds funding sources, oversees the permitting process, and explains to communities why the restoration projects are important, all at no charge to the community. One project at the Pompeston Creek Watershed in Burlington county includes continued water quality monitoring and data collection, community education programs, stream bank restoration and detention basin retrofitting projects. The Rutgers extension specialist has led four planting and construction days at Pompeston Creek, training between 15 and 30 volunteers each time.

Impact: The Rutgers extension specialist provided training for the volunteers, who have repaired about 700 feet of eroding stream banks and stabilized them to stop erosion. They also have restored 2 retention basins. The community has saved about $60,000 by using volunteers for the project. It is unlikely that they would have been able to restore any of the erosion without these volunteers (It is estimated that 75 percent of watershed restoration projects in New Jersey would be impossible without volunteers). It is also unlikely that the volunteers could be properly trained without the assistance of the Rutgers extension specialist. The restoration has removed phosphorous and nitrogen from the stream.

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

Scope of Impact: State-specific

Goal 4

Key Theme: Natural Resource Management
Water Quality

Activity: A large portion of New Jersey's agricultural community depends on groundwater for irrigation, making recharge of these aquifers vital for sustainable agriculture to exist in New Jersey. Also, fifty percent of the State's drinking water is extracted from the aquifers. In addition to water supply, the groundwater tables provide the base flow for New Jersey's streams. A decrease in stream base flow can be shown to be directly related to impairments of the stream's biological communities and therefore, the health of the stream. With the recent droughts in New Jersey, the recharge of groundwater is a crucial component of providing a safe and plentiful water supply for the residents of the State. Recently, New Jersey's Department of Environmental Protection has released new stormwater management regulations that focus on promoting groundwater recharge and minimizing the impact of nonpoint source pollution on the waters of the State. In addition to the stormwater management regulations, the NJDEP has released new stormwater NJPDES permitting regulations that require all 566 municipalities of the State to obtain a permit and implement controls that address nonpoint source pollution issues. A significant cost for each municipality can be associated with complying with these rules.

Cook/NAJES' Water Quality Initiative created a Stormwater Management Education and Outreach Program to help municipalities minimize the costs of compliance, and the resulting tax burden, through education and outreach efforts.

One part of the program involves helping NJDEP to develop guidance documents that are clear, concise and based upon good science. A water quality specialist prepared a chapter for the NJDEP Stormwater Best Management Practice Manual that discusses the issues with recharging parking lot runoff and recommended pretreatment requirements for recharging these volumes. Another part of this program involves educating local municipalities on the new stormwater NJPDES permitting rules. In addition to giving several presentations to environmental commissions, county engineers, and watershed groups, an interactive web site will allow municipalities to assess their existing compliance status with these new regulations and provide them a detailed outline of the effort needed to completely address the new stormwater permitting regulations.

Impact: The Governor of New Jersey signed into law the new set of stormwater management rules this year. The chapter that was prepared for the New Jersey Stormwater Best Management Practices Manual will help promote the groundwater recharge of larger volumes of stormwater runoff from parking lots and due to the recommended pretreatment systems, the aquifers that are being recharged with the stormwater runoff will be protected from pollutant contamination. With regards to the new stormwater NJPDES permitting rules, the education and outreach effort has not only informed local groups about the best methods for addressing these new rules, but has also empowered these groups to work together and to work closely with Rutgers Cooperative Extension when attempting to address the requirements outlined in the new rules. The increased research and administrative efficiencies will ultimately save the tax payers of New Jersey significantly. Compliance with these rules is expected to reduce the percentage of New Jersey waterways that are currently classified as impaired, as well as protect drinking water resources.

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

Scope of Impact: State Specific

Goal 4

Key Theme: Natural Resource Management
Riparian Management
Wetlands Restoration and Protection

Activity: Preserving open space is a high priority in New Jersey, not just because open space adds to the quality of life, but also because wetlands are necessary for cleansing pollutants from our water supply. In urban areas, such as Rahway, empty parcels of land quickly become dumping grounds. In suburban areas, such as the Pompeston Creek in Burlington County, dense development upstream leads to flooding and erosion downstream. Despite concern for the environment, municipalities often do not have the resources to restore watersheds: an estimated 75 percent of current watershed restoration projects in the state would not be possible without volunteer labor. When volunteers are available, there must also be someone who is able to organize and train them. In addition, municipalities have great difficulty obtaining permits for wetland renovation projects because state agencies are not accustomed to considering these types of permit requests (the permit process is set up to review requests to develop wetlands rather than for requests to renovate these areas).

Cook College & NJAES strategically hired an extension specialist in water quality to tackle these issues. The specialist is now involved in numerous projects throughout the state. He identifies problems, designs solutions, finds funding sources, oversees the permitting process, and explains to communities why the restoration projects are important, all at no charge to the community. Following is a case study of one project: The City of Rahway is located in Union County, which is a densely populated county with virtually no open space. The city had decided to tear down houses on a 4.5 acre parcel of land, and wanted to prevent it from becoming a dumping ground. At the request of the city, the extension specialist (who was at that time working as an engineer for a private company) and the New York and New Jersey Baykeepers office came up with a proposal to return that site to its natural riparian flood plane. The extension specialist then "sold" the plan to the community, which entailed educating them about why restoring the land as a wetland was more beneficial than building a soccer field. Once the community was convinced, the specialist then had to "sell" the plan to the NJDEP. The state agency required the same permit of the city that it requires for proposed buildings on waterfront property—restoring wetlands, rather than developing them, was previously unheard of in the state. Finally, beginning on the one-year anniversary of September 11, the specialist led 350 volunteers during a four-day massive planting. The specialist (who now worked for Rutgers) organized and trained the volunteers, using the occasion to explain what a watershed is and why it is important to their community. The volunteers planted 5,000 shrubs, and 10,000 plugs of grasses.

Impact: The Rahway project, completed in the summer of 2002, created 4.5 acres of natural open space (not a park) in one of the nation's most densely developed counties. The site now contains natural vegetation and wildlife with a walking trail. The assistance of the extension specialist was able to obtain a permit in a few months that otherwise could have taken the city years to obtain (if at all). By organizing and training volunteer labor, the extension specialist saved the city about $200,000 over the four day period (estimated $28 per hour for landscape laborer and $5 per shrub if not done by volunteers). In addition, the project taught the kids and adults, including senior citizens, about the importance of watersheds, which have been shown to remove pollutants, such as phosphorous, petroleum, hydrocarbons and metals, from the water.

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

Scope of Impact: State Specific

Goal 4

Key Theme: Natural Resource Management
Recycling
Water Quality
Waste Management

Activity: Caring for the environment is one of the most critical challenges facing youth. Today's young people, as the future leaders and inhabitants of our earth, must be empowered to take action to address these issues and create needed changes. The 4-H Youth Development program has a number of environmental education programs in which youth gain hands on experiences on how to preserve and/or reclaim our environment. Two specific opportunities are the NJ 4-H Adventures in Environmental Science Program and the "Caring Keepers of Our Planet Earth" 4-H Environmental Ambassador Program. The 4-H Adventures Program is a one-week residential program for youth grades 7-12 which has attracted 300 youth since its inception. The week is an intensive study of environmental issues encompassing waste management, water quality, and land use. It includes hands- on experiments such as building mini- landfills and incinerators, and on-site tours of water treatment plants, recycling centers, composting facilities and energy generation facilities. These activities provide the students with a comprehensive look at environmental issues from all sides of the spectrum. A career exploration component is also included. In addition, the group has conducted a stream restoration project, and a soil study of different types of farm fields comparing fertilizer use.

The "Caring Keepers of Our Planet Earth" 4-H Environmental Ambassador Program is a 3 day/2 night educational opportunity for youth in grades 5-7 of a three county region in the southern part of New Jersey to study waste management and environmental conservation. Participants became environmental ambassadors in their schools and communities and are responsible for organizing and implementing environmental projects. Over the past 5 years, this program has reached 356 youth and 81 adults from 20 school districts.

This program brings waste management alternatives and environmental issues to life using activities that utilize experiential, inquiry-based and cooperative learning techniques. Participants learn about recycling, landfilling, incineration, source reduction, composting and sewage treatment. The program also emphasizes careers in the field of waste management and how we can positively impact the environment by effective trash disposal.

Impact: Due to the longevity of the 4-H Adventures in Environmental Science program a long- term evaluation of participants from the previous 10 years was conducted in 2002. There was a 16% return rate to the mailed surveys. Some of the results are as follows:

- 100% of the respondents reported being more aware of environmental issues around them
- 91% reported being more careful about what they throw in the trash
- 97% reported sharing information they learned at the program with others either in school, at home, or in other groups
- 59% said that the program influenced the classes they took in high school or college
- 41% said that this program influenced the career they are in or wish to have in the future
- 29% currently work or volunteer in an environmental field or organization

The stream restoration project was conducted for two years. In 2002, a biologist from the NJ Division of Fish, Game and Wildlife helped the students conduct a fish survey to determine the health of the stream. The results of this survey concluded that the stream bank improvements have helped to maintain the stream as a natural trout producing body and the wide variety of species found indicated the stream is indeed very healthy.
Over 13 years, the students have collected almost 10 tons of garbage and recyclables from the Delaware River. The shad population of the river continues to increase which is an indication of a healthy river.

Evaluation results from the 4-H Caring Keepers of Our Planet Earth had similar results. The majority of the participants indicated that they would share the information they learned with members of their family and students in their school. The most common responses to the evaluation question relating to the environmental things the participants plan to do because they attended this program were: improve recycling in home, school and community; to compost; to practice the 3 R's (reduce, reuse, recycle); to reduce littering; and to tell others about helping the environment.

One school developed an educational video program about waste management and environmental conservation to be used on a local television station. Another school started a compost program to recycle food waste from school lunch trays. Several schools conducted presentations for peers in their school, parents, school administrators, teachers and board of education members.

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

Scope of Impact: State Specific

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 consumer 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 program have been planned and implemented resulting in the development of leadership skills, workforce preparation, basic life and financial management skills.

Financial management continues to be one of our flagship programs. This year focused on the implementation of the "Investing For Your Future" home study course which reach over 1,300 readers.

Project HAY –Horses and Youth was developed to reduce recidivism and serve as a comprehensive prevention/intervention strategy to involve youth in life skills development through horse care and management.

Through character education programs youth have develop skills to do peer leadership programs for at risk youth. In addition, over 3,000 teachers educators and youth serving professionals have been trained to implement Character Counts to more than 100,000 youth in New Jersey.

Youth have also been engaged in community development projects through community gardening and 4-H farmers markets bringing a sense of pride and hope to depressed communities.

Goal 5

Allocated Resources:

Research

Hatch Funds: $94,436K
All Funds: $1,680K
SY's: 7

Extension

Smith-Lever Funds: $392K
All Funds: $2,348K
FTE's: 45

Goal 5

Key Theme: Youth Development/4-H
Children, Youth and Families at Risk

Activity: The youth of New Jersey are our most valuable resource. They are challenged in today's environment with making choices and 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. The 4-H Youth Development Program uses experimental 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 the 67,367youth who participate in the program.

Impact: In 2002, New Jersey 4-H youth and adults joined the nation in celebrating the 100th Anniversary of the 4-H Youth Development Program. They pledged 10,877 hours of service to people and communities as a part of the National 4-H Power of Youth Pledge Campaign.
Volunteers are the backbone of the 4-H program. In 2003, 3,054 adult leaders and 1,053 teens successfully delivered the program to 67,367youth. The average adult volunteer donates 220 hours per year. This volunteer investment of time and efforts translates to over $11 million dollars in return. 4-H educators work collaboratively with other youth serving agencies and organizations to extend the outreach of 4-H to a population of more diverse and underserved youth, while at the same time increasing resources available to 4-H. The youth of New Jersey are engaged in meaningful experiences and are gaining invaluable skills which will benefit society in the future.

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

Scope of Impact: State Specific

Goal 5

Key Theme: Children, Youth and Families at Risk
Jobs/Employment
Workforce Preparation

Activity: The New Jersey Bureau of Forestry's assessment of the state's tree health and maintenance problems pointed out the need for qualified managers and an infusion of labor to preserve, maintain and enhance our natural tree resources. In their December 2000 study, a marked decline of street tree health was reported, from 69% in good health in 1944 to 34% in 1999. In the same period, the need for major pruning maintenance rose from 14% to 24%, and abiotic injury to the nearly 2.1 million street trees in the urban forest rose from 6% to 25%. As more labor-intensive maintenance is required for a maturing urban forest, individual and volunteer efforts are being replaced by hired contractors and trained public works and shade tree commission employees. To provide meaningful career opportunities for underserved youth and expand the locally available labor, RCE identified partners to create an education-based solution.

The Rutgers Cooperative Extension Arboriculture Training and Internship Program is a state-wide youth training program. It is the workforce preparation component of the New Jersey Youth Corps serving at-risk youth in New Jersey. The New Jersey Youth Corps obtained grant money from the Cumberland County Empowerment Zone, and training opportunities were made available to all 12 New Jersey Youth Corps offices (Asbury Park, Camden, East Orange, Jersey City, Newark, Paterson, Phillipsburg, New Brunswick, Trenton, and Vineland, NJ). Thirty-five youth were identified for three days of intensive outdoor hands-on training that provided participants with workforce skills preparing them for future careers in forestry and the green industry.

Impact: Pre- and post-training evaluations were completed to assess knowledge gained, use of proper techniques, and the development of employability skills of the trainees. Prior to the 2001 training, 83% of the group understood the need for hard hats, voice commands, and other general safety procedures (29 of 35). This can be attributed to their general training in other workforce preparation classes within the New Jersey Youth Corps program. Following the 2001 arboriculture training, the youth participants displayed the following knowledge gains:

1. 30% of the trainees displayed the proper safety techniques in ascending a tree utilizing either the rope and saddle or aerial lift methods, a 70% increase from the pre-test results.

2. 36% of the trainees exhibited a working knowledge of tie-in safety measures and other fall-prevention measures when working in and around trees and landscape material, a 300% increase from the pre-test results.

3. 40% of the trainees properly identified potential electrical hazards and detailed the necessary safety measures and precautions when working near electrical lines, a 95% increase from the pre- test results.

Members of the arboriculture industry in New Jersey and throughout the region have been proactive in expressing their desire to participate in the program. Most noteworthy is the fact that four program participants have accepted full time positions with tree care companies and garden centers/nurseries.

Sources of Federal Funds: Smith-Lever (b) & (c)

Scope of Impact: State Specific

Goal 5

Key Theme: Character/Ethics Education
Conflict Management
Youth Development/4-H

Activity: The trend of increasing diversity of the population in the community is most noticeable in the schools where students of many different cultural backgrounds come together. High school students confront situations where racial and cultural bias may affect their decisions and their response to others. There is an increasing need for understanding, tolerance, and communication about differences. Approximately 20 youth from five area high schools participated in a weekend camping retreat organized for the purpose of planning the C.O.L.O.R.S. program activity for the coming year. The youth decided they would write a script describing scenarios or incidents they had observed or been involved with at school. They identified the most common themes that occur frequently such as disagreements about interracial dating, bias in athletics, and intra-racial discrimination. The objective was to dispel bias and cultural myths by exposing it as misinformation and lack of understanding and in the process create an awareness and sensitivity to diversity issues. In an effort to expand this project into a community service, the youth elected to use their script to produce a drama on video that would be shared with all of the high schools in the county. Over a nine week period in partnership with adults, the youth raised funds, rehearsed and revised the drama, hired a production company, and planned a Youth Summit event to introduce the program to schools. About 150 students from 8 high schools attended the Summit. The three hour program included introducing the concepts, showing the video, and facilitating round table discussions where each school received a copy of the video. C.O.L.O.R.S. participants assisted each school in planning how they would implement a diversity program in their school using the video. Following the summary and conclusion, students gathered for lunch and social time.

Impact:

- Youth participants in the program reported increased sensitivity to diversity issues.
- Communication skills were enhanced through the exercise of writing, revising, and then dramatizing and playing roles.
- Students learned teamwork skills as they worked co-operatively to complete numerous tasks on deadline.
- Over a three to four month period of intense activity, the C.O.L.O.R.S. participants encountered situations arising in their own diverse group that tested their patience, tolerance, and conflict resolution skills. They shared a sense of accomplishment in overcoming challenges and reaching their goals.
- Eight area high schools sent representative teams to participate in the diversity training offered at the Youth Summit by the C.O.L.O.R.S. youth and adult members.
- Following the training at the Summit, a variety of presentation forums were planned by the round table discussion groups for their school audience.
- Through facilitation of a collaborative support group, 4-H youth development was recognized for the first time as a leader in diversity programming by the County Human Relations Council, the Sheriff's office, Burlington County College, Family Service, Inc., and the "Family Y".
- A community service activity initiated by about 20 youth was leveraged through a train-the-trainer approach to provide community service opportunities for 150 youth.

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

Scope of Impact: State Specific

Goal 5

Key Theme: Children Youth and Families at Risk
Youth Development/4-H

Activity: Education data indicates that our at-risk communities have a significant rate of high school dropouts and poor attendance – Atlantic City had a 10.5% drop out rate, and Pleasantville had an 7.4% rate (the state average is 3.8%). While Atlantic County has improved its ranking for juvenile arrests, it still ranks 13th out of 21 counties and the juvenile commitment rate shares 7.1% of the state average, ranking 15th. In Atlantic County, an estimated 15.4% of our children (1998 Kids Count, New Jersey) live below the poverty level and has experienced a 40% increase in juvenile assaults and misdemeanors.

The summer campers were part of the Uptown Complex Family Center's Peacemakers Summer Day Camp Program. The participants were from the high at-risk communities of Atlantic City and Pleasantville and ranged from grade 1 to grade 8. The objectives of the overall program were to provide youth enrolled in the Peacemakers Summer Day Camp Program with:

a. hands-on gardening and plant science activities
b. food preparation and nutrition education of common garden vegetables and herbs
c. an opportunity to exhibit projects in annual 4-H Fair

As an action oriented summer program, all activities were hands-on with processing time during snack time at the close of each of the weekly sessions. Each session was 2 hours in length, with 6 separate sessions held throughout the program.

Seventy-two youth enrolled in the Uptown Complex Family Center's Peacemakers Summer Day Camp participated in 6 weeks of gardening/plant science and food and nutrition activities. A variety of vegetable, herb, and flower seedlings were planted in 3 raised beds. Participants learned how to prepare a garden site, plant seedlings, and care for plants throughout the 6 weeks. The youth also learned about garden products and their uses through activities such as making blueberry milkshakes, ice cream in a bag, and pasta salad using fresh grown tomatoes, peppers, and basil. The participants also made nature crafts that they exhibited at the annual Atlantic County 4-H Fair.

Impact: All participants rated the overall program as great or good. Evaluations indicated that the majority of participants learned how to work together on group games and experiences, how to use food from the garden in favorite recipes, and skills in planting and caring for plants from seedlings to harvest.

All participants were observed to participate fully and enthusiastically in all activities and many parents began to pick up their own children at Cityscape as the weeks progressed initially because of the excitement their children had been expressing and then to note the garden growing each week.

The director of the Family Center, stated families have already requested to have their child put on a waiting list for the next gardening program available at Cityscape.

Sources of Federal Funds: Smith-Lever (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 move 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 counties 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 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, reviews and evaluates the proposals. 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 NJAES 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 5-year Plan of Work.

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 and 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. Multistate, multi-institutional, and multidisciplinary 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 residents. Planned programs also address identified critical issues within the region where formal memoranda of understanding and collaboration agreements have been developed between states. The resulting 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 in FY03.

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 and 6) receiving numerous grants including a "Consumer Acceptance of Food Biotechnology in the US" funded by USDA's IFAFS program.

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, 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.

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 3500 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.

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 commercials 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.

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.

US Environmental Protection Agency Region 2/Cornell and Rutgers

Through collaborative funding provided by EPA, Cornell and Rutgers Cooperative Extension, and USDA-CSREES, the liaison works out of the EPA Region 2 offices in New York City to facilitate a cooperative educational partnership among the sponsoring agencies. Work of the liaison focuses on water quality and watershed protection/place-based environmental protection initiatives, including the agricultural dimensions of these issue areas.

With this leadership to a team representing four universities (Rutgers University, Cornell University, University of Virgin Islands and University of Puerto Rico) and EPA, a grant was obtained for Regional Water Quality project coordination from USDA-CSREES.

The liaison for EPA Region 2 initiated an agriculture team within the regional office; supported Region 2 in national dialogues, work with teams on EPA's agricultural initiatives (regulatory and assistance), and supported the regional office in its participation in a national outreach effort directed to the state commissioners of agriculture. He also provided leadership to developing an animal agriculture regulatory/technical assistance (CAFO/AFO) project to be conducted in New Jersey in association with several other federal and state partner agencies.

The liaison continues to provide similar support and participation in other EPA Region 2 initiatives and dialogues in the areas of: nonpoint source water pollution (funding, regulatory initiatives, etc.); pollution prevention initiatives; innovations work group (to improve agency efficiency and effectiveness). He also routinely participates in senior staff meetings of the EPA Region 2 Division of Environmental Planning and Protection.

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 NC140 a New Jersey County Ag Agent contributes to the demonstration and outreach of results from apple, semi-dwarf apple, apricot, sweet cherry, varietals 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.

U.S. Department of Agriculture
Cooperative State Research, Education, and Extension Service
Supplement to the Annual Report of Accomplishments and Results
Multistate Extension Activities and Integrated Activities
(Attach Brief Summaries)

Institution Rutgers University
State New Jersey

Check one: X **Multistate Extension Activities**
____ **Integrated Activities (Hatch Act Funds)**
____ **Integrated Activities (Smith-Lever Act Funds)**

Actual Expenditures

Title of Planned Program/Activity	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004
PENN-JERSEY Livestock/Crops	4,000	4,000	17,770	-	
MAC-PATHWAYS/Food Policy & Food Systems Web	21,500	25,000	27,448	18,450	
Mid-Atlantic Fruit, Veg., Crop Manuals/Conference	4,000	4,000	7,511	5,300	
Weed Science – NJ/Delaware	2,500	2,500	2,912	2,980	
Northeast Direct Marketing	1,000	1,000	752	780	
EPA-2/Cornell & Rutgers	13,000	13,000	8,000	-	
4-H Jury Curriculum & Related	1,000	1,000	1,166	1,475	
Regional Research Projects	1,423	1,500	1,850	2,140	
Other	-	-	-	-	
Total	48,423	52,000	67,409	31,125	

Karyn Malinowski — Director of Extension
April 1, 2004 — Date

Form CSREES-REPT (2/00)

F. Integrated Research and Extension Activities

Animal Production Efficiency

Integrated projects are focused on increasing the reproductive efficiency of sheep and goats, as well as elucidating the roles of steroid hormones in female sexual behavior. Studies with female goats provide a strong comparative model for human post-menopausal women. In addition, NJAES reported on projects investigating strategies for maintaining and improving immune function in exercising aged horses, and preventing insulin/glucose-related metabolic diseases of younger horses. The latter project has resulted in a patented test of a low dose oral dextrose challenge as a reliable test of glucose metabolism in young horses. In dairy heifers, an investigation on certain dairy products demonstrates the physiological and economical impact of using alternative feed sources and bedding ingredients on the growth and efficiency of heifers.

Field and Forage Crops

A proactive campaign is being developed to increase the awareness of new federal regulations relating to nutrient management. Our faculty investigated the use of animal manure on crops and reported an improvement in soil fertility, tilth, organic matter and increase water holding capacity while reducing the need for chemical fertilizers. A team continues its efforts in identifying species that persist and provide stable yield production across growing environments and seasons with reduced herbicide inputs. New soil and analysis test methods developed for vegetable crops enables farmers to better adjust nitrogen fertilizer needs to the crop. The co-application of manganese fertilizer and herbicides saves time and money. Suppressing plant diseases with nutrients such as manganese or silicon reduces the need for pesticides. Cooperative Extension has been successful in equine pasture management educational efforts related to soil fertility and soil testing.

Turfgrass Breeding and Management

Our team of turfgrass specialists including breeding, biotechnology, management, pathology, entomology, and weed control science continue to make progress on developing new varieties and establishing best management practices for the production and maintenance of turfgrass, and the reduction of pesticides and fungicides. The objective is to explore and develop turfgrass that exhibit qualities that make them resistant to damage by weed control chemicals, foot traffic and mowing. This will be accomplished through the use of best management practices such as utilizing germplasm with improved traffic stress and disease resistance, implementing sound cultural practices, and initiating fungicide application strategies based on IPM scouting techniques rather than calendar-based sprays. The effectiveness of nematodes against white grubs continues to be demonstrated, and has proven effective for long term control, thereby dramatically reducing the need for grub insecticides. Continuing work on the heat tolerance of bentgrass species aid in establishing management practices for heat tolerant species. Results from this research help golf course superintendents make informed choices when selecting new bentgrass cultivars and improve their ability to manage these cultivars once they are established. Researchers determined that fungal endophytes are important in turfgrass due to the insect tolerance conferred by alkaloids produced by the fungi. The development of perennial ryegrass

cultivars with resistance to gray leaf spot should greatly improve the usage of this species and reduce fungicide applications. Approximately 200 turfgrass varieties from this program are currently licensed to and are being marketed by commercial seed companies. These specialists continue to participate in a multi-state effort to develop best management practices for turf systems in the eastern US.

Plant Pest Management

There are a number of projects focused on integrated pest management for economically important plants, including fruit trees. One project that is associated with a multi-state effort focuses on the incidence and control of Plum Pox disease. An ongoing surveillance program has been developed in cooperation with the NJ Department of Agriculture and educational programs have been developed to increase awareness of NJ growers. Other projects investigate ways to combat sooty blotch, powdery mildew and other diseases in apples, as well as evaluating disease resistant potato cultivars.

Plant Production Systems

Several multistate efforts are actively researching the problems facing the landscape (environmental) plant industry. The nationwide membership of this research group provides an excellent means for researchers in states with similar production, marketing, or management problems to cooperate as a team. 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 NASA's long duration space missions, can be directly applied to the commercial greenhouse industry. The NJ program supports the NJ commercial greenhouse industry and continues to contribute to a NASA funded NSCORT project to develop closed plant production systems for advanced life support research program. Research focusing on the efficiency of greenhouses reported improved production using reduced amounts of heat and improved ventilation, especially important for cool and cloudy climates. The research and outreach efforts that have been conducted in support of the New Jersey greenhouse industry, especially related to design, construction, and operation of controlled environment plant production facilities have received special recognition. The American Society of Agricultural Engineers recognized the Rutgers University contribution to the development of integrated systems for low-cost and low-energy greenhouses as one of the centuries 100 most significant, and their Blue Ribbon Award was presented to a Rutgers faculty member for providing exceptional educational material on the subject.

Food Safety

A food science specialist has developed a good agricultural practice training program to improve the safety of produce grown in NJ. In partnership with the NJ Department of Labor, a training program has been developed to teach food safety, good manufacturing practices and HAACP to food companies Focusing on the high cost of foodborne diseases, a study of the obstacles to adopting safe food habits, including food safety knowledge and factors affecting attitudes and behaviors can help food safety educators better understanding of why people engage in risky

behaviors and improve food safety education interventions. Research on compounds that inhibit foodborne disease causing organisms provided information on how nisin and pleurocidin can significantly decrease the activity of a wide spectrum of these foodborne disease agents. Another project provides information via workshops, seminars and computer programs for processors and retail operators in the safe cooling of food products using mathematical models and predictive modeling.

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 the 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 a contribution to a multi-state research project), and demonstrated that better monitoring and management of animal diets leads to less nutrient excretion and greater profitability. An additional research and education program focuses on diverting food wastes to animal feed instead of landfilling or incinerating. 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.

Agricultural Financial Management

This is multifaceted program with the New Jersey Farm Management Program as its centerpiece. The latter program funded through a multi-year grant from the NJ Department of Agriculture provided formal training to over 4000 producers in the areas of management, marketing, finance and investment. Another component of this overall program is participation in Northeast Farm Management Working Group focusing on risk management. As 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, ICM, and organic production methods were made available on line 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-own workshops targeted at greenhouse owners. Greenhouse Cost Accounting software program allows greenhouse managers to allocate costs to specific crops. It enables users to easily determine profitability of specific greenhouse crops and explore full cost accounting.

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State New Jersey

Check one: ____ **Multistate Extension Activities**
__X__ **Integrated Activities (Hatch Act Funds)**
_____ **Integrated Activities (Smith-Lever Act Funds)**

	Actual Expenditures				
Title of Planned Program/Activity	**FY 2000**	**FY 2001**	**FY 2002**	**FY 2003**	**FY 2004**
Animal Production Efficiency	39,755	20,858	52,228	49,863	
Field and Forage Crops	35,821	17,465	35,173	-	
Turfgrass Breeding and Management	54,413	73,470	58,809	45,827	
Plant Pest Management	32,588	-	-	40,714	
Plant Production Systems	42,578	126,517	127,809	92,261	
Food Safety	16,425	8,354	9,577	73	
Food Security	19,941	-	-	-	
Human Nutrition	8,732	-	-	-	
Nutrient Management/Recycling	23,365	33,365	39,078	40,085	
Agricultural Financial Management	16,491	17,440	9,650	24,125	
Total	294,109	297,469	332,324	292,948	

Keith Cooper, Ph.D — Dean of Research
April 1, 2004 — Date

Form CSREES-REPT (2/00)

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	Actual Expenditures				
Title of Planned Program/Activity	**FY 2000**	**FY 2001**	**FY 2002**	**FY 2003**	**FY 2004**
Field and Forage Crops Management	**7,880**	**9,556**	**-**	**-**	
Turfgrass Breeding and Management	**37,293**	**60,516**	**96,598**	**88,617**	
Plant Pest Management	**13,122**	**-**	**-**	**-**	
Plant Production Systems	**58,715**	**81,937**	**47,066**	**45,990**	
Food Safety	**11,666**	**-**	**9,415**	**9,806**	
Environmental Quality (now part of Nutr. Mgt/Recycling)	**19,997**	**-**	**-**	**-**	
Nutrient Management/Recycling	**13,087**	**13,246**	**23,000**	**23,627**	
Agricultural Financial Management	**7,720**	**8,895**	**9,030**	**12,944**	
Animal Production Efficiency	**-**	**4,990**	**-**	**-**	
Total	**169,480**	**179,140**	**185,109**	**180,984**	

Karyn Malinowski — **Director of Extension**
April 1, 2004 — **Date**

Form CSREES-REPT (2/00)