Certification
Of New Jersey Annual
Report of Accomplishments and
Results (FY 2001)

Approval:

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Date

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. 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

An example of adding value to an existing crop is the project to develop basil varieties with cold tolerance. These varieties will enable early and late planting in major growing areas as well as enable the shipping and storage of cut basil resulting in increased shelf life. Initial and replicated studies have determined the best screening methods for cold tolerance.

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 will provide farmers with an opportunity to create new businesses based on value added agricultural products, developing new products and commercial opportunities.

The Mid-Atlantic region of the United States has a large concentration of nutraceutical firms. This industry faces a number of challenges including access to raw and semi-processed plant materials. To address this issue efforts have been made to enhance international trade with West Africa, a source of tremendous indigenous biodiversity. One outcome of this effort has been an agreement to explore the formation of a natural plant products business incubator program in the region.

Increasing production efficiency and reducing costs has long been the goal of Rutgers Research and Extension personnel. The *Garden State Agricultural Re-Engineering Initiative* provides agriculture 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. Over 70 farmers have received computers at low cost to enable them to utilize available software.

Work in our oyster breeding program continues and has resulted in a cooperator increasing by ten-fold an investment in the pilot farm. Our trail grow-out studies have shown that Surf clams can be grown to marketable size in one year. To date, survival through the grow-out system has increased 10-fold, from 1-2% in 1999 to over 20% in 2001.
Of special note is the production of the web based and television series "If Plants Could Talk", which brings home lawn and gardening information directly to the homes of thousands of New Jersey residents – providing them with quality non-biased research based information in a practical format.

Allocated Resources:

Research

Hatch Funds:	$1,373K
All Funds:	$15,405K
SY's:	39

Extension

Smith-Lever Funds:	$413K
All Funds:	$3,320K
FTE's:	49

Goal 1

Key Theme: Adding Value to New and Old Agricultural Products

Activity: The main objective of this project is to develop Basil varieties with cold tolerance. Cold tolerance basil varieties will enable early and late planting of Basil in major growing areas including New Jersey, will open new area for the growth of Basil and will enable the shipping and storage of cut basil under 4°C thus increasing its shelf life. The commercial stakeholders using basil including growers, distributors, food chains and the final customers would benefit as the current shelf-life of fresh basil is short, the fresh product now sold in groceries and supermarkets often damaged by cold injury just by placement in coolers and/or the display areas used for fresh culinary herbs and specialty produce. This program is also aimed towards the selection and development of genetic material suitable for the isolation of genetic factors (cloned genes or tightly linked markers) governing basil cold resistance or tolerance. Such factors will serve in future breeding program through which this desirable trait will be transferred from one basil variety to another, and in research programs aimed towards better understanding of cold sensitivity and resistance in basil. In short, we are seeking to develop new commercially acceptable basil varieties with cold tolerance and understand the underlying biological mechanism of such tolerance.

Impacts: Initial studies were conducted with Italian Large-Leaf basil. Replicated studies determined the best screening methods for cold tolerance. We also determined the optimum condition for Basil cold acclimation. Cold acclimation is a sub-cold treatment given to plants to increase their cold tolerance. Plant material with which we have been evaluating includes several unidentified varieties originated from Wisconsin and Florida and Italian Large-Leaf basil. The Wisconsin sweet basil material originated from several plants that survived the cold temperature of Wisconsin and then were sent to us for co-development with the Lewis family. We developed lines from each of these plants. We also studied the response of these lines to exposure to 96 hours of 4°C. These lines respond well to cold however they do not exhibit the desired shape of plants and leaves and thus we consider them as a genetic source for a long term breeding program in which we will utilize this material as a source for the introduction of cold tolerance into elite basil varieties. Seeds of the Wisconsin lines have been collected and are now ready for advanced screening and future programs.

Source of Funding: The New Jersey Farm Bureau, State, Private

Scope of Impact: State Specific

Goal 1

Key Themes: Agricultural Competitiveness
Agricultural Profitability

Activity: Examination of New Jersey's share of the national food manufacturing industry shows that the New Jersey food manufacturing industry has lost significant ground over the past 25 years, relative to its national counterparts. In addition, the agricultural industry in New Jersey is under severe pressure and more and more farmland is lost to development each year. A significant challenge for farmers in an urbanizing state such as New Jersey is the rising cost of doing business. In fact, over last decade agricultural production costs in the state have grown by 37% and net farm income has dropped by almost 40%. Farmers need alternative ways of deriving income from their farm operation if they are to remain viable in the future. Venturing into value-added production is one way that can increase profits by enabling the farmer to capture more of the consumer dollar.

Impact: The NJAES created the Food Industry Research and Extension (FIRE) to provide solutions to a variety of constituents including farmers desiring to create new businesses based on value-added agricultural products, startup companies evaluating differentiated new concepts in the area of nutraceuticals and other high-growth sectors, and existing companies seeking to commercialize new technologies. With its team of on-site specialists and its linkage to vast resources at Rutgers University, FIRE provides its client companies a full array of services that include business development, market development, product and process development, workforce development and training, regulations and manufacturing support, and quality assurance and food safety programs. It is believed that this integrated level of support offered to clients, backed by in-house expertise and the vast resources of a leading state university, already makes the FIRE program unique in the country.

During 2002, FIRE plans to initiate construction of its Food Business Incubator in Bridgeton, New Jersey, which will allow it to fully realize its impact to the community. FIRE has already received indications from over 40 food companies (existing processors, startups and farmers) expressing their desire to likely utilize the services of this proposed Food Business Incubator. Bridgeton, located in Cumberland County, is geographically located at the center of the Southern New Jersey agriculture industry and in an area where the unemployment level has been the highest in the State. In the Food Business Incubator, clients will have access to state-of-the-art food processing and laboratory equipment that can be rented on an hourly basis. A full spectrum of processors will benefit, from fledgling startups in need of basic small scale processing capacity to sophisticated businesses in need of pilot or test market processing for the development of new products. The small operator will gain access to equipment and services they could not likely afford to develop or buy on their own. Larger processors will be able to minimize their capital risks associated with new products and processes in test market, scale up or commercialization phases.

FIRE will be the catalyst in creating a viable and sustainable food processing and agricultural base in Southern New Jersey. A series of educational seminars are being offered by FIRE dealing with business plans and consumer trends, and value-added product development and regulatory issues. FIRE is also introducing to the region its New Jersey Food Entrepreneurs Network (NJ FEN) that will serve to build connections within the community of entrepreneurs based within the State. In addition, FIRE is proactively developing value-added products from underutilized, culled agricultural raw materials and providing these to farmers within the region. Finally, FIRE is taking a national leadership position as it is founding and hosting the first-ever nationwide meeting of food business incubators. This exciting program will serve to identify best practices across the country and case studies of companies now successful because of the support of their local food business incubator.

Sources of Funding: State, NJ Commission on Science and Technology, City of Bridgeton, Cumberland County

Scope of Impact: State Specific

Goal 1

Key Themes: Agricultural Competitiveness
International Trade and Expansion
Adding Value to New and Old Agricultural Products

Activity: The Mid-Atlantic region of the U.S. is home to a large concentration of nutraceuticals firms, especially botanicals manufacturers. This industry, however, is relatively young and faces a number of challenges as it continues to expand, including access to raw and semi-processed plant materials. West Africa (Nigeria, Cote D'Ivoire and Ghana) has tremendous indigenous biodiversity. Botanicals and other natural plant products have a long history of use, however, formal industry development has been slow to evolve. Consequently, much activity in the botanicals "industry" revolves around wild-harvesting plants for use in informal markets. National economic diversification goals in these countries, however, have raised interest in developing these industries and expanding formal trade in natural plant products. This market assessment is seen as a necessary step toward developing strategies for promoting formal botanicals industry and market development in West African and fostering linkages with American botanical companies in order to facilitate trade. A three nation (Nigeria, Cote D'Ivoire, and Ghana) market study was conducted to (i) document current market activity in the area of botanicals and other natural plant products, (ii) assess current industry structure and identify major actors in the industry, (iii) identify key impediments interfering with market/industry development and international trade in botanicals, and (iv) identify promising trade opportunities.

Impact: Key deliverables of the project were a market report on the natural plant products sectors in Nigeria, Cote D'Ivoire and Ghana and a directory of natural products companies and contacts in the region. It was found that the natural products markets in West Africa not well developed, making international trade more difficult. A series of technical and policy recommendations for promoting industry/market development and trade formation were developed and advanced to the US Agency for International Development (the funding agency for this study). A major outcome of the project was an agreement to explore the formation of a natural plant products business incubator program in the region to assist companies in a variety of areas including: sustainable and efficient raw material collection, technology adoption and implementation, product development, quality assurance, packaging, market development, and international trade protocols.

Funding Sources: USAID, State

Scope of Impact: State Specific

Goal 1

Key Theme: Aquaculture

Activity: At the turn of the century, the Delaware Bay and Atlantic Coastal Bays of southern New Jersey contributed significant shellfish resources to the state's economy. Oysters and clams produced locally supplied markets in New York, Philadelphia and Baltimore. Declines in coastal water quality and the outbreak of MSX disease in the 1950's destroyed this lucrative industry. With the changes in the aquaculture industry, and consumer demands for shellfish products, researchers at Rutgers focused their attentions on improving the health and marketability of two major shellfish products to supply the demand and advance the aquaculture industry.

Rutgers has developed a multifaceted research and extension program to address the complex needs of this industry. Both traditional and biotechnical approaches have been used to develop and improve disease resistant oyster strains, and to explore new, more profitable species of clams. Research in detection and control of shellfish diseases has complemented the breeding programs. Resource studies have provided critical information for management strategies. In addition, population dynamics modeling assists the development and evaluation of transplant strategies and aquaculture techniques.

Impact: Through the traditional breeding program, Rutgers has produced disease resistant strains of oysters currently being used by the industry. Rutgers researchers have also developed the first tetraploid oysters that are ideal for aquaculture due to their sterility, superior growth and improved meat quality. This technology has been patented and is licensed newly established NJ-based company which marketing the technology worldwide. Cultured Rutgers oysters from the pilot farm reach market size one year earlier than traditional harvests and with less disease mortality. These oysters were marketed to local restaurants at prices that were 10-15 cents per oyster more than other Delaware Bay oysters. The demonstration projects have also identified appropriate culture methods for New Jersey, have evaluated disease resistant stocks and have generated production cost information for enterprise budgets. These results have encouraged the industry cooperator to fund a ten-fold increase in the pilot farm. In addition, Surf clam (Spisula solidissima) culture was initiated to produce a substitute for imported ``Manila''-type clams, and also augment the half-shell and steamed clam trade, currently dominated by the hard clam (Mercenaria mercenaria). With growth rates twice that of hard clams, surf clams hold exceptional aquacultural promise. Our trial grow-out studies have shown that Surf clams can be grown to marketable size in one year. To date, survival through the grow-out system has increased 10-fold, from 1-2% in 1999 to over 20% in 2001.

Source of Funding: Hatch, State, County, and Private Grant

Scope of Impact: State Specific

Goal 1

Key Theme: Plant Health

Activity: Rusty spot of peach, suspected of being caused by the apple powdery mildew pathogen is found throughout the United States and a serious disease on susceptible cultivars. Direct crop loss occurs through infection, which results in necrosis of epidermal cells and cracking of the fruit surface. This study proposes to increase our understanding of the quantitative, temporal aspects of peach rusty spot epidemics. In order to achieve that goal, it is necessary to determine the analytical model that best describe disease progression of peach rusty spot, and quantify and compare the effects of different numbers of fungicide applications on epidemic development. With this information, it is possible to explore rusty spot disease progression as a function of fruit growth and maturation. Such information provides a foundation for implementation of novel disease management tactics and improvement of current strategies.

Impact: Quantitative epidemiological analysis of peach rusty spot epidemics indicated that infection occurs during a relatively narrow time in early spring. Therefore, results of this analytical analysis show that four sprays at 100% petal fall, shuck-split, first cover, and second cover provided optimum control. An empirical analysis, which compared areas under the disease progress curve for the treatments, also indicated that these four sprays provide optimum disease management. Studies on the importance of ontogenic resistance, as exemplified by the relationship between disease progress and fruit growth, have been completed; data are currently being analyzed. Current recommendations for peach rusty spot control stipulate that fungicide sprays should be applied beginning at shuck-split and continuing on a 10-14 day basis for the remainder of the season. This approach results in as many as six to eight applications per season, depending on date of harvest. Analytical and empirical results from this research indicate that only four sprays are needed per season, even for late-maturing cultivars. Fungicide usage is reduced by 33 to 50% without any loss in quality or quantity of fruit grown. Consequently, grower profitability will be enhanced and environmental impact will be lessened.

Source of Funding: Hatch, State

Scope of Impact: State Specific

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.

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.

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. Analyses of participant data have revealed significant improvements for local producers being more efficient and saving dollars as well as numerous farms being saved.

Source of Funding: Smith-Lever 3(b) & (c), State, County

Scope of Impact: State Specific

Goal 1

Key Theme: Home Lawn and Gardening

Activity: Extension agents maximize the use of the internet, broadcast and cable television media to reach the large diverse population which exists in New Jersey with non-biased research based information in a practical format. Twelve, 30 minute educational television programs were created and aired as part of the "If Plants Could Talk" gardening and pest management series in 2000 to 2001. The television program promotes the following: 1) Environmental Stewardship, 2) Proper Plant Selection and Care, 3) Judicious use of pesticides, fertilizers and water, 4) Integrated Pest Management, and 5) support of local agriculture. The series airs on NJN Public Television with a potential audience of over 7.8 million throughout NJ and parts of NY, PA, CT, and DE. In FY 2001 the "If Plants Could Talk" website was expanded to include: 1) fact sheets, 2) informational sheets, 3) educational slide shows, 4) virtual tours, 5) digital photographs of recommended plants for our area, 6) maps and listing of gardens and pick-your-own farms and 6) streaming video on educational topics discussed on the television program.

Impact: The television program consistently receives 10 to 25% higher Nielsen rating than the comparable and nationally popular "Victory Garden" which normally runs in the same time slot. Nielsen ratings indicate that in parts of South Jersey and Philadelphia alone the program is attracting between 30,000 to 50,000 viewers on average. The total audience is estimated at 100,000 to 150,000 viewers on average. These are extremely conservative figures. This has helped to bring practical research based information to a much greater audience. Over 25 newspapers throughout New Jersey ran articles on the "If Plants Could Talk" television show and website. Two major newspapers in New Jersey, The Star Ledger and Burlington County Times (combined readership of 250,000) both ran major stories on the IPCT television program and website. The American Vegetable Grower and the American Nurserymen (combined national readership of over 140,000 people) also ran stories on the IPCT television program and website. The public has responded with hundreds of positive emails, letters and over 2 million hits on the website corresponding to the television program. As a result of one episode on ornamental grasses, a nursery in Englishtown, NJ sold out of their stock of ornamental grasses. The series in addition to providing quality information is having a positive impact on agricultural viability through the promotion of local agriculture.

Source of Funding: Smith-Lever 3(b) & (c), State, County

Scope of Impact: NJ, PA

Goal 1

Key Theme: Agricultural Competitiveness
Agricultural Profitability

Activity: New Jersey extension specialists continue ongoing work on field trials and evaluations of vegetable crops to develop new products and increased production for agricultural producers. Comprehensive applied research on vegetable crops has resulted in new disease resistant varieties.

Impact: Field trails and evaluation of processing tomato varieties have resulted in the identification of 4 new hybrids with improved yield and processing quality. These hybrids are currently in use by growers of processing tomatoes, a commodity which exceeds $2 million annually.

One hybrid bell pepper with resistance to phytophthora was developed. This particular hybrid accounted for 15% of the acreage and was the only one surviving in the field after excessive rains. Paladin has added more than $100,000 per year to growers' income. An experimental hybrid of spinach was identified as having very good yield potential plus greater resistance to fusarium root rot, white rust and anthracnose. In its second year of commercial use, it accounts for 30% of acreage and will replace the standard in a few years resulting in increased profitability.

Source of Funding: Smith Lever 3(b) & (c), State, County

Scope of Impact: State Specific

Goal 1

Key Theme: Ornamental/Green Agriculture

Activity: New Jersey produces over 100 million dollars in ornamental crops annually in greenhouse operations. Rutgers agricultural agents continue work with Cornell agents to produce a multistate monthly newsletter entitled “Northeast IPM Notes”.

Impact: Subscribers to the newsletter were surveyed. Respondents indicted that information learned resulted in adoption of IPM practices on 1,400,000 square feet of controlled greenhouse space and 40 acres of outdoor flower crops representing a total crop value of approximately 16 million dollars.

Source of Funding: Smith Lever 3(b) & (c), State, County

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 Rutgers campus. 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 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.

Allocated Resources:

Research

Hatch Funds: $269K
All Funds: $1,573K
SY's: 6

Extension

Smith-Lever Funds: $3K

All Funds:	$353K
FTE’s:	1.7

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.

Source of Funding: State

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: In 2001, we developed research parameters 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. We 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 will be posted in full on the web in 2001. Finally, we initiated a statewide mapping project to GIS map several sectors of the food system throughout the state.

Source of Funding: Hatch, State

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 2

Key Theme: Food Borne 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.

Source of Funding: Smith Lever 3(b) & (c), State, County

Scope of Impact: NJ, NY

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.

Rutgers researchers are investigating the way alcohol and estrogen affects cells in the pituitary gland to determine the role of estrogen in tumor growth. This study will provide information on how alcohol use or hormone use can affect cancer formation.

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.

Scientist 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. These programs have resulted in increased awareness and behavior changes which have impacted the health status of New Jerseyans.

Allocated Resources:

Research

Hatch Funds:	$241K
All Funds:	$3,222K
SY's:	7

Extension

Smith-Lever Funds:	$40K
All Funds:	$456K
FTE's:	10

Goal 3

Key Theme: Human Health

Activity: Prolactinomas are tumors of the prolactin-secreting cells in the pituitary gland and are the most frequently occurring tumor in the human pituitary. In the general population, 1:2800 men and 1:1050 women have prolactinomas. Prolactinoma development has been linked to estrogen exposure in both humans and animals. There are now several reports showing evidence for the existence of high levels of prolactin in chronic alcoholic men and women. We have recently obtained data showing that ethanol causes hyperprolactinemia by increasing prolactin release and increasing lactotropic cell proliferation. Estrogen has been linked to tumor growth in a variety of tissues in both human and animals. Estrogen exposure has been correlated with tumors of the breast, prostate, uterus, and pituitary. Despite the rate of incidence of such tumors, the influence of estrogen on cells and eventually tumor growth is not well understood.

Impact: A professor in animal sciences, with funding from the National Institutes of Health, and working with the Rutgers University Center for Alcohol Studies, has investigated the way alcohol and estrogen affects cells in the pituitary gland. Specifically, he has examined the interactions between two separate populations of cells within the pituitary and how these interactions could explain why pituitary tumors develop. Results from recent experiments suggest that these cell-to-cell interactions are important in determining the role of estrogen in tumor growth. Current results provide evidence that ethanol directly acts on specific pituitary gland cells to increase prolactin secretion, whereas ethanol increases cell growth by altering cell-to-cell communication between the pituitary cells. Present studies are being performed to examine how alcohol can affect estrogen's actions in tumor growth. By understanding the mechanisms in which estrogen and alcohol lead to tumor growth in pituitary gland cells, new treatments for these types of cancers can be found. This study will also provide information on how alcohol use or hormone use can affect cancer formation.

Source of Funding: National Institutes of Health, National Research Initiative Funds, Hatch, State

Scope of Impact: State Specific

Goal 3

Key Theme: Human Health

Activity: The appearance of West Nile virus (WNV) in the New York – New Jersey metropolitan area underscored the need for mosquito research and control that is based on science. This program, which was originally designed to monitor mosquito vectors for eastern equine encephalitis virus, was able to expand its activities toward this new invasive mosquito-borne pathogen and collect surveillance data to define the extent of the health threat and identify areas that required immediate investigation. This project had the task of collecting and evaluating scientific information on a new disease entity since 1999. Numerous questions have been raised regarding the health threat of this new, invasive mosquito-borne virus. Although many questions remain unresolved, this project maximizes vector surveillance and control efforts by monitoring the disease according to the scientific method and analyzing the results for immediate implementation. The scope of the threat to human health was analyzed, and a statewide surveillance effort to monitor the virus in mosquitoes, wild birds, and deer was conducted.

Impact: This relatively new program has provided findings which impact the effective and environmentally sound control of mosquitoes: (1) *Culex* mosquitoes, thought to be the primary vectors for this disease, play a major role in the amplification of WNV in local bird populations but their role as vectors to humans is questionable; (2) floodwater *Aedes* mosquitoes appear to pose the highest risk to humans and equids; (3) mosquito surveillance should focus more fully on meteorological events such as floods; (4) sentinel chicken flocks have limited value as indicators of WNV in any geographic area; and (5) WNV is exceptionally lethal to wild crows. 6) Preliminary studies with White-tailed Deer suggest that a fairly high proportion of the NJ herd is making contact with WNV. Results suggest that studies should be designed to determine the exact role of deer in the WNV cycle. These findings have and will be critical to the development of strategies to control mosquitoes and the spread of this threat to human health.

Source of Funds: Hatch, State, Center for Disease Control, N.J. Department of Environmental Protection

Scope of Impact: State Specific

Goal 3

Key Theme: Human Health
Nutraceuticals

Activity: The potential of food to be used as preventative and curative weapons against chronic disease is widely recognized. However, the evaluation of nutraceuticals requires complex, coordinated chemical and biological investigation. Rutgers researchers, via a "Pioneer Nutraceuticals Research Project," are providing high-quality chemical and biological research related to the health benefits of food. The research team is comprised of food science researchers from Rutgers' Center for Advanced Food Technology, who are making chemical analyses of nutraceuticals, and collaborating biological researchers from other Rutgers departments and the University of Medicine and Dentistry of New Jersey (UMDNJ), who are evaluating the biology.

Impact: The food scientists are also working towards understanding the effects of processing on stability of these value-added compounds. Potentially therapeutic compounds have been identified in the seeds of Quinoa (Chenoposium quinoa), blue cohash, and almond skin extract, among others. In addition, the research group has discovered various mechanisms by which nutraceutical compounds, such as flavanoids, flavonoids, compound found in Inula Britannica, an extract of the root of the Chinese plant Polygonum cuspidatum, cranberry proanthocyanidins, and licorice compounds, act upon specific cells within the body. The research group has also discovered ways in which food processing can enhance the health-promoting properties of food, such as in the antioxidant activity of Fru-Arg in garlic extract as it ages and the formation of sulfur compounds when methionine degrades.

Source of Funding: Private, State

Scope of Impact: State Specific

Goal 3

Key Themes: Human Health

Activity: The obesity epidemic is a major public health concern. It is an independent risk factor for premature death, cardiovascular disease, and other various diseases. Human obesity has genetic components, but the recent rapid rise in the prevalence of obesity clearly underscores the importance of environmental causes. It appears that human obesity is a multigenic disease in which gene-environment and gene-gene interaction factor in the development of an obese phenotype. More research is needed to determine cause of obesity. Over 50 percent of New Jersey citizens are obese, and since obesity and fat distribution are independent risk factors for the development of type 2 diabetes, researchers at NJAES are examining factors that influence the production and secretion patterns of leptin, which has been associated with adiposity, endocrine, and immune function. In order to bring together obesity researchers to catalyze inter- and multi-disciplinary research into the causes, metabolic complications, treatment and prevention of obesity, the New Jersey Obesity Group (NJOG) was created to initiate and carry out new obesity projects by providing consultation, methodological expertise, technical and equipment support for feasibility studies, allowing investigators to undertake high risk, high gain projects. Also, the clinical/outreach component of the group will recruit subjects and facilitate planning and implementation of clinical research studies.

Impact: In its first year of existence, the New Jersey Obesity Group has made considerable progress toward our goal of developing multidisciplinary projects understand obesity. Approximately 20 researchers, across Rutgers University, the NJAES, and University of Medicine and Dentistry in New Jersey are regularly discussing research and developing new projects. Toward this goal, we established two core laboratories to facilitate new collaborative and pilot and feasibility projects. New projects include an analysis of community needs for obesity prevention in New Brunswick, studies of calcium homeostasis during massive weight loss, and understanding fatty acid trafficking in fat cells. Projects under discussion include testing of novel compounds to treat obesity, and phenotyping of new transgenic mouse obesity models. To bring researchers together, we sponsored a number of very exciting seminars and symposium that were very well attended by faculty and students from Rutgers, UMDNJ, and academic and industry scientists from throughout the tri-state area. We are also initiating bioinformatics and computational imaging projects relevant to understanding the determinants of human fat distribution and their metabolic consequences.

Source of Funding: Hatch, State

Scope of Impact: State Specific

Goal 3

Key Theme: Human Health
Human Nutrition

Activity: Obesity is rapidly becoming a major health crisis. Latest federal figures show that obesity is on the rise in adults and children. Adults need to control their own weight and be role models for their children. Many use quick weight loss or fad diets to shed pounds quickly. Family and Consumer Sciences educators have developed web based instruction guides for consumers to alert them of healthy eating and exercise habits and the negative effects of fad diets.

Impact: Participants have gained an understanding of the negative impact of fad diets and developed changed behaviors to reduce caloric intake and increase expenditure resulting in improved overall health.

Source of Funding: Smith Lever 3(b) & (c), State, County

Scope of Impact: State Specific

Goal 3

Key Theme: Human Health

Activity: Osteoporosis is the third cause of death in the elderly population. Eighteen million Americans are at risk for osteoporosis and ten million Americans currently have osteoporosis. Men are becoming increasingly at risk. The annual cost to the health care system is $13 billion annually.

Extension educational programs have been planned and conducted through the Strong Bones for a Lifetime program to educate residents about osteoporosis prevention. In Hunterdon County alone, 8 sites participate in this program developing strategies to improve wellness.

Impact: Over 179 participants in the program have learned the basis of how bones work, what osteoporosis is and risk factors of osteoporosis. Informal evaluation continues to show that participants have increased dietary calcium consumption, increase amount of weight they can lift. Strength training and increase calcium consumption contribute to bone health, flexibility and balance, reducing fracture risk and strain on the health care system and mortality rate due to hip fracture.

Source of Funding: Smith Lever 3(b) & (c), State, County

Scope of Impact: State Specific

Goal 3

Key Theme: Human Health

Activity: As part of a major initiative to address human health issues, Family and Consumer Sciences Educators have developed and conducted a multifaceted program entitled Herbs and Health: Safety and Effectiveness. This program addresses issues of quality, safety and regulatory issues which consumers are confronted with as many attempt to self-medicate with herbal supplements. The herb and health programs have been targeted to health professionals, faculty, students and the general public.

Impact: Post class evaluations indicated that:

- 78% learned the need for herbal laws and regulations.
- 82% learned the importance of the safety and effectiveness of herbal supplements.
- 85% learned factors that influence the quality of herbal supplements.
- 89% learned some herbal supplement/drug interactions.

When asked what they plant to do with the information learned:

- 37% stated they would research and collect science-based information on herbal supplements before taking them.
- 70% stated they would be cautious in the use of herbal supplements when taking prescribed medications.
- 59% stated they would be alert to adverse reactions when taking herbal supplements.
- 56% stated they would inform their physician if using herbal supplements.

At three months after the class, post evaluation revealed that as a result of the class:

- 72% indicated the information presented was useful concerning the safety and effectiveness of herbal supplements.
- 61% indicted that after the class, they explored science-based information on herbal supplements before taking them.
- 88% stated that as a result of the class they learned to sue caution in using herbal supplements.

Source of Funding: Smith-Lever 3(b) & (c), State, County

Scope of Impact: State Specific

Goal 3

Key Theme: Human Health
Human Nutrition

Activity: Extension Family and Consumer Sciences Educators recognized the need youth have to experience positive, supportive relationships and opportunities to reduce the chances of at-risk behaviors such as alcohol, drug use and violence. Educators developed Kids R Cooks summer day camp program that is centered on building developmental assets that lead to positive productive lives. The camp program focused on building the external assets of youth through a variety of youth development activities.

Kids R Cooks summer program focused on teaching youth how to make healthy food choices as well as engage in regular exercise to promote better health and reduce risk of early on set of chronic diseases. Youth learned what foods help their bodies grow and be healthy and that a proper diet will boost their performance in school, help prevent obesity, diseases and other disorders. Program goals were: 1) Youth will understand that food helps their bodies grow and be healthy, 2) Youth will learn that regular physical activity helps to achieve a healthy body and mind. This year three lessons were developed using Disney adventures including The Lion King, Emperor's New Groove and Spy Kid. Specifically, the youth were taught to eat more fruits and vegetables, eat less fat, sugar and salt, eat yummy nutritious snacks and eat breakfast.

Impact: Spy Kid lesson taught the Breakfast Rule – *start the day right and include three of the food groups at breakfast*. An evaluation instrument was administered to three groups, a total of 48 youth. 34% of the youth matched all three sets of food groups (100% correct) to create a complete breakfast, while 54% matched one or two of the food groups sets. Evidence documents that the youth understood the Rule and could apply the Rule to select a complete breakfast.

Source of Funding: Atlantic City Housing Authority, State, County

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 to 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.

A major focus in New Jersey has been in biological and integrated pest management. The recent development of a hypervirulant strain of the pathogen that is the causal agent of Chestnut Blight disease may serve as a biological control agent for this factor that is responsible for the destruction of chestnut trees in eastern hardwood forests. Another program has developed insecticidal nematodes that serve as biological control agents. These nematodes have been patented and licensed to biotechnology firms. Rutgers staff have also facilitated cooperation between New Jersey and Pennsylvania to control blackfly populations in the Delaware River. We have GIS and GPS technologies to identify site-specific targets for the use of biological pesticides guided by IPM practices. In addition to extensive IPM programs in traditional crops such as fruits, vegetables and field crops, we have planned and implemented IPM programs for landscape plantings including turfgrass. The “Best Management Practices for Turf Systems in the East” research and extension program will help golf course superintendents make informed choices and should improve their ability to manage new cultivars when they are established.

One of the most serious problems which continues to face New Jersey farmers has been crop losses due to white tail deer. In response, Rutgers has created a Center for Wildlife Damage Control. The Center uses traditional and GIS survey techniques to identify and quantify deer densities and resulting crop losses. It also provides extensive educational programs on damage control technologies and has funded research in the area of non-lethal fertility control in deer. A survey was conducted to access the altitudes and perceptions of the non-farming public of deer and the impact hey have on their lives. The results will aid in the development of sound policies for deer management.

Rutgers also has a long history in waste management and recycling. A recent program has facilitated the diversion of food wastes to animal feeds. This program has served as a national model and has led to significant industry and regulatory changes. New guidelines for the application of sewage sludge to agricultural lands have been published and are forming the basis of new right-to-farm rules including farm conservation plans and other agricultural management practices.

New Jersey 4-H youth development faculty have capitalized on Rutgers environmental science capacity and have planned and implemented extensive environmental programs for youth. These programs have received local and national recognition. In Cape May County targeted

efforts were made to increase diversity by reaching special needs youth with environmental sciences programs.

Resources Allocated:

Research

Hatch Funds:	$867K
All Funds:	$1,515K
SY's:	14

Extension

Smith-Lever Funds:	$124K
All Funds:	$1,200K
FTE's:	21

Goal 4

Key Themes: Biological Control
Forest Resource Management
Plant Health

Activity: The American Chestnuts once occupied 25 percent of our eastern hardwood forests. However, the pathogen *Cryphonectria parasitica*, the causal agent of Chestnut Blight disease, resulted in the destruction of chestnut trees in the forests of Northeast America. Rutgers scientists, along with others in the Northeast, have been investigating viruses that may reduce virulence of the fungus and cause it to be less of a problem in forest settings, and to investigate the response of the fungal pathogen to these viruses. The goal of this research is to use viruses for biological control of chestnut blight and try to understand the natural biology of the fungus and its viruses, then where appropriate, try to manipulate those viruses to our benefit in a forest setting. Study of viruses of C. parasitica will help determine their long-term usefulness as biological control agents for the fungus that has virtually eliminated the American chestnut from North American hardwood forests

Impact: Two transposable elements have been identified which will assist in tracking the early geographic movements of the fungus, and provide markers to assess the effect of the biocontrol viruses on the fungal population in the forests of North America. Furthermore, these elements may be of great value for developing gene-tagging vectors for plant pathogenic fungi. Being able to monitor the dynamics of virulence of this pathogen will assist in planning strategies for biologically based control practices. Characterization of a DNA probe used to examine the background population on C. parasitica isolates in Howell Township was completed and published. A DNA probe that shows greater variability in this population, called Crypt2 has been isolated, sequenced, and used to examine other isolates from the population. This probe is allowing for more critical examination of the C. parasitica populations in this study.

Source of Funding: Hatch, McIntire-Stennis, NRI, State

Scope of Impact: Multistate Research (CT, MA, MD, NJ, NY, WV)

Goal 4

Key Themes: Integrated Pest Management
Pesticide Application

Activity: Domestic production of fruit, vegetable, herb, turf, ornamental, and other specialty crops are estimated to be worth over $40 billion dollars annually (1997 Census of Agriculture). In New Jersey, 89% of the farm gate value of crops are from high value, low acreage horticultural crops. Producers of these crops (collectively called minor crops) have numerous problems with insect, disease, and weed pests that can cause a significant reduction in farm gate value. Due to high costs of research and development, the basic producers of crop protection chemicals often do not extend legal registrations of their products into these high value, low acreage specialty crops. USDA has established Interregional Research Project Number Four (IR-4) as the national program to support the registration of chemical and biological pest control tools for minor or specialty crops. This program is a partnership between USDA and the State Agriculture Experiment Stations. The IR-4 Project is administered from its National Headquarters at Cook College/New Jersey Agricultural Experiment Station, Rutgers-The State University of New Jersey.
Growers face the loss of important pesticide uses without the assistance of IR-4, which is the only publicly support research program in the U.S. created to clear pest control agents for minor uses. To permit both large and small growers to continue to produce a safe variety of fruits, vegetables and ornamentals without undue losses from pests that threaten to put them out of business, and to effectively employ minor uses of pesticides, and biologically based pest control products in helping keep food and non-food costs at realistic levels for the public.

Impact: The IR-4 program provides pest management solutions to growers of fruits, vegetables and other minor crops. Fruits, vegetables, nuts, berries, herbs, nursery plants, and ornamentals totaling over 600 crops are classified as minor crops in the United States based on their limited production acreages. In2001, research was conducted on 107 projects representing 608 trials. IR-4 food safety data submitted to EPA, California, Canada and industry and data development resulted in pest control solutions including Section 18 time limited tolerances and re-registrations representing 543 clearances for fungicides, herbicides, insecticides, rodenticides and biopesticides. In addition, this program helps its clients keep abreast of and meet any new demands by regulatory officials for additional research data for pesticides and biopesticides in or on food, feed and fiber, crops and ornamentals. The clientele needs are identified by the submission of requests from research and extension personnel, farmers, grower organizations and others through liaison Representatives to the regional offices. Field research coordinators verify each clearance request and forwards it to IR-4 Headquarters where it is entered into a master list.

Source of Funding: Hatch, CSREES Special Grant, and Private Grant

Scope of Impact: Multistate Integrated Research and Extension all 50 states

Goal 4

Key Themes: Integrated Pest Management
Plant Germplasm
Home Lawn and Gardening

Activity: The purpose of this multidisciplinary research and extension program, which contributes to Multistate Research Project NE-187, "Best Management Practices for Turf Systems in the East," is to aid golf course superintendents in the selection of improved bentgrass cultivars that will require reduced fungicide inputs. It focuses on the disease response of several new bentgrass cultivars maintained under different nitrogen fertility, mowing height, and fungicide regimes. Three common foliar diseases were evaluated – dollar spot, brown patch, and copper spot. In 2001, the focus was on the discovery of new sources of resistance to the fungal disease dollar spot (Sclerotinia homeocarpa) in bentgrass, assessing factors that can be used to reduce fungicide inputs while maintaining acceptable turf quality of bentgrass cultivars varying in susceptibility to dollar spot and brown patch (Rhizoctonia solani), and identifying bentgrass cultivars that exhibit an improved ability to compete against annual bluegrass invasion under traffic and determine whether the time of establishment affects the competitiveness of bentgrasses against annual bluegrass.

Impact: Twelve new germplasm sources (out of 500) of resistance to dollar spot were evaluated in 12 replications over 2 years. The bentgrass cultivars Penn G2, SR 7200 and L-93 were least susceptible to dollar spot under most nitrogen and cutting height treatments. In general, brown patch was most severe on turf maintained at greens height and high nitrogen. In general, fungicides within the benzimidazole, dithiocarbamate, nitrile, phenylpyrrole and phosphonate chemical classes provided the most effective control of dead spot (78-97% control) compared to untreated turf. Bentgrass cultivars having the capacity to produce high density turf under fairway and putting green conditions have exhibited good to excellent tolerance to both wear and compaction treatment. Velvet bentgrass has considerably better tolerance of traffic stresses than previously reported. The velvet bentgrass experimental, 7001, has exhibited the greatest tolerance to traffic as measured by annual bluegrass invasion. Other high-density bentgrasses including Penn G-1, Penn A-4, and SR 7200 have exhibited good tolerance to annual bluegrass invasion under traffic stresses. Results from this research will help golf course superintendents make informed choices when selecting new bentgrass cultivars and should improve their ability to manage these cultivars once they are established

Source of Funding: Hatch, State, Private Grant

Scope of Impact: Multistate Integrated Research and Extension (CT, FL, ME, MD, MA, ME, NJ, NY, OH, PA, RI)

Goal 4

Key Theme: Wildlife Management

Activity: New Jersey is a state with a significant suburban environment. This suburban environment provides the native white-tailed deer with an ideal habitat, and consequently, their numbers have risen to a point that there is a significant overpopulation of deer in many areas of the state. Research on this issue has largely focused on the economic impact of deer on New Jersey's farming community; however, the deer also affects the suburban, non-farming public. In order to explore the attitudes and perceptions of suburban residents, a survey of New Jersey residents regarding their perception of deer, and the impact they have had on their lives. This survey was conducted by the Rutgers Center for Wildlife Damage Control, and Rutgers University's department of Agricultural, Food, and Resource Economics to assess the impact of deer on the non-farming population of New Jersey. The survey sampled 500 NJ residents who lived in suburban areas.

Impact: From the survey results, it was discovered that people's perceptions about deer depend on their own experiences, especially if they have encountered deer while driving. Although the large majority of respondents believed that deer have their own intrinsic value and are an important aspect of the natural environment, they also agreed that overpopulation is a problem, and measures should be taken to control the population. The majority of respondents were not aware of the current deer management methods. Also, 41% of the non-farming public did not realize the deer have a negative impact on the state's farmers. From these results, it was concluded that although residents appreciate the fact that there is a deer problem, they are not always aware of the cost or methods for deer management, and do not realize the economic impact to farmers. The researchers stressed the importance of educating the non-farming public about the impact of deer overpopulation on natural environments and farmer's livelihoods, as well as current deer management methods, to aid in developing sound policies for deer management.

Source of Funding: Smith Lever 3(b) & (c), State, County, New Jersey Department of Environmental Protection, New Jersey Farm Bureau

Scope of Impact: State Specific

Goal 4

Key Theme: Recycling

Activity: Solid waste managers nationwide are considering the possibilities of diverting food residuals to animal feed instead of landfilling or incinerating. There are several plants (Florida, Wisconsin, New Jersey, Hawaii, Alabama, etc.) using food residuals to produce animal feed nationally. One of those, located in central New Jersey makes a product using restaurant and/or supermarket waste. This company, Enviro-Feed Corp., has been in operation for nearly two years. The food waste to animal feed research and education program at Rutgers University has shown potential to greatly alter the means by which food waste is managed in this country. Food waste's high nutrient content makes it a potential animal feed. Most analyses reveal food waste to have high protein and fat content, both in excess of 20 per cent. Any animal feeding problems relate primarily to animal health concerns, moisture content, and nutrient variability. A bulk of the research completed with food waste has used wet waste for animal feed; however, recent projects have used various processed (extruded, dehydrated, pelleted, ensiled, etc.) products in animal feeding experiments. The ability to further process and de-water food waste would allow preservation, storage, and easier use commercially. This project has continued to examine the use of processed food wastes as animal feeds.

Impact: The food waste to animal feed research and education program at Rutgers has shown significant impact on all influence by it through national symposia and invited presentations, publication in both peer reviewed and non-peer reviewed press, undergraduate student development and organization of a trade group for those with an interest in the topic. Currently research is being completed examining a dry product produced by mixing wet wastes with wheat middlings and corn and drying them. These have been fed and are being fed to swine. Both growth and nutrient digestibility are studied. Work is in progress comparing the growth performance of swine fed food waste and swine fed a more traditional diet. In the first experiment swine fed food waste as a component performed acceptably when fed diets that were isonitrogenous and isocaloric with a traditional diet. The carcass performance was acceptable as well. Currently underway is a repeat of the previous experiment where growth and carcass merit were compared. In the future, studies are being performed on the digestibility of the diet.

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

Scope of Impact: State Specific

Goal 4

Key Theme: Recycling

Activity: Maintaining the delicate balance between agriculture and the environment in a densely populated state such as New Jersey is critical. High production costs affect the sustainability of agriculture. Extension specialists have looked at alternate means of managing limited resources and protecting the ecosystem while at the same time reducing farmers' costs. Specialists have developed best management practices based on field and laboratory experiments to utilize food processing residuals for fertilizers and to improve soil quality.

New Jersey specialists have also examined the proper use of sludge as a land application to reduce the need for synthetic fertilizers. This program investigates social and legal aspects of land application issues, performs analyses of sludge quality data and develops recommendations.

Impact: Experiment results have been used by regulators within the state and beyond. The proper use of non-traditional organic wastes reduce farmers' costs for fertilizers and improve the soil quality while providing local means for municipalities and companies to recycle organic wastes. Use of these practices has resulted in reduced non-point source pollution.

Research regarding social and legal issues concerning land applications of sewage sludge resulted in important discovery which were utilized in determining policies. The resulting guidelines were used by the New Jersey Department of Agriculture as a basis for developing their agricultural management practices and helped the Natural Resources and Conservation Service (NRCS) in developing farm conservation plans.

Source of Funding: Smith Lever 3(b) & (c), State

Scope of Impact: State Specific

Goal 4

Key Theme: Natural Resource Management

Activity: Targeted efforts to increase diversity in outreach for the 4-H youth development program in Cape May County resulted in the development of the Woodbine Elementary School 4-H Gardening project. Youth grades Pre-K through 8th were provided with opportunities to develop life skills, enhance self esteem, and develop school and community pride through hands-on science activities. Teachers and students developed skills in plant science, gardening and horticulture.

Impact: This effort has enhanced the diversity of the Cape May County 4-H Program by reaching an audience that had never been served. The project established a dynamic partnership between 4-H, the school and an underserved community. Teachers/aides, students and parent volunteers learned basic gardening skills and utilized them in both indoor and outdoor gardens which received recognition at the county 4-H Fair for outstanding community service. This successful project now serves as a model or establishing other Rutgers Cooperative Extension school partnerships. Administrators and teachers ranked the session as excellent. The mayor and local community leaders also got involved in this grassroots community development project.

Source of Funding: Smith-Lever 3(b) & (c), State, County, New Jersey 4-H Development Fund

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.

Allocated Resources:

Research

Hatch Funds: $146K
All Funds: $1,515K
SY's: 5

Extension

Smith-Lever Funds: $534K
All Funds: $2,665K
FTE's: 48

Goal 5

Key Theme: Family Resource Management

Activity: Family and Consumer Sciences Educators developed and distributed a home study course entitled “Investing For Your Future” aimed toward consumers who are faced with the challenge of making wise choices when making retirement plan decisions in voluntary salary reduction plan and determining asset allocations of their portfolio. This home study course taught the basic principles of successful investing and characteristics of available investment products. The course was available on line as a web-based instruction as well as print copies. A train the trainer session was held for 35 financial educators at a national meeting.

Impact: There are currently over 1,300 registered online readers of Investing For Your Future and the course receives about 80 to 120 hits per day. Written and online evaluation forms indicate numerous instances of increased knowledge and changed behavior. One reader noted, "I feel this course is a great public service to the community, since we really never learned it in school. It is also great because it is very unbiased information. I trust the course info more than any articles or books I read.”

70% of respondents to a follow up study reported that they saved or invested money since completing the investment home study course. Chi-square analysis showed evidence that new information learned by respondents was associated with corresponding behavioral change.

Source of Funding: Smith-Lever 3(b) & (c), State, County, The Foundation for Financial Planning

Scope of Impact: NJ, AR, FL, RI

Goal 5

Key Theme: Family Resource Management

Activity: Family and Consumer Sciences Educators developed and piloted a financial management course targeted especially to women who have financial security needs which are different from men. Women have historically earned less and lived longer which attributes to the fact that a disproportionate 75% of the elderly poor are women and 80% of those living in poverty were not poor before the death of their husbands. The Women's Financial Education Series and workbook, "Money Talk: A financial Guide for Women" were presented to Extension professionals in New York and New Jersey who will in turn teach the series. The workbook will be shared at the CSREES National Initiative Roll-Out Conference on Financial Security in Later Life providing an opportunity for national replication of this educational series.

Impact: Participants in the pilot test of this new educational program reported positive attitudinal shifts and positive behavior changes that impacted how they managed their personal finances as a result of this course. Seventy percent of the women taught continue to attend other financial education classes. The practices most often reported as accomplished during and after the workshops are: starting a financial notebook, establishing financial goals, developing or updating a net worth statement, and identifying leaks in spending. The majority of participants surveyed (83%) said they felt more secure about managing their money after taking the course.

Source of Funding: Smith-Lever 3(b) & (c), State, County

Scope of Impact: NJ, NY

Goal 5

Key Theme: Children Youth and Families at Risk

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.

In an effort to combat these startling statistics, the 4-H agent developed Horses and Youth (HAY) is an innovative program designed to reduce recidivism and serve as a comprehensive prevention/intervention strategy. The goal of HAY is to provide prevention strategies for young people by helping them gain competencies, self-confidence, group interaction capabilities, leadership skills, and opportunities to explore non-traditional vocations. Nineteen juvenile offenders and at-risk youth, ages 12-18, took part in the four phases that make up HAY – life skills development, horse care and management, horsemanship, and aftercare. The group met five days a week – four of them were on the farm working directly with the horses. On the 5th day the group met at the 4-H Center for activities and group recreational games focusing on leadership, communication, self-awareness, and teamwork/conflict resolution.

Impact: The Pennsylvania 4-H Life Skills Goad Record served as the model for the HAY Life Skills Goad Record.

Likert ratings averaging 1.5 pre-program increased to 3.4 in Anger Management/Conflict Resolution skills; in self-worth the ratings went from 1.25 to 3.75, and problem solving skills rose from 1.875 to 3.25. Of equal importance to note was that workplace/marketable skills only went from 2.22 to 2.9. This clearly demonstrates a need for improved programming in this area. Self-assessment in the participants' three selected life skills areas showed marked increase.

Source of Funding: Smith-Lever 3(b) & (c), State, County, Atlantic City Housing Authority

Scope of Impact: State Specific

Goal 5

Key Theme: Character/Ethics Education

Activity: A large proportion of first time juvenile offenders in Burlington County are convicted of shoplifting and other minor offenses. The Juvenile Conference Committee of the Superior Court has identified a need for alternative adjudication programs for first time offenders. The purpose of such a program is to divert offenders from further court involvement.

An assumption is made at the outset that young people generally know and want to do the right thing. However, they may not have the capacity or level of awareness for effective decision making. Increasing awareness of the consequences of their actions on themselves and others can increase their capacity as well as their desire to make responsible choices.

Focusing on the six pillars of character: trustworthiness, respect, responsibility, fairness, caring and citizenship, role-playing, skits, and real life scenarios are used to engage participants in applying the pillars. The teens lead the entire program and demonstrate a sense of ownership.

4-H teens participated in more than fifty hours of training. Once teens facilitate a three-hour discussion/activity period with juvenile offenders who have been required by the Court to attend. Youth and adults work as partners in planning and implementing this program.

Impact: Five 4-H teens have participated in more than fifty hours of training in ethical decision making as well as facilitation skills. Over one hundred first time juvenile offenders have participated in the three-hour workshop led by 4-H teens. None of these participants have been repeat offenders. The court continues to track their records to ascertain a recidivism rate. A clean record for six months is considered important while a clean record for eighteen months is considered a significant indicator that the offender will not return to court involvement. The evidence shows that the recidivism rate has decreased for those at risk youth who have participated in the program.

Source of Funding: Smith-Lever 3(b) & (c), State, County

Scope of Impact: State Specific

Goal 5

Key Theme: Character/Ethics Education

Activity: Character Counts is one of the most widely used and recognized character education and ethical decision-making models. Training using this model was conducted on the Cook Campus during FY 2000. This 4-day session was an interactive session designed to introduce participants to the Six Pillars of Character (Trust-worthiness, Respect, Responsibility, Fairness, Caring and Citizenship). Those who received have been actively engaged in training youth.

Not only have schools participated in the program but also many businesses have trained their employees in Character Education and Workplace Ethics.

Impact: In addition to impacts reported last year more than 3,000 teachers, educators and youth serving professionals and volunteers have been trained to implement Character Counts to over 100,000 youth in the state of New Jersey. The results of these efforts can be seen throughout the state. Teen participants have said their understanding and tolerance of others have increased significantly. Youth realize they are role models in the school and community, teachers and counselors are working to make the program a mandatory part of the curriculum.

Source of Funding: Smith-Lever 3(b) & (c), State, County

Scope of Impact: State Specific

Goal 5

Key Theme: Leadership Development
Workforce Preparation – Youth
Children Youth and Families at Risk

Activity: Youth living in urban environments have limited exposure to positive, supportive relationships, places and opportunities. To reduce the chances of these youth becoming involved in at risk behaviors such as alcohol and other drug use, school problems and violence the 4-H program has engaged them in a community beautification project.

In Union County community greening program has involved residents, both adults and children, in beautifying their community. In the process of this beautification work, they have developed leadership and decision making skills. Youth have developed a new sense of pride in themselves as well as their community gaining the positive attitude which is necessary to enable them to say no to negative behaviors.

In Monmouth County youth and families are also faced with the challenge of inaccessibility to farm markets for WIC participants to redeem vouchers for fresh produce. Youth operate 4-H farmers markets after they receive extensive training in customer relations and other workforce preparation skills.

Impact: In Union County the community gardening program has resulted in the planting of numerous bulbs and flowers in the neighborhood. Where the plants have thrived, residents say it has brought hope and beauty to what can be a hopeless and ugly place. The program has trained 15 youth in job-readiness skills. It has taught 40 youth and 5 adults horticulture skills, such as how to fertilize, wee, and mulch plants. It has provided jobs for two youth. It has established Rutgers Cooperative Extension 4-H Program as a caring and compassionate program in the eyes of the Elizabethport residents.

In Monmouth County evaluations indicate that those who were employed to operate the 4-H Farmers Markets, improved in teamwork ability, ability to relate to customers, appreciation of employment requirements, understanding of the community, math skills, and knowledge of produce and nutrition. 71%T revealed that they had applied work skills and math skills. There has been an increase in WIC produce voucher cashing as a result of the farmers market. Communities express growing interest in growing their own produce in conjunction with the 4-H Farmers Market. Collaborative relationships have been established with Juvenile Justice Commission, NJ Department of Agriculture, Job Corps and the Department of Health and Human Services to address the needs of two critical at risk audiences.

Source of Funding: Smith-Lever 3(b) & (c), State, County, New Jersey Forestry Service, Union County and City of Elizabeth, Monmouth County, Brookdale Community College, Asbury Park Job Corps., State-Department of Health & Senior Services, New Jersey Department of Agriculture

Scope of Impact: State Specific

Goal 5

Key Theme: Air Quality

Activity: Health Indoor Air for America's Homes is a national program that the New Jersey Housing and Energy specialist has implemented through train-the-trainer programs and collaborative partnerships with organizations and agencies concerned about the quality of indoor air. Seventy-eight train-the-trainer sessions have been conducted to increase awareness of common indoor air quality problems such as radon, molds, excessive moisture, second-hand smoke, lead dust, carbon monoxide and others. A series of fact-sheets were authored and has been used to support educational programs. The "Get the Lead Out" program, targeted to reach limited resource urban audiences with the message of the dangers associated with lead poisoning has been taught to school audiences. Many of the educational programs were presented in both English and Spanish. Asthma programs were also presented at schools and targeted to underserved audiences. Extension specialists and educators worked with community outreach workers dealing with health issues.

Overall, program outreach has benefited greatly from 1) linking with already-established county programs and audiences and 2) partnering with agencies such as the American Lung Association and the Maternal and Child Health Consortia for joint programming. Support has also been received from state government and the regional EPA office.

Impact: The Home Depot Project provided training to 2,200 customers and 750 Home Depot Workers. A significant percentage of people responded to the follow up survey and implemented Lead Safe remodeling practices. They also reported the adoption of remodeling practices to avoid indoor air quality hazards.

Healthy Indoor Air for America's Homes evaluations were conducted mainly with pre-post questionnaires. These tested knowledge gained typically, some 80% of community health outreach workers (agency staff, health department personnel, and a few physicians) demonstrated "knowledge gained" on post test performance. Varying percentages of respondents pledged to take measures to improve indoor environment quality; in one class, 46% of 59 respondents planned to control indoor humidity, 32% planned a radon test, and 22% planned to ban smoking in the home. In another group of your parents, 100% said they would take steps to better control moisture and 67% planned to test for radon and install CO detectors.

Source of Funding: Smith Lever 3(b) & (c), State

Scope of Impact: NJ for the report: however there is a national report of impact for the following territories and states AL, AK, AS, AR, CA, CO, CT, DE, DC, FL, GA, ID, IL, IN, IA, KS, KY, LA, MD, MI, MN, MS, MO, NE, NV, NM, NY, NC, ND, OH, OK, OR, PA, PR, RI, SC, SD, TN, TX, UT, VA, WA, WI, WY.

B. Stakeholder Input Process

Cook College New Jersey Agricultural Experiment Station (NJAES) engaged in a strategic planning process which resulted in the development of a new mission and vision statement and strategic plan for the future.

Stakeholders were actively engaged in this process that included ten visioning and listening workshops held on campus, county dialogue sessions held throughout the state that engaged residents and provided an opportunity to involve under-represented and under-served populations. At the county level, individual letters of invitation followed by phone calls were sent to invite agency heads, master and teaching volunteers, county decision makers, program participants and other key county leaders representing the unique diversity of each county. In addition, a diverse group of stakeholders were contacted via telephone interviews for input into the process. Stakeholders played a key role in identifying critical issues and mapping future direction through their service on "strategy teams" formed to explore 3-5 year strategies and goals for Cook College NJAES. A website was also established to provide an opportunity to insure inclusiveness in engaging stakeholders and others in the process. This process has involved academic program, research and Extension clientele in a process where their input was valued and given equal consideration as that of all others involved in the visioning and planning effort.

Our strategic plan has been a catalyst for renewed enthusiasm and engagement of stakeholders in the planning of both the research and extension 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.

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 diverse needs of county residents are addressed through appropriate Extension educational program.

Stakeholder input sessions were conducted in all twenty one counties throughout the state and by program areas engaging a diverse cross section of residents and organization, encouraging their input into the program planning and development process.

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 and provide significant input and links. Of note are the newly formulated statewide advisory committees which support the program development of the department of Family and Consumer Sciences.

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 first 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 seventy-five 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.

Additionally the Penn Jersey Extension Partnership offered under its Crop Master Program a two-day intensive weed school for farmers and crop consultants. Twenty-six NJ and PA farms participate in a Pasture ICM program which outlines short and long term strategies to maximize pasture quality and productivity.

In 2001 an interactive website was developed for farmers and crop consultants in the region. The site offers crop scouting, current crop management information, and pest emergency bulletins. Between April and December, the site received over 50,000 hits.

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

This regional project in NJ, NY, MD and DE focuses 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.

During FY 01 700 fourth grade students participated in the “Young Consumer’s Program”. The Burlington County 4-H Agent developed training for business mentors in the intern program for the supermarket management component of the Partnership project.

- **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 successes for 2001 included supporting 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 2001 New Jersey Extension specialists and agents 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 01 the 31st 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. Several members of this team were successful in receiving an USDA grant on "Improving the Efficiency of Processing Tomato Production".

- **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. Approximately 75% of the participants rated the usefulness of the information presented as excellent. The information was also presented at an annual field crop growers meeting to approximately 30 producers. 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 provided 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. To date, the New Jersey 4-H Science Discovery Kids, Volume 1, have been accepted as part of the national 4-H Juried Curriculum Collection. 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 also 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.

Of special relevance in 2001, was the multistate project NE-183 team being recognized by receiving the US Secretary of Agriculture's 55th Annual Honor Award-the highest award bestowed by USDA, "for providing timely information to apple growers nationally about the likely success of establishing new apple cultivars in different regions while meeting consumers' desire for diverse and tasty apples." (Cowgill is NJ State Leader for NE-183)

U.S. Department of Agriculture
Cooperative State Research, Education, and Extension Service
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Multistate Extension Activities and Integrated Activities
(Attach Brief Summaries)

n Rutgers University
New Jersey

e: X Multistate Extension Activities
____ Integrated Activities (Hatch Act Funds)
____ Integrated Activities (Smith-Lever Act Funds)

Planned Program/Activity	Actual Expenditures FY 2000	FY 2001	FY 2002	FY 2003	FY 2004
JERSEY Livestock/Crops	4,000	4,000			
ATHWAYS/Food Policy & Food Systems Web	21,500	25,000			
antic Fruit, Veg., Crop Manuals/Conference	4,000	4,000			
cience – NJ/Delaware	2,500	2,500			
ast Direct Marketing	1,000	1,000			
Cornell & Rutgers	13,000	13,000			
y Curriculum & Related	1,000	1,000			
al Research Projects	1,423	1,500			
	0	0			
	48,423	52,000			

Zane R. Helsel
Director

April 29, 2002
Date

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F. Integrated Research and Extension Activities

Animal Production Efficiency

Projects are aimed at increasing the reproductive efficiency in sheep and goats, educating horse owners about aging horses, more effective nutrient use in dairy and beef cattle, and nutritional control and/or prevention of heritable disorders in equine. The latter project has resulted in a patent (Diagnosing a predisposition for equine osteochondritis dissecans) and the testing and production of new feeds and feeding practices for growing horses. In addition, the immune profile and exercise performance of older horses will be investigated.

Field and Forage Crops

New management systems are being investigated for hay production and pasture productivity that enhance profitability and minimize the potential for nitrate leaching. Hay producers can increase profitability, and decrease or eliminate herbicide use by planting smooth bromegrass and orchardgrass. Best management practices for NJ horse pastures are being developed and will be disseminated through a new web page. A proactive campaign is being developed to increase the awareness of new federal regulations relating to nutrient management. Wheat, soybean and corn trials were conducted at three locations across the state and results have been made available to producers.

Turfgrass Breeding and Management

A team of turfgrass specialists including breeding, biotechnology, management, pathology, entomology, and weed control science are focusing on the development of new varieties and management practices for production and maintenance of turfgrass in New Jersey. 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. The team has also examined the potential for gene flow between the hybrids and non-transgenic varieties. Another project focuses on the effectiveness of nematodes for control of turfgrass pests, such as white grubs. As noted previously, approximately 195 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 Production Systems

Current multistate efforts are employing active collaborations to address researchable problems confronting the rapidly expanding 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. **The NJ program supports the NJ commercial greenhouse industry and is contributing to a NASA funded NSCORT project to develop closed plant production systems for long duration space missions. An economic analysis of the greenhouse, nursery and sod sector of in the U.S. was conducted, and a website was made available to provide the industry's producers and managers with useful budget and accounting information. A strawberry research project evaluates the productivity and profitability of a plasticulture system conducive to moderate climate sites and possibly harsher climate sites. Vegetable and fruit breeding and evaluation are providing new cultivars of important horticultural commodities for use by NJ growers. Also, current research is investigating the use of supplemental lighting for commercial plug production and ventilation of greenhouses.**

Food Safety

By creating a user-friendly computer predictive modeling system, a food science specialist is providing food processors and retailers a tool for predicting the risk of foodborne illness from two major bacterial species. He has developed a good agricultural practice training program to improve the safety of produce grown in NJ. Also a fact sheet on the new FDA regulations for fresh juice was developed for producers. 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.

Nutrient Management and Recycling

Teams are working on developing methods for efficient and ecologically sound utilization of nutrients for crop production. Established soil fertility research methods will be used to examine relationships between plant response and nutrient supply in soils. 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). An additional research and education program focuses on diverting food wastes to animal feed instead of landfilling or incinerating. This program has resulted in the publishing of a book (Food Waste to Animal Feed) and numerous scientific and popular articles, development of six national symposia, numerous invited presentations, and the creation of the Food Recovery and Recycling Association of North America. Solid waste management (sewage, food, animal) presents numerous problems in our densely populated state. Agents and specialists have developed an extensive set of guidelines on the use of sewage sludge on agricultural land which is forming the basis of an "agricultural management practice" promulgated right-to-farm rule for NJ. Guidelines on food wastes and horse manure are based on applied research are forthcoming.

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.

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te New Jersey

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

e of Planned Program/Activity	Actual Expenditures FY 2000	FY 2001	FY 2002	FY 2003	FY 2004
imal Production Efficiency	39,755	20,858			
ld and Forage Crops	35,821	17,465			
rfgrass Breeding and Management	54,413	73,470			
nt Pest Management	32,588	-			
nt Production Systems	42,578	126,517			
od Safety	16,425	8,354			
od Security	19,941	-			
man Nutrition	8,732	-			
trient Management/Recycling	23,365	33,365			
ricultural Financial Management	16,491	17,440			
tal	294,109	297,469			

Adesoji Adelaja
Director

April 29, 2002
Date

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te New Jersey

eck one: ____ Multistate Extension Activities
____ Integrated Activities (Hatch Act Funds)
_X_ Integrated Activities (Smith-Lever Act Funds)

e of Planned Program/Activity	Actual Expenditures FY 2000	FY 2001	FY 2002	FY 2003	FY 2004
ld and Forage Crops Management	7,880	9,556			
fgrass Breeding and Management	37,293	60,516			
nt Pest Management	13,122	-			
nt Production Systems	58,715	81,937			
od Safety	11,666	-			
vironmental Quality (now part of Nutr. Mgt/Recycling)	19,997	-			
trient Management/Recycling	13,087	13,246			
ricultural Financial Management	7,720	8,895			
imal Production Efficiency	-	4,990			
tal	169,480	179,140			

Zane R. Helsel
Director

April 29, 2002
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