Cornell University
FY01 Annual Report for Agricultural Research and Extension Formula Funds

Cornell University Agricultural Experiment Station
NYS Agricultural Experiment Station
Cornell Cooperative Extension
College of Agriculture and Life Sciences
College of Human Ecology
College of Veterinary Medicine

March 1, 2002

FY2002 Annual Report
Cornell University

Table of Contents

Background and Methods

Planning Option: Statewide activities -- integrated research and extension plan.

Period Covered: October 1, 2000 through September 30, 2001

Program Definition and Scope

This report directly reflects our approved plan of work. As indicated in our approved plan, all program descriptions were framed as ongoing major programs. We have not, therefore, separated results into timeframe categories (short-term, near-term, long-term). Data and narrative documentation were collected for the indicators included in our approved plan of work and supplement.

Methodology

A variety of data sources and documentation procedures were used to generate this report. For extension, the primary sources were system-wide annual accountability reports and fiscal and personnel accounting records. The annual reports include participation data, reports against our approved performance indicators, and program impact statements. For research, The CRIS reporting system, annual faculty activity reports, and fiscal and personnel accounting records were the primary sources.

Our approach reflects directly the approved plan. For example, as outlined in the plan supplement we used joint extension/research appointments as direct evidence of integrated activity and rely on personnel accounting to do so. In the case of multi-state extension activity, we relied on project proposal ear-marking and direct reports by faculty on a project-by-project basis. With final approval of our plan and supplement, we have worked to include appropriate indicators in our project documentation and reporting structures to facilitate reporting in future years. Stable reporting requirements are essential to permit an accurate accounting of our work.

For each of the five goals, we provide indicator, expenditure and effort data to reflect the scope and reach of programming in that area and selected impact statements to convey the nature of that work. For the indicator data, we include results for 2001 followed by the plan of work target result. In reviewing our aggregated FY01 data, we noted that most of the reported research indicators approximate the targets projected in the plan of work. Research expenditure and FTE data for Goal 3 is a notable exception. After reviewing the data, we concluded that the discrepancy is due to: a) reclassification of Hatch projects in the CRIS system in 1999, b) refinements in data collection and reporting methodology at the local level, and c) the inadvertent inclusion of Animal Health funds and associated indicators in the original plan of work. Most of the extension indicators met or exceeded targets. The few that did not are likely reflect normal annual program fluctuations.

We did not attempt to communicate in detail the work within or across goals. Rather, we selected examples to provide a broad view of our efforts related to each goal. This approach is best illustrated by our use of impact statement data. Impact statements are solicited annually from research and extension faculty and off-campus educators. The scope of reported results was very broad. For this report, rather than including all statements, we have selected a small number to illustrate primary themes within each goal. It should be noted that the impact statements included reflect both federal formula funds and associated matching and/or supplemental funding. In most cases, Smith-Lever and Hatch funding is significantly enhanced by other sources in carrying out any given project.

This year, we are taking another step toward research/extension integration by identifying key themes using the Research Problem Areas identified in the CRIS system. Research projects currently are allocated within this classification structure allowing accurate monitoring and reporting of program emphases. Unless an alternative classification structure for extension programs is imposed, it is our intent to employ the same classification structure for monitoring future extension efforts thereby allowing truly integrated reporting. For this document, Appendix A indicates those themes identified in the Annual Report Guidance that are represented in reported activities for FY01 (simple presence or absence of activity). Appendix B provides a detailed listing of the CRIS research problem areas, number of associated research projects, and presence/absence indication for reported extension activity.

GOAL 1 – AN AGRICULTURAL PRODUCTION SYSTEM THAT IS HIGHLY COMPETITIVE IN THE GLOBAL ECONOMY

Agricultural production systems in the United States are part of the overall growing global economy of food and fiber products. On a more localized level our production systems are the basis for maintaining the rural economy and providing a safe and nutritious food supply to our diverse population. Our agricultural systems in the northeast are broad and encompass small and large scale plant and animal farming; regional and specialty market production and processing; and, local, national and international marketing. This diversity has enabled our agricultural systems to remain competitive in the global economy. The foundation for this has been our ability to develop and integrate new technology into our agricultural production systems through the combined efforts of fundamental and applied research programs linked with effective extension efforts. However, as the global market changes, we must understand where our opportunities lie.

Although our efforts are extremely diverse, they can be subdivided into the areas of production, protection, processing and marketing.

Production

Improving the yield and quality of plants and animals in agricultural production systems is fundamental to improving our ability to compete in a global economy. These improvements can be accomplished through: 1) traditional and modern breeding programs which select for desired traits (such as yield, flavor and pest resistance) and an understanding of how they can be expressed under different environmental regimes; 2) improving our understanding of the nutritional requirements for plants and animals so that inputs and waste products are minimized; 3) improving our understanding of soils in order to maintain or improve the health of the soil; 4) improving our understanding of the impact of environmental conditions on plant and animal production.

Protection

Plants and animals are stressed by various organisms including insects, pathogens and weeds. Traditional control of these pests through the application of synthetic pesticides has allowed farmers to manage some of these pests, but concerns about their effects on the environment and the development of resistance must be taken into account. Improvements in protection of our production systems can be accomplished through: 1) genetic engineering of plants to express pesticidal traits and the development of management systems which ensure the durability of the deployment of these plants; 2) utilization and/or improvement of insects and microbes which may act as pesticides against insects, pathogens and weeds; 3) improvements in the production systems for mass producing natural enemies; 4) an improved understanding of the non-target effects of pesticides.

Processing

The value of agricultural raw products is multiplied through processing them into foods and fiber which become distributed through wholesale and retail markets traded worldwide. The value of grapes at harvest, for example, is minimal compared with the value of the wines they produce. Improvement of our agricultural production systems on a global market can be achieved through processing which: 1) recovers components from what would be engineering waste and converts them into marketable items (particular enzymes, flavors, bulk materials, etc.); 2) enhances the food product by preserving or increasing the level of nutrients or flavors; 3) maximizes the freshness of the product through minimal processing; 4) minimizes the process of converting the raw product into foods.

Marketing

The competitiveness of our agricultural products is influenced by domestic and international factors and an understanding of the production, distribution and marketing costs will influence what agricultural production systems are most competitive for our region. Improvement of our agricultural production systems on a global market can be achieved through: 1) an understanding of the costs for our production systems compared with other domestic and regional production areas; 2) an understanding of the specific desires of the consumers in various regions of the world economy; 3) an understanding of the political, regulatory and social structures which influence the production and distribution of agricultural products which are produced in other regions.

The agricultural production systems of the northeast are diverse. Over the decades some of our systems have lost their relative strengths compared to other regions while other systems have grown in their relative strengths. The majority of the population of the US is centered in the northeast region and the opportunities for agricultural systems should be high. However, presently we import ca. 80% of our food. In many cases this is the result of more favorable agricultural conditions (lower labor costs, longer season, etc.) outside our region. Future research investments should be directed toward those projects which provide us with the best opportunities to compete both nationally and internationally. Dairy systems, floriculture and ornamental and fresh foods are examples of areas in which northeastern agriculture can effectively compete. The growth of community food systems, such as local and roadside markets, should be encouraged as well. For any of these areas, there will continue to be a need to increase research investments in fundamental and applied sciences to improve the production, protection, processing and marketing of our agricultural products so they can be competitive on the regional, national and international markets.

Key Themes Summary

Appendix A indicates those themes identified in the Annual Report Guidance that are represented in reported activities for FY01. Appendix B provides a detailed listing of research problem areas, number of associated research projects, and presence/absence indication for reported extension activity.

PERFORMANCE GOALS FOR INITIATIVES RELATED TO GOAL 1

Empower individuals and enterprises in agriculture and food systems to thrive in order to:

- maintain strong, rural communities;
- advance a clean healthy environment;
- promote attractive landscapes;
- assure a safe, nutritious, and abundant local food supply; and
- support a thriving New York State economy.

Indicator Data Specific to Goal 1

(For each indicator, both actual and annual target results are included, the latter in parentheses.)

INDICATOR 1.1 The total number of refereed or peer reviewed articles or materials reporting research on topics related to agricultural production and competitiveness.

Year	# refereed items	# patents, licenses, varieties
2001	908 (675)	70 (40)

OBJECTIVE 1.1 To produce new and value-added agricultural products and commodities.

INDICATOR 1.1.2 The total number of persons completing non-formal education programs on production of new and value-added commodities and products and the number of these persons who actually adopt one or more recommended practices or technologies within six months after completing one or more of these programs.

Year	Output: # completing programs	Outcome: # adopting practice/ technology
2001	6662 (5000)	2076 (2300)

OBJECTIVE 1.2 To annually increase agricultural producer awareness, understanding, and information regarding the production of new and value-added commodities and products in U.S. agriculture.

INDICATOR 1.2.1 The total number of persons completing non-formal education programs to improve the productivity and global competitiveness of the U.S. agricultural production system and the number of these persons actually adopt one or more new production techniques or strategies within six months of completing one or more of these programs.

Year	Output: # completing programs	Outcome: # adopting practice or technology
2001	15985 (10000)	9405 (4000)

OBJECTIVE 1.3 To improve decision-making on public policies related to the productivity and global competitiveness of the U.S. agricultural production system.

INDICATOR 1.3.1 The total number of persons annually completing non-formal education programs on topics related to public policy issues affecting the productivity and global competitiveness of the U.S. agricultural production system and the number of those persons make use of such knowledge within six months of completing one or more of these programs.

Year	Output: # completing programs	Outcome: # utilizing information
2001	5221 (5500)	2890 (2400)

Resources Allocated to Goal 1 (FFF & Match)

Dollars x 1000 and (FTE) or (SY)

	FY2001 Target	FY2001 Actual
Extension Total	3,378 (60.9)	3,470 (62.4)
Research Total	5,200 (34.1)	5,690 (72.0)

Impact Examples Related to Goal 1

New York Dairy Farm Business Summary and Analysis Project

New technologies and management practices for dairy farms are being adopted at a rapid rate. These new methods of operation include improved herd housing and ventilation, more efficient milking, lower cost and temporary feed storage, intensive rotational grazing, and organic milk production. To survive and prosper during these fast-changing times, it is critical that farms make the appropriate adjustments. The collection and analysis of data on individual farms is essential to provide benchmarks, standards, and analytical results to assist farms in making those necessary changes. These data further assist in understanding the changes and trends in the aggregate dairy industry and provide an up-to-date data set for analysis of emerging issues and problems.

Cornell researchers summarized and analyzed business and financial records for 2000 from 294 New York dairy farm businesses using the Dairy Farm Business Summary computer program. This program enables computation and analysis of a farm's balance sheet, income statement, cash flow, efficiency factors, and costs of production. Sixty-five farms used intensive grazing practices, 70 farms had more than 300 cows, 63 farms had 70 cows or fewer, and 20 farms rented their real estate. The records from these groups of farms were summarized and analyzed and the results published to enable farmers to compare their business performance with that of similar farms in the state. Analyses were also published regarding bST usage, buying versus growing forages, regional differences, milking frequency, and herd size and barn type.

Dairy farmers, bankers, and agribusiness consultants use the summarized data to monitor the industry, improve decision making on individual farms, and set goals for future performance. On average, farms that participated in the project over the last four years increased their net worth by 28 percent and production per cow by 4 percent. By using benchmarking, they were able to determine business strengths and areas for improvement on which to focus management attention to remain competitive.

Cornell Plant Pathologists Help Fight Scab Disease of Poinsettias

Poinsettia growers nationwide are now less fearful of scab outbreaks because they know much more about how to manage the disease. In 2001, only one-tenth as many poinsettia cuttings were discarded as a result of poinsettia scab compared with 2000, so the economic impact of this disease has been sharply reduced through the generation and sharing of knowledge. Poinsettia growers will have the financial benefit of reduced disease losses, and their customers will enjoy the absence of scab symptoms on this popular holiday flower.

In 2000, treatments for the control of poinsettia scab were tested at Cornell's Long Island Horticultural Research and Extension Center (LIHREC), Riverhead, N.Y., and at Chase Research Gardens, Mt. Aukum, Calif. Weekly treatments with certain fungicides, including some of the new reduced-risk strobilurin materials, were found to be effective at preventing scab infections. Options for cultural control were suggested by the observation that extensive periods of leaf wetness were essential for disease development. This information was shared at national and international conferences of florists as well as at grower meetings across New York State. In 2001 a study at the LIHREC screened 48 poinsettia cultivars for their relative susceptibility to scab to help plant breeders develop poinsettias less prone to the disease and to help growers choose less-susceptible cultivars. Control information for scab was summarized in an on-line article on poinsettia diseases co-authored with plant pathologists from five other states; the article was chosen by Science News as its pick of the week in December 2001: www.apsnet.org/online/feature/xmasflower/

Poinsettia growers nationwide are now less fearful of scab outbreaks because they know much more about how to manage the disease. In 2001, only one-tenth as many poinsettia cuttings were discarded as a result of poinsettia scab compared with 2000, so the economic impact of this disease has been sharply reduced through the generation and sharing of knowledge. Poinsettia growers will have the financial benefit of reduced disease losses, and their customers will enjoy the absence of scab symptoms on this popular holiday flower.

Sweep Net IPM Workshops

Dairy farming is the number one industry in Yates County in terms of both land use and economic impact. Alfalfa is the number one forage crop of dairy farms. The Potato Leaf Hopper(PLH) is the most economically

damaging pest of alfalfa. Managment of PLH to reduce yield losses sustains economic viabilty of dairy farming. Integrated Pest Dairy farming is the number one industry in Yates County in terms of both land use and economic impact. Alfalfa is the number one forage crop of dairy farms. The Potato Leaf Hopper (PLH) is the most economically damaging pest of alfalfa. Management of PLH to reduce yield losses sustains economic viability of dairy farming. Integrated Pest Management (IPM) of PLH uses a sweepnet with standardized counts to determine economic threshold levels. Prior to this growing season adoption of sweepnets was low among Mennonite farmers in Yates County due to high cost. Previously farmers used their hats to sweep their fields. Management decisions were made that resulted in unnecessary insecticide application due to inaccurate identification and sampling or a yield loss from a failure to recognize an economic threshold. This created unnecessary burdens on the environment and economy of Yates County.

Area Field Crops Specialist Mike Stanyard and Extension Educator Judson Reid initiated a Build Your Own Sweep Net project. Design and materials were obtained within the Mennonite community. The nets were sown together by the Yates County SAREP 4-H Club. On-farm workshops were offered at multiple sites to increase attendance by farmers whose transportation is limited to bicycles and horse buggies. Attending farmers assembled their own nets, learned to identify PLH as well as beneficial insects, learned to use the sweepnets to monitor populations and recognize economic thresholds. Each grower received an IPM Field Crop pocket handbook as well as DEC pesticide applicator recertification credits.

Procuring the components of the net from sources within the Mennonite community and underwriting the costs with a NYS IPM grant the cost of a sweep net for participating farmers went from $35.00 in 2000 to $0.00 in 2001. Over 40 Mennonite dairy farmers in Yates County adopted this IPM technology in 2001 vs. 6 in 2000. The estimated saving per farm is from $1-3000. This figure comes from decreased pesticide applications, increased alfalfa yields and quality and resulting increased milk production. The 4-H youth took a field trip with the Extension Educators to a dairy farm to learn how to use the tools they helped build as well as increased their understanding of agriculture and IPM. The sewn nets were sold back to the program as fundraiser for the youth. The club earned $180 for their labor. Sewing skills were also learned by the 4-Hers.

Cornell Plant Breeders Develop Disease-Resistant Birdsfoot Trefoil Variety

Much of the hay and pasture production in New York is on poorly drained or shallow soils. Birdsfoot trefoil provides a productive forage legume that helps farmers remain competitive. Fusarium wilt is the most devastating trefoil disease, killing crops as early as the seeding year. This disease has hurt the competitive position of New York farmers. All current varieties of birdsfoot trefoil are susceptible.

Cornell breeders and plant pathologists have developed Pardee birdsfoot trefoil with high forage yield and strong resistance to Fusarium wilt. On a 0 (no disease symptoms) to 5 (dead plant) basis, Pardee was rated 2.45 compared to 4.64 with Norcen, a very popular variety during the last 20 years. Pardee has 50% of its plants that are resistant compared to less than 1% in other varieties. In the first production year of an experiment, Pardee yielded 4.49 tons/acre of dry matter forage compared to Norcen's 2.31 tons/acre. After the first production year, Pardee was the only variety in the experiment that maintained more than 50% plant stand. In experiments without the disease, Pardee ranks first among varieties for forage yield, especially as stands get older. Extension activities are encouraging seed companies to produce and distribute these varieties.

Pardee trefoil will help more than 10,000 New York farmers with shallow or poorly drained soils to maintain their competitiveness. Pardee will be particularly helpful to growers on small farms in hilly areas of New York, who have limited choice of productive crops. For some, the loss of trefoil from Fusarium wilt threatens their economic survival. Birdsfoot trefoil is included in seedings on about 200,000 acres in New York, producing more than $10 million of hay annually. The Pardee variety will remove the Fusarium wilt threat to help maintain the competitiveness of New York farmers, as well as producers in the Northeast and Midwest faced

with poorly-drained, shallow soils. In addition, extension specialists have predicted that the early maturity of Pardee will increase the options of growers to produce high quality forage during a wider range of harvest period. Seed will be available to growers for planting in spring 2002.

Agricultural and Economic Vitality and Farmland Preservation

Residents of Otsego County consistently expressed concerns over the protection of local agricultural resources, which for decades have experienced a steady decline due in part to pressures from commercial and residential development, changes in agricultural technology, an aging and declining farm population, and unstable farm product pricing. Yet agriculture continues to make a significant contribution to the economic and cultural vitality of Otsego County. To address these challenges, the Otsego County Agriculture and Farmland Protection Board, in conjunction with the County Planning Department, received funding from the NYS Department of Agriculture and Markets to develop an Agriculture & Farmland Protection Plan for Otsego County. This plan was and adopted by the Otsego County Board of Representatives in January 1999.

One of the first Action Steps recommended to implement this plan was to hire an Agriculture Development Specialist to provide leadership and day-to-day coordination of the plan's activities and educational programming. Cornell Cooperative Extension played a leading role in establishing this position, and currently serves as the organization under which the position is managed and financed.

At this point, farm producers, agribusiness, county officials, and the general public are significantly more aware of the Agriculture and Farmland Protection Plan, which, in essence, had been shelved for nearly two years after its approval. The Extension Educator position has provided the opportunity to present the plan, not as a static document, but as a guideline for activities and, ultimately, programs that support the goals and objectives of the plan. Example early accomplishments, include:

- Goals and strategies for implementation of the plan have been established.
- The Otsego County Board of Representatives allocated resources necessary to complete the remaining 20% of the LESA Study (Land Evaluation & Site Assessment), using state funding currently available only within a limited timeframe.
- Promotional materials were developed to support current recruiting efforts of new and experienced farm producers to the region.
- A two-day "New Farmer" workshop was developed with the Central NY Dairy, Livestock, and Field Crops Team geared toward downstate and local audiences considering agriculture in the region.
- Established working relationships with six Cornell programs, NYS Ag & Markets, NYS Farm Bureau, NYSERDA, Otsego County Economic Development and others to develop and effectively deliver a "tool kit " of resources for farm producers to enhance farm profitability and viability.

GOAL 2 – A SAFE AND SECURE FOOD AND FIBER SYSTEM

To provide a safe and secure food supply our research program currently maintains three broad initiatives: food safety research program, food quality and functionality program and value-added enhancement program. The three programs combine to address the issues of a safe and secure food system.

We improve the safety and nutritional quality of foods to promote wellness and reduce the risk of disease. We identify and study important consumer and processor food safety issues in the areas of microbiological safety, chemical safety and naturally occurring plant toxicants as well as health promoting opportunities from food components.

Our food safety research program includes initiatives to study the agents, environments and controls related to microbial contamination of fresh and processed foods. Expand research on foodborne pathogens, both emerging and long- recognized species. Develop and utilize modern immunological and molecular biological techniques to study the effect of innovative processes and products on microbial growth and survival and to detect microbial contaminants at very low levels.

This program conducts studies to help processors develop HACCP programs. It includes developing computer simulation/modeling systems to improve food quality and safety and models of microbial growth inhibition. Our scientists investigate putative natural toxicants or antinutrients in genetically modified plant and animal foods. We study the chemistry and toxicology of production-enhancement chemicals used in plant and animal production and manifesting themselves as residue or chemical changes in foods. We investigate health-promoting phytochemicals. This program establishes both required and toxic concentrations of consumption. We investigate risks/benefits associated with increased consumption of plant-based foods. In this program we investigate factors that influence bioavailability of nutrients in foods and diets. We study the effects of processing, preservation and storage on nutritional value and quality of foods. We develop improved chemical and instrumental methods for measurement of macro and micronutrients in foods that can be used for analysis in support of nutrition labeling or for process control. We utilize this knowledge to provide direct assistance to companies to insure the processing of safe foods.

Our program on value added processing systems improves technologies and systems that enhance food value including nutritional value, safety and cost thus securing our food system for the future.

In this effort we evaluate new plant and animal foods and food components as well as production management techniques that add nutritional value and economic benefit. We develop new methods for quality assessment and help set goals for plant and animal breeding and selection. We explore process technologies (e.g., fermentation, thermal processing, extraction, concentration, separation, sensor development) and new modeling techniques that can improve the profitability of the food industry. We study methods of minimal processing and packaging of foods. We also study the economic potential of new products and processes. Our scientists develop engineering systems based on microbiology, enzymology and mechanical techniques to minimize waste disposal problems of the industry. This program develops processing methods for fractionating major and minor components of foods. A major effort includes the development and/or evaluation of processes and/or ingredients designed to improve the sensory quality of low fat foods. We seek to generate the knowledge base to provide leadership in value-added processing for the food manufacturing industry.

Our program on food quality and functionality uses a multidisciplinary effort as we seek to improve the understanding of mechanisms affecting food acceptability and probe the molecular basis of functionality and quality with special emphasis in the areas of biochemistry of plant and animal foods/post harvest physiology, sensory quality of foods, physical/chemical properties of foods and ingredients and microbiology of foods. Quality foods are a key component to ensuring the security of our food system.

In this program on food quality we develop methods to define and improve quality in fresh and processed foods by studying the factors that influence composition, appearance, flavor and texture with a focus on post harvest storage management and enhancement. We study the biochemistry and genetics of plant and animal products that determine appearance, flavor, and texture. We study the microbial population of foods, and their relationship to quality and shelf life. In order to understand food quality we investigate physical and chemical properties of fresh, raw, and processed foods and ingredients. The development of mathematical models of the relationships between product properties, instrumental measurements and human perceptions are key efforts in this program. Industry directly utilizes this research through outreach and advisory programs.

As effective as these initiatives are, numerous issues will combine to affect changes in their direction over the next five years. The emergence of new pathogens is increasing and will demand greater attention by our scientists. Clearly an interrelationship of both water and food safety issues in our food supply will drive an integration of these research areas. Also the need for unique functional ingredients for food manufacture and health will drive research programs in this area. The need for advanced systems to ensure freshness, quality and safety in fresh and minimally processed foods will require highly interdisciplinary teams of scientists.

Key Themes Summary

Appendix A indicates those themes identified in the Annual Report Guidance that are represented in reported activities for FY01. Appendix B provides a detailed listing of research problem areas, number of associated research projects, and presence/absence indication for reported extension activity.

PERFORMANCE GOALS FOR INITIATIVES RELATED TO GOAL 2

Improves the health, nutrition, and safety of communities and individuals

- Prepare and keep foods safely
- Reduce food insecurity
- Increase citizen participation in local food related policy decisions
- Expand knowledge of health behaviors that effect women's health status
- Increase fruit and vegetable consumption

Indicator Data Specific to Goal 2

(For each indicator, both actual and annual target results are included, the latter in parentheses.)

INDICATOR 2.1 The total number of refereed or peer reviewed articles or materials reporting research related to a safe and secure food and fiber system and the number of related patents, licenses, or varieties issued.

Year	# refereed items	# patents, licenses, varieties
2001	164 (125)	1 (5)

OBJECTIVE 2.1 To improve food accessibility, affordability, safety, and nutritional value.

INDICATOR 2.1.2 The total number of persons completing non-formal consumer education programs on food accessibility and food affordability, and the total number of these persons who actually adopt one or more recommended practices within six months after completing one or more of these programs.

Year	Output: # persons completing programs	Outcome: # who actually adopt practices
2001	44872 (20010)	20194 (14000)

OBJECTIVE 2.2 To increase the effectiveness of constituent and citizen participation on public policy issues affecting food security (i.e., food access, affordability, and recovery).

INDICATOR 2.2.1 The total number of persons completing non-formal education programs on public policy issues affecting food security (i.e., food access, affordability, and recovery) and the total number of these persons who actually become actively involved on such issues within six months after completing one or more of these programs.

Year	Output: # persons completing programs	Outcome: # who actually become involved
2001	7907 (2001)	3292 (600)

OBJECTIVE 2.3 To annually increase consumer awareness, understanding, and information regarding food safety and food borne risks and illnesses.

INDICATOR 2.3.1 The total number of persons completing non-formal, consumer education programs on food safety and/or food borne risks and illnesses and the total number of these persons who actually adopt one or more recommended food safety behaviors or practices within six months after completing one or more of these programs.

Year	Output: # persons completing programs	Outcome: # who actually adopt behaviors
2001	78050 (30000)	25350 (17000)

Resources Allocated to Goal 2 (FFF and Match)

Dollars (x 1000) and FTE or SY

	FY2001 Target	FY2001 Actual
Extension Total	2,360 (31.5)	2,260 (31.9)
Research Total	790 (5.2)	511 (3.5)

Impact Examples Related to Goal 2

Cornell Advances the National Good Agricultural Practices Program to Help Growers Reduce Microbial Risks on the Farm

In the past two decades, there has been a noticeable increase in the consumption of fresh fruits and vegetables in the United States and a marked increase in the global distribution of produce. Between 1990 and 1997, total U.S. per capita consumption of fruits and vegetables increased 24 percent, from 577 to 718 pounds. At the same time, the number of produce-related outbreaks of foodborne illnesses in the United States increased significantly. Foodborne disease surveillance reports from 1973 to 1998 suggest that the annual number of produce-associated outbreaks, the number of persons affected annually in the outbreaks, and the proportion of outbreaks caused by fresh produce among illnesses with an identified food vehicle have at least doubled. In 2001 imported

cantaloupes from Mexico caused a salmonellosis outbreak in the United States. Outbreaks such as this continue to erode consumer confidence in the safety of fruits and vegetables and negatively affect growers.

The national Good Agricultural Practices (GAPs) program, which was established in 1999, continues to work with growers to reduce microbial risks in fruits and vegetables. In the last two years, the GAPs program has planned, developed, and conducted a series of workshops to promote good agricultural practices and food safety assurance techniques in the production of fruits and vegetables throughout the United States. The Cornell GAPs team is made up of individuals from the Department of Food Science, the Department of Horticulture, and the Department of Education. Twenty-five individuals at land grant universities across the nation are part of the national GAPs team. In addition, the scope of the national GAPs program has been expanded to produce educational materials for farmworkers and develop an economic model to determine the financial impact to growers who implement good agricultural practices on the farm. In 2001 the national GAPs program received the Cornell Cooperative Extension Award for Excellence in Innovative Extension Approaches.

The national GAPs team has developed many educational materials that form the backbone of the program. Food Safety Begins on the Farm: A Growers Guide, a 28-page booklet, has been distributed to approximately 47,000 people and won two awards in 2001. Over 20,000 copies of a brochure entitled Reduce Microbial Contamination with Good Agricultural Practices have been distributed, and in 2001 this publication was translated into Spanish and Chinese. A CD containing PowerPoint presentations was developed and has been used in over 100 presentations delivered by the GAPs team at grower meetings. A poster designed to support food safety education at farm markets was created, and photo novelas that are focused on farmworker education are being designed. In addition, tabletop exhibits (developed by the Cornell GAPs team) are being used by collaborators at grower meetings throughout the country. A resource manual containing background information and additional references and resources has been completed and will be distributed in 2002.

Cornell University Farm to School Program Benefits Students and Local Farm Businesses

In the past, small and medium-sized farms have had difficulty remaining profitable in an increasingly global marketplace. At the same time, there has been increasing attention on providing children of all ages with fresh, nutritious foods. One way to increase farm revenues is through direct sales, such as at farmers' markets and stands or to institutions such as public schools, colleges, and universities. Nationally, public school food services represent a $16 billion market, although purchasing directly from farmers constitutes only a tiny part of that total. To put this in perspective, New York State public schools serve more than 2 million meals, and Cornell, just one New York university, serves 27,000 meals per day. It is believed that farmers, schools, and communities can benefit from farm to school programs. Schools can provide students with more fresh, nutritious produce, while nearby farmers gain new markets for their products. Developing successful farm to school programs requires identifying barriers and developing strategies to overcome them.

As part of a multistate project, Cornell is working to link farms and schools of all educational levels. Cornell held both a statewide workshop and then a regional conference where more than 50 and 180, respectively, food service personnel, farmers, policy makers, and educators helped identify barriers and potential solutions to creating farm to school links. Additional interviews with various stakeholders further clarified these issues. Two New York school districts (Johnson City and Hannibal) were identified and agreed to participate as K–12 farm to school pilot project sites. (Two more schools will be selected as pilot sites over the next two years.) Four colleges/universities also will be selected to participate as pilot sites. The programs will be evaluated for impact on family farm profitability and other farmer issues; school food service benefits and challenges; participation and food choice issues for students; and parent and community involvement in the development of these projects. Cost and revenue issues, logistics, marketing restrictions, state and federal procurement guidelines, seasonal availability, and cultural differences also will be evaluated.

Farms and schools interested in establishing links need easier ways to contact each other, such as through a web site or clearinghouse. To learn what products are seasonally available, and to adjust menus accordingly, food service directors are using the Northeast Regional Food Guide as a resource. The current K–12 pilot project schools have agreed to serve more potatoes, cabbage, onions, apples, carrots, and dry beans, all foods that are available nearly year round in New York State. In the fall, the schools also will offer more locally grown tomatoes, peppers, lettuce, broccoli, cucumbers, pears, and melons. Because schools prefer certain products in

minimally processed forms, which individual farms often cannot supply, schools will need to expand preparation of whole items and/or processing facilities will need to be developed. Because schools depend on produce suppliers to provide a variety of high-quality produce at reasonable cost, need an easy way to order, and want dependable delivery, it makes sense for farmers to work together through distributors or cooperatives to sell and deliver to schools. More specific data will be gathered on these pilot projects. Cornell University Dining has sponsored several weeklong local food events, and plans are being made for longer-term arrangements with New York State farmers.

Occupational Safety and Health through the Use of Protective Clothing

The goal is to understand the textile and pesticide parameters that are critical in the migration of pesticides from clothing to skin and to use this understanding to develop educational resources and programs that improve worker training in the selection of textiles for protective clothing. The work develops a predictive model for nonwoven fabrics that will serve as a basis for recommendation of textile material selection for full body coverage personal protective equipment (PPE) when using existing and/or new pesticide products. This will be used to prepare new research-based resources that enhance current educational efforts while exploring the potential for improvements in PPE development and pesticide labeling. Fabrics and pesticides were characterized for chemical and performance properties. Multiple regression analyses was used to develop the model using parameters that impact fabric protection and moisture transport for typical woven work clothing, nonwovens, and microprous materials. The predictive model will be validated with laboratory methodology, using textile materials not included in the development of the model and a representative selection of pesticides and pesticide formulations. Educational materials will be developed based upon the research model. Educators and users will collaborate to develop a systematic and practical mechanism to assist in the selection of appropriate PPE.

The effects of liquid/fabric surface tension difference, solid volume fraction of fabrics, thickness of fabrics and viscosity of pesticide mixture on pesticide penetration of nonwoven fabrics were studied, in order to develop a predictive, statistical model that estimates pesticide penetration. Fourteen fabrics commercially available and the pesticide active ingredients of atrazine and pendimethalin were used. Eleven pesticide mixtures were made in different mixing rates at the recommended field rates, and surface tension and viscosity of each mixture were measured. Fabric thickness, weight, air permeability, and water vapor transmission were measured. For this situation, statistical analyses showed that pesticide penetration has the highest correlation with surface tension difference between fabric and pesticide mixture, followed by solid volume fraction and thickness.
The outreach goal is to translate this and related research into educational programs that help users understand the tradeoffs between reducing pesticide exposure and maintaining wearer comfort. A teaching kit demonstrates the variety of materials worn as body covering when handling pesticides. Those materials included a variety of fabrics, from those found in ordinary work clothes to specialized barrier fabrics. The kit is used to introduce, compare, and identify materials that pesticide handlers may have noted on pesticide labels or seen in stores and catalogs. The kit enhances exhibits and presentations at pesticide applicator trainings and is available for loan to the staff of Cornell Cooperative Extension, Integrated Pest Management, and Cornell Pesticide Management Program.

The intention is to help people better understand potential exposure situations such as home, farm, school, playgrounds, etc. and to suggest ways to mitigate that risk. Cornell University participated in the interlaboratory testing to develop the proposed ASTM standard test method currently being considered by Committee F23. The information on children's exposure to pesticides is useful in community-based organizations such as schools, planning boards, and childcare agencies.

Community Kitchens Food Service Training Program

Many foodservice operators are experiencing high turnover rates among kitchen staff, and often must hire new employees with little or no foodservice experience and/or knowledge of sanitation and food/menu development. In addition, most new employees require "on-the-job" training, frequently at great expense and with some risk to the foodservice operation. The foodservice industry benefits substantially when prospective employees receive proper foodservice and sanitation training before they begin working in foodservice positions. At the same time, county social service departments are seeking job training opportunities to help unemployed and underemployed residents receive the education and training needed to qualify for positions that support a living wage. The county residents targeted through this program are either homeless or currently receiving social-service support.

The Community Kitchen Program is a multi-agency partnership among the Samaritan Center, ARISE Child and Family Services, and the Food Bank of Central New York. The program provides a free, 10-week foodservice training for job-seeking individuals and is conducted at the Samaritan Center – a not-for-profit organization that serves free hot meals for those in need. Cornell Cooperative Extension of Onondaga County was contracted to provide the food safety-training component of the program between June 2000-August 2001. Four Community Kitchens Programs have been conducted, with a total of 23 graduates. Participants spent the majority of the full-time training learning "hands-on" food preparation and training in the Samaritan Center's kitchen. CCE provided ten hours food safety training utilizing the EFNRA non-certification course and six hours of nutrition education with a "healthy living skills" focus. Each participant received a food safety course book, food thermometer and a packet of supplementary materials. A standardized exam was administered at the end of each food safety-training course. All participants received passing scores and each was provided with a certificate of participation. Graduates received assistance - from ARISE Child & Family Services - with finding employment in local foodservice operations. By graduation day, many program participants were already employed in foodservice, while others awaited interviews for employment.

The comprehensive training program provided "hands-on" experience in: foodservice sanitation, food ordering, menu planning, food inventory, portion sizes, food preparation/cooking/serving, banquet set-up, nutrition and food decision making, and job search/retention skills. As a result:

- Foodservice operators were provided with job applicants who possess demonstrated competencies and skills that are directly applicable to foodservice operations.
- Foodservice operators saved time and money spent on training new employees in foodservice basics.
- Community residents were provided with a no-cost opportunity to gain marketable employment skills and earn dual certificates in food safety and food service training, further increasing their competencies and qualifications in the eyes of potential employers.
- Several participants were hired by - or received job offers from - local foodservice operations while still enrolled in the program, indicating that the foodservice industry is supportive of a program that provides well-trained employees.

GOAL 3 – A HEALTHY, WELL-NOURISHED POPULATION

Improving the health of our population through food/nutrient-based strategies will become increasingly important in the next five years in achieving health goals designed to reduce preventable mortality and morbidity in the United States. These strategies will be of special significance to USDA because they will serve as important bridges between the country's food production and health sectors. These strategies will be particularly valuable to approaches that seek to empower individual consumers in taking increased responsibility for their health, assure that our food system is consistent with health goals, and refashion our health system, particularly approaches most concerned with cost containment through prevention of chronic, debilitating diseases.

Research areas of current interest include (1) the study of glucose, lipids, vitamin E and homocysteine in cardiovascular disease, obesity, and/or diabetes, (2) role of various nutrients in fetal neural and cognitive development (e.g. genetic polymorphisms and folic acid metabolism), retinoic acid and gene transcription, (3) nutrition and cancer (e.g. modes of action of selenium and vitamin E, role of predominant plant based diets, and the physiochemical properties of dietary fiber), (4) the role of nutrition in the regulation of inflammation (e.g. effects of dietary fat on the expression of genes during the inflammatory response), (5) maternal nutrition during pregnancy and lactation, (6) postpartum weight retention, (7) fetal metabolic imprinting and its relationship to chronic disease, (8) neurohormonal and psychological influences on eating behavior, (9) food security, (10) domestic and international food and nutrition policy, (11) iron and other micronutrient deficiencies, (12) nutritional impact of parasitic infections, (13) behavioral determinants of food choices, (14) dietary assessments among ethnic minorities, and (15) social patterns of obesity and weight control.

The most recent dietary guidelines reemphasize the increased reliance on plant-based foods as a means of controlling caloric consumption, reducing fat intake, modifying the composition of ingested fats, enhancing the consumption of foods associated with reduced cancer risk, and simultaneously insuring that macro- and micronutrient needs are met. For the first time the dietary guidelines also provide information to consumers who restrict their consumption of animal foods completely or rely on only selected few to meet their dietary needs. Future research activities must explicitly recognize the health goals, policy aims, and consumer practices that support these guidelines.

Thus, future research investments will be made in activities that (1) explore how complex genetic interactions determine developmental and other physiological pathways (and thus specific phenotypes) under diverse nutritional conditions (The impending description of the human genome make this an especially exciting opportunity.), (2) capitalize on an improved understanding of the determinants of human behavior to design effective interventions for behavior change related to nutrition, (3) analyze outcomes of food policy options related to food security, health, and disease prevention, and (4) enhance international collaborations that recognize the globalization of the US food supply.

Key Themes Summary

Appendix A indicates those themes identified in the Annual Report Guidance that are represented in reported activities for FY01. Appendix B provides a detailed listing of research problem areas, number of associated research projects, and presence/absence indication for reported extension activity.

PERFORMANCE GOALS FOR INITIATIVES RELATED TO GOAL 3

Improves the health, nutrition, and safety of communities and individuals.

- Increase citizen participation in local health and safety policy decisions
- Expand knowledge of health behaviors that effect women's health status
- Increase fruit and vegetable consumption

Indicator Data Specific to Goal 3

(For each indicator, both actual and annual target results are included, the latter in parentheses.)

INDICATOR 3.1 The total number of refereed or peer reviewed articles or materials reporting research on human nutrition and health or health promotion and the number of related patents, licenses, or varieties issued.

Year	# refereed items	# patents, licenses, varieties
2001	105 (300)	1 (2)

OBJECTIVE 3.1 To achieve a healthier, more well-nourished population.

INDICATOR 3.1.2 The total number of persons completing non-formal nutrition education programs on better management of health risk factors (e.g., obesity, hypertension, etc.) and the total number of these persons who actually adopt one or more recommended nutrition practices to reduce health risks within six months of completing one or more of these programs.

Year	Output: # persons completing programs	Outcome: # who actually adopt practices
2001	63345 (35000)	38605 (16500)

OBJECTIVE 3.2 To annually increase consumer awareness, understanding, and information on dietary guidance and appropriate nutrition practices.

INDICATOR 3.2.1 The total number of persons completing non-formal nutrition education programs that provide dietary guidance to consumers and the total number of these persons who actually adopt one or more recommended Dietary Guidelines within six months after completing one or more of these programs.

Year	Output: # persons completing programs	Outcome: # who actually adopt recommendations
2001	32950 (38000)	11675 (19000)

OBJECTIVE 3.3 To promote health, safety, and access to quality health care.

INDICATOR 3.3.1 The total number of persons completing non-formal education programs on health promotion and the total number of these persons who actually adopt one or more recommended practices within six months after completing one or more of these programs.

Year	Output: # persons completing programs	Outcome: # who actually adopt practices
2001	59752 (20010)	28545 (12001)

OBJECTIVE 3.4 To annually increase the level of individual and family safety (or reduce risk levels) from accidents in the homes, schools, workplaces, and communities.

INDICATOR 3.4.1 The total number of persons completing non-formal education programs on home and workplace safety and risk reduction and the number who actually adopt one or more recommended practices within six months after completing one or more of these programs.

Year	Output: # persons completing programs	Outcome: # who actually adopt practices
2001	18125 (4500)	6420 (2001)

OBJECTIVE 3.5 To annually increase the effectiveness of constituent and citizen participation on public policy issues affecting health community decision-making.

INDICATOR 3.5.1 The total number of persons completing non-formal education programs on public policy issues affecting health community decision-making and the total number of these persons who actually become actively involved in one or more public policy issues within six months after completing one or more of these programs.

Year	Output: # persons completing programs	Outcome: # who actually become involved
2001	385 (2500)	322 (500)

Resources Allocated to Goal 3 (FFF and Match)

Dollars x 1000 and (FTE) or (SY)

	FY2001 Target	FY2001 Actual
Extension Total	3,758 (50.2)	3,902 (51.1)
Research Total	1,295 (8.0)	564 (1.7)

Impact Examples Related to Goal 3

Cornell Food Scientists Find Processed Tomatoes Have Higher Nutritional Value

Regular consumption of fruits and vegetables is associated with reduced risk of chronic diseases such as cancer, heart disease, diabetes, Alzheimer's disease, cataracts, and age-related diseases. The National Research Council has recommended eating five or more servings of fruits and vegetables to increase public awareness of the health benefits of fruit and vegetable consumption and promote adequate intake of known vitamins. Both growing consumer awareness of the health benefits of fruits and vegetables and the emerging need for convenience as a result of fast-paced lifestyles have resulted in high demand for ready-to-use processed fruit and vegetable products. In recent years, manufacturers have come up with various vegetable products to bring convenience to consumers, but processed fruits and vegetables have long been considered to have a lower nutritional value than their fresh counterparts based on the loss of vitamin C in processing. Cornell food scientists recently demonstrated that vitamin C in fresh apples, however, contributed less than 0.4 percent of total antioxidant activity. Most of the antioxidant activity comes from other beneficial substances in apples called phytochemicals (phenolics, flavonoids, and carotenoids) and not vitamin C. This suggested that processed fruits and vegetables may retain their total antioxidant activity in spite of the loss of vitamin C after heat processing. Antioxidants protect the body from cell and tissue damage that occurs when free radicals are released as oxygen is metabolized by the body.

In research using tomatoes, Cornell food scientists found that despite an observed loss of vitamin C, heat processing significantly elevated total antioxidant activity and lycopene content in tomatoes and had no significant effect on total phenolic and flavonoid content. Lycopene is the major plant chemical substance in tomatoes with red color and is the single most efficient oxygen quencher (10 times more than that of vitamin E) thus making its presence in the diet important. This research demonstrates that heat processing actually enhances the nutritional value of tomatoes by increasing lycopene content and total antioxidant activity, dispelling the notion that processed fruits and vegetables have lower nutritional value than fresh produce.

From a scientific and human health standpoint, this research may have a significant impact on consumers' food product selection and also help promote the "five-a-day" program, increasing the consumption of fruits and vegetables to reduce the risk of chronic diseases such as cancer and heart disease. In addition to the scientific impact, this research will also have a critical economic impact on New York State and U.S. tomato growers and the tomato processing industry. In the United States, tomatoes are second only to potatoes in vegetable consumption, with a farm value of about $1.8 billion in 2000. Processed tomato products account for about 81 percent of total tomato consumption. The concept that processed tomatoes have higher nutritional value will benefit New York State and U.S. tomato growers and the tomato processing industry by increasing consumption of processed tomatoes.

Research in Cornell's Department of Communication Helps Inform and Target Efforts to Promote Low-Risk Drinking among College Students

Nationally, about 40 percent of all college students are binge drinkers, consuming five or more drinks in a sitting. Studies have shown that a person's lifelong drinking behavior can be established in college. Research has also shown that excessive drinking poses both direct and secondary problems for drinkers and those around them. Examples of direct effects include passing out, memory loss, engaging in unwanted or unprotected sex, causing a car accident while driving drunk, personal injury, and poor university-community relations in college towns. Examples of secondary problems, which are experienced by others but caused by excessive drinkers, include unwanted sexual advances, property damage, fights, and disturbed sleep. Typically, universities use social norms marketing campaigns to change student drinking behaviors. Social norms marketing is based on the idea that once people learn what the actual norm is in terms of a certain attitude or behavior within a peer

group, they will change their own attitudes and behaviors to more closely align with the perceived social norm. However, these traditional efforts to persuade college students to drink in moderation and avoid binge drinking have had limited success at some universities.

Research conducted by faculty in Cornell's Department of Communication focused on identifying those factors that predicted drinking behaviors on college campuses and testing social norms marketing campaigns aimed at curbing excessive use of alcohol and promoting drinking in moderation. Surveys of approximately 550 undergraduate Cornell students about their and their friends' drinking habits indicated that current social norms campaigns are not working on campus, a finding which is not consistent with reports from other college campuses that use social norms campaigns. Instead, what did have an impact on drinking behavior was students' perceptions of their friends' drinking behavior, in particular their male friends.

Based on these findings, health campaigns will be redesigned to have greater impact on student drinking. Instead of relying on social norms marketing, campaigns will be designed based on different theoretical concepts that may prove to be more effective in changing students' drinking behavior. These new theory-based persuasion campaigns will have applications at universities with student populations who do not respond well to traditional social norms marketing efforts. It is expected that these new campaigns will help reduce both primary and secondary effects of student drinking.

Older Adult Fitness and Nutrition Series

A survey of community residents and health care providers identified a clear need for senior fitness/nutrition classes within a rural community and in a town with no fitness clubs or organized programs for seniors. The survey was drafted and administered by the Livingston County Department of Health, Noyes Hospital, and Cornell Cooperative Extension of Livingston County.

A CCE nutrition educator and certified personal trainer, in collaboration with the Livingston County Diabetes Coalition, developed and implemented a 12-week fitness and nutrition class. One hour classes were offered twice weekly from September to November 2001. The first 6 weeks included nutrition education (on the "Food Guide Pyramid", serving sizes, and heart-healthy eating with some general diabetes diet education) and fitness instruction on strength training "using Dynabands". The second half of the series included reinforcement of above stated nutrition principles and a low-impact aerobics session. About 20 persons attended each session.

Almost all (95%) of the participants demonstrated knowledge of basic fitness principles (warming-up, cooling-down, stretching only when muscles are warmed-up, basic strength training and aerobic movements) and demonstrated knowledge of good nutrition practices. Two thirds of the participants lost weight (2-7 lbs) after the 12-week session. All of the participants reported to be more physically active on their own time because of the program. For example, one participant stated, "I walk more, and park farther away from the store." Three quarters of the participants identified a change in their eating habits since the start of the program. "I eat less fried foods and doughnuts, and eat more fruits and vegetables" according to one participant.

CCE-Tompkins County Nutrition Education Partnership with an Alcohol and Drug Treatment Facility Reaches Diverse Audience

Welfare to work efforts have made it a necessity pursue creative strategies to reach the low income target audience for nutrition education programs. Our association has made a commitment to reaching diverse audiences with all our programming. In the past we have reached males and minorities in small numbers in comparison to their prevalence in the population eligible for our services. The audience served by this program included:

- 60 residents participated
- 18 participants were members of minority groups (30%)
- 49 participants were male (82%)
- 90% of the audience received food stamps
- There were 119 persons in the families of the participants, including 34 children age 12 and under and 14 children ages 13-19.

A partnership was formed with Cornerstone Recovery Services to provide residents of an alcohol and drug treatment facility hands-on nutrition education programming emphasizing food resource management, nutrition education, and food safety. Two Nutrition Teaching Assistants (NTAs) worked with small groups of participants for weekly two-hour lessons in seven six-week series. Dietary data collected at the onset of the program revealed that the facility was serving a very small number of fruits and vegetables to the residents.

Outcomes and Impacts:

- 47 persons completed the program within the fiscal year (82% completion rate)
- 56% of participants improved one or more food resource management practices
- 65% of participants improved one or more nutrition practices
- 42% of participants improved one or more food safety practices
- The treatment facility increased the number and variety of fruits and vegetables served to the residents as a result of an increased number of requests for these foods from class participants.
- Food safety procedures in the facility improved as a result of gains in knowledge by participants and staff.

GOAL 4 – GREATER HARMONY BETWEEN AGRICULTURE AND THE ENVIRONMENT

Improving the integrity of our environment and maintaining the ecological systems that enable human prosperity will continue to be high priorities of society, and therefore high priorities of its publicly supported research and educational institutions for the next five years. Growing human populations cause growing consumer demands on the agriculture and food system, which magnifies the challenges of balancing agricultural production and food processing with stewardship and protection of the environment.

CUAES has invested heavily in science to avoid and mitigate impacts of agriculture on the environment. We view the long-term sustainability of agriculture as being inexorably linked to environmental quality. As part of our strategy, we are emphasizing a higher level of integration of research and extension to accelerate: identification of problems, focusing scientific effort to resolving problems, field testing and evaluation of technology and cultural practices, and introduction of environmentally superior innovations/practices to the agricultural community.

The research program is necessarily broad, with complementary thrusts in:

1. Minimization of chemical inputs–(a) research to improve pest management in plant agriculture, (b) development of viable biological control of pests, (c) improved cultural practices (plant systems management), (d) plant and animal breeding research to improve pest resistance and minimize nutrient inputs, (e) soil-plant systems investigations to improve nutrient management, and (f) technological innovations to reduce pathogens associated with animal agriculture.

2. Development of agricultural practices that minimize negative impacts on other natural resource values—(a) protect the integrity of water quality, fish and other aquatic resources, wetlands, terrestrial wildlife habitat, forests, and aesthetic considerations; (b) minimize consumption of energy and petroleum-based materials on farm.

3. Development of environmentally friendly and profitable alternative agricultural products—(a) identify new products and production methods that result in less impact on the environment, (b) develop markets and design marketing strategies that increase profitability of environmentally friendly agricultural products.

4. Improvement of waste management associated with the agriculture and food system–(a) reduce quantity of on-farm waste, (b) improve management of farm-produced waste, including quality and disposal, (c) reduce quantity of waste in food processing, (d) improve management of waste produced in food processing, including quality and disposal, (e) develop scientific understanding of potential for use of agricultural land for environmentally safe application of municipal sewage sludge.

Future research investments will continue to be made in fundamental and applied science areas leading to improvements in chemical management, nutrient management, waste management, and habitat protection on the farm; energy conservation on farm and in food processing; waste management associated with food processing; and natural resource stewardship.

Issues, Opportunities and Constraints

Issues–Accelerated time frame of society's expectations for "cleaning up agriculture" versus reality of pace of science progress, especially given modest funding levels; public image of agriculture and AES system

Opportunities—Keen interest of excellent scientists to address the problems and discover solutions; public support for this kind of work; graduate student interest is high

Constraints—Lack of sufficient federal funding directed at this area so that science can be accelerated (need facilities improvements, fellowships for best grad students, research operating dollars, etc.)—society's desire for improvements in this area are not matched with financial commitments required to do the job at the rate we all would like; AES's can move some FFFs to this need, but many other agricultural production needs exist that make it very difficult to redirect large portions of the FFF research portfolio.

Key Themes Summary

Appendix A indicates those themes identified in the Annual Report Guidance that are represented in reported activities for FY01. Appendix B provides a detailed listing of research problem areas, number of associated research projects, and presence/absence indication for reported extension activity.

PERFORMANCE GOALS FOR INITIATIVES RELATED TO GOAL 4

Improves the quality and sustainability of human environments and natural resources.

- Ensure quality and conservation of water supply
- Promote environmental stewardship and sound decision making about the management of natural resources
- Promote community, agricultural, and residential environmental enhancement
- Prepare youth to make considered environmental choices
- Enhance science education through the environments

Indicator Data Specific to Goal 4

(For each indicator, both actual and annual target results are included, the latter in parentheses.)

INDICATOR 4.1 The total number of refereed or peer reviewed articles or materials reporting research on agricultural, natural resource, and environmental policies, programs, technologies and practices and the number of related patents, licenses, or varieties issued.

Year	# refereed items	# patents, licenses, varieties
2001	423 (255)	3 (2)

OBJECTIVE 4.1 To develop, transfer, and promote adoption of efficient and sustainable agricultural, forestry, and other resource policies, programs, technologies, and practices that protect, sustain, and enhance water, soil and air resources.

INDICATOR 4.1.2 The total number of persons completing non-formal education programs on sustaining and/or protecting the quantity and quality of surface water and ground water supplies and the total number of these persons who actually adopt one or more water management practices within six months after completing one or more of these programs.

Year	Output: # persons completing programs	Outcome: # who actually adopt practices
2001	30325 (15000)	5195 (5000)

OBJECTIVE 4.2 To annually increase producer adoption of agricultural production "best practices" that conserve, protect, and/or enhance the soil resources on or adjacent to agricultural production sites or land uses.

INDICATOR 4.2.1 The total number of persons completing non-formal education programs on conserving, sustaining, and/or protecting soil resources and the total number of these persons who actually adopt one or more soil conservation practices within six months of completing one or more non-formal education programs.

Year	Output: # persons completing programs	Outcome: # who actually adopt practices
2001	13982 (6500)	2376 (3250)

OBJECTIVE 4.3 To annually increase the effectiveness of constituent and citizen participation on public policy issues affecting agricultural production, the environment, and ecosystem integrity and biodiversity.

INDICATOR 4.3.1 The total number of persons completing non-formal education programs on public policy issues affecting agricultural production and ecosystem integrity and biodiversity and the total number of these persons who actually become actively involved in one or more public policy issues within six months after completing one or more of these programs.

Year	Output: # persons completingprograms	Outcome: # who actually become involved
2001	12290 (30000)	3538 (2001)

Resources Allocated to Goal 4 (FFF and Match)

Dollars x 1000 and (FTE) or (SY)

	FY2001 Target	FY2001 Actual
Extension Total	3,184 (50.4)	3,228 (51.3)
Research Total	2,150 (13.6)	2,219 (23.4)

Impact Examples Related to Goal 4

Nutrient Management Education

Farms have been evaluated for their potential to pollute critical watersheds in the CNYDLFC team area. Watersheds were prioritized at a state and federal level by risk potential. Those watersheds with the greatest risk received government funding to help farms make changes that would eliminate the possibility of polluting those watersheds. Funding is aimed at building structures that would reduce pollution discharges such as milk center wastewater, barnyard runoff and silage leachate and for nutrient management plans. Farms that have been selected to receive EQIP (Environmental Quality Incentive Program) funding to make changes in current practices have been targeted for training. Producers have asked for more information on using phosphorous in starter fertilizers for corn. They would like to know if they can reduce the amount of phosphorous they are using or if they can eliminate starter fertilizer all together. Cornell released nutrient management planning software that will allow producers to develop their own nutrient management plans. Producers need training if they are to use the software effectively.

Educational workshops were conducted in 4 watersheds in the CNYDLFC team area on nutrient management planning to help participants better utilize the plant nutrients on their farms in particular how to utilize the nutrients in manure and how to use soil tests. Emphasis was placed on the timing of manure applications so that manure does not runoff to streams and lakes. During the 2000 and 2001 growing seasons corn starter demonstration plots were established on 4 farms. Information was collected to see if there was a response to phosphorous fertilizer or any starter fertilizer. A meeting was held at one of the demonstration farms to share the information that has been collected so far. Three trainings on the use of Cornell Cropware were conducted and two people have received individual training. The training sessions were hands on with computers so that individuals were able to work through examples and develop some proficiency before working on their own plans.

Outcomes and Impacts

- 40 farms participated in nutrient management workshops during the past year. Participants in general report:
    - Reducing the amount of starter fertilizer used when planting corn from 200-300 pounds per acre to 100 pounds. On 100 acres of corn the savings is about $1000.
    - A willingness to haul manure to distant fields that have lower soil nutrient levels because they have not received manure applications in the past.
- The test plots have shown that producers can reduce corn starter fertilizer rates by 50% and still receive the same yields. One farm which has had a test plot for the past two years has eliminated starter fertilizer for corn at a yearly saving for 250 corn acres of $5,000. They have high soil fertility levels and have not seen a decrease in yields.
- Twenty five people have received training on the use of Cornell Cropware with all of those participating anticipating using the software to develop their own nutrient management plans in the next year. One has already completed a plan to meet NRCS requirements for technical assistance.

Phosphorus Reduction Through Precision Animal Feeding

Environmental issues, and specifically nutrient management issues, are of paramount concern to the agricultural community in New York State. Among nutrients, phosphorus (P) has received much attention due to its direct effect in promoting algal growth in surface drinking water supplies. When substantial algal growth occurs, water supplies require chlorination prior to drinking, which increases the risk of contamination of the drinking water with carcinogenic chlorination byproducts. Excessive P levels have been identified as the critical concern in the impairment of the Cannonsville Reservoir, a drinking water supply for New York City.
The dairy industry in the Northeast imports large quantities of phosphorus into this region. The vast majority of this imported phosphorus enters the farm as purchased feed. Imported feed phosphorus is directly related to the amount of P excreted in animal manure. When manure is then used as a soil fertility amendment on the farm, it becomes the vehicle for P accumulation in soils as

well as a potential point in the P cycle on the farm where direct loss to water bodies can occur. The need to address feed phosphorus for water quality protection on dairy farms is therefore well justified and is of great interest to the agricultural and non agricultural communities.

In response to this issue in the Cannonsville Reservoir Basin, part of the New York City water supply, Cornell Cooperative Extension of Delaware County took the lead in designing and implementing The Phosphorus Reduction Through Precision Animal Feeding program. This multi year research and demonstration program is designed to investigate and implement feed management strategies to reduce imported and excreted (manure) phosphorus on dairy farms in the Cannonsville Reservoir Basin in Delaware County. The program approach is a field based, collaborative effort between Cornell Cooperative Extension of Delaware County, commercial dairy farmers, Cornell University scientists, and local agencies and policy makers. The program is an integral component of Delaware County's Action Plan for phosphorus management (DCAP).

Outcomes and Impacts: To date:

- Precision feeding program is adopted and integrated into overall Delaware County Action Plan for phosphorus management and has been adopted by New York State Department of Agriculture and Markets as a best management practice under the Agriculture Environmental Management program.
- A 2 year plan of work was developed, funded, and implemented.
- Local pilot dairy farms and their feed companies are participating in developing and implementing precision feed management strategies.
- The project has demonstrated 30%+ reductions in feed phosphorus imports and manure phosphorus excretions (equivalent to 9-14 kg per cow per year) through precision feed management, while maintaining or reducing feed costs to the farm.
- Precision feeding phosphorus reductions recognized as single largest non point source phosphorus reduction achievable in the Cannonsville Reservoir basin, with potential annual reductions of 64,000 to 73,000 kg per year for the entire basin.
- Cornell University and Cornell Cooperative Extension of Delaware County are collaborating in research at the local level to develop and implement practical feed management strategies and in testing the Cornell Nutrient Management Planning System (cuNMPS) software as well as researching emerging crop technologies.
- Invited and presented a paper on the project presented at the 2001 National Non Point Source Pollution Conference in Indianapolis IN.
- Invited to present results to NYS AEM Steering Committee, NYS Non Pont Source Coordinating Committee, and the NYS Soil and Water Conservation Committee.
- A multi year strategic plan is has been developed to implement the strategies developed in the current project on more dairy farms in the Cannonsville Reservoir Basin, and proposals have been submitted for funding.

Communicating the Risks and Benefits of Non-commercial Fish Consumption

Recreational fishing is a multibillion-dollar industry across the nation. Many anglers would like to keep and eat the fish they catch. Eating fish can provide important health benefits, for both children and adults. However, 48 states, the District of Columbia, and one US Territory have issued fish consumption health advisories with recommendations to limit or avoid eating recreationally-caught fish because of concerns about chemical contamination in the waters in which these fish are found. Most advisories are issued in response to presence of PCBs, dioxins, methylmercury, and/or chlordane. In the contiguous 48 states, 100 % of Great Lakes waters, 71% of coastal waters, 23% of lake acres, and 9% of river miles are covered by these health advisories (USEPA Fact Sheet, 2000). Chemical contaminant exposure risks may be higher for certain populations, due to high levels of fish consumption or to the types of adverse health impacts the chemicals pose (e.g., reproductive and developmental effects). Subpopulations of special concern for these reasons include women of childbearing age, children, and those who rely on sport-caught fish for cultural or dietary/economic reasons. Risk

management and communication research is necessary to help anglers and their families decide which, and how much, sport-caught fish they should eat, taking into account both potential benefits and risks from eating fish.

Research in the Human Dimensions Research Unit in Cornell's Department of Natural Resources has improved our understanding of human attitudes and behaviors related to fish consumption health advisories. Studies have focused on determining what factors may influence anglers' and other potential fish consumers'understanding of and response to these advisories, as well as program evaluation research to assess the impacts of various risk communication approaches. Research has also addressed factors influencing risk perception, the importance of comparative dietary risk information, assumptions of risk management, methods to assess fish consumption, and challenges of institutional coordination in these programs (which often include health, environmental quality, and fishery management agencies in state and tribal governments).

Results from this research program led to Cornell faculty writing, under contract to USEPA, the first major guidance document on risk communication associated with fish consumption health advisories, now used widely by states and tribes. The first edition is now being revised by a consulting team, with the scientific lead provided by a Cornell faculty. The first major National Risk Communication Conference focused on fish consumption health advisories, held in May, 2001 in Chicago, featured Cornell faculty as the keynote speaker, in a presentation titled "Risk Communication Challenges: Are Audiences Hard to Reach: Or are the Messages Hard to Send?" In addition, a Cornell faculty member was appointed recently to the Institute of Medicine/National Research Council Committee on Implications of Reducing Dioxin in the Food Supply. She provides the risk communication expertise to this committee.

Cornell Researchers Control Powdery Mildews with Benefical Mites

Powery mildews are a diverse and destructive group of plant pathogens that affect nearly all agricultural crops. Cornell entomologists and plant pathologists at the New York State Agricultural Experiment Station in Geneva, N.Y., have found that certain mites (Tydeids) feed upon powdery mildew on the plant surface and can provide a surprising degree of control of these often difficult-to-manage diseases. Tydeid mites have been shown to reduce the severity of powdery mildew on three diverse crops: grapes, roses, and cucumbers. On grapes, they have provided almost complete control of the disease under moderate disease pressure.

Working together, Cornell plant pathologists and entomologists discovered a tiny mite that eats the powdery mildew pathogens on grapes, roses, and cucumbers. This work has received international attention and has great potential to control biologically one of the largest and most destructive groups of plant pathogens.

Preservation of Rural Watersheds and Drinking Water Resources

The capacity of rural communities across the nation for understanding and managing water resources is a major factor in successful water resources protection. Among those who impact the watershed and are responsible for its protection are small water system operators, who can be key players in rural watershed protection efforts. Examples of small water systems, some of which are classified as non-community water supplies, are mobile trailer parks, campgrounds, restaurants, small and rural apartment buildings and gas stations/convenience stores. The majority of these small systems are in rural areas or small villages and hamlets that do not have a municipal water supply and are traditionally under-served communities. These small water system operators are first operating a business and secondly supplying water as a business need (water for the restaurant or campground that is the source of their income). Many of these suppliers also have onsite wastewater systems, handle toxic chemicals, manage solid wastes, and maintain small road networks. They need non-point source (NPS) and source water protection education both to protect water resources and to enhance their ability to conduct their business. Although municipal water operators generally have adequate access to education, small water system

operators may not have the same resources. Supplying water to customers may be only part of their business and responsibilities, and their financial and time resources may be limited.

The overall approach involves the development of an assessment and educational program that can be delivered one-on-one and a workshop approach that will enable the small water operator to conduct a self-assessment. The site assessment allows each individual to evaluate sources of non-point source pollution and practice pollution prevention measures. The program is supported by an educational package that helps the user determine possible sources of contamination on and off site, identify travel routes of contaminants, and develop management practices that will minimize the potential for contamination of water resources. It includes materials such as a site map template, education and assessment guides (wells, on-site wastewater treatment systems, fuels, pesticides, waste management, grounds maintenance and hazardous chemicals) and educational leave-behind items such as door hangers or posters. The pilot sessions occurred in summer 2001 in the Lake Ontario and Susquehanna River Basins. Participants received the information through a site assessment, a workshop, or a workshop followed by a site assessment. Each participant was interviewed before the workshop and site assessments and will be interviewed six months later to determine behavioral changes. A control group was included. Various incentives to participate, such as health department certification and continuing education and renewal credits for licensed operators are being developed.

The first important and near-term impact of this project is the understanding of how operators of small water systems protect source water and how they view their roles in that protection. We have found them to be very conscientious about source water protection. They work well with their county health agencies in most cases, and they view the health agency as a partner in the process. Participants do not feel that the required testing regimen or the regulatory atmosphere is excessive. Their motivation to participate in the overall educational program provided by this project, including one-on-one site assessments, varies widely and ranges from personal growth to a need for certification units. The operators who participated in the pilot project reported an increase in knowledge about pollution prevention and a strong motivation to protect our water resources. An overall impact of the program is improved water quality for rural communities. In addition, collaboration with local and state health departments by extension educators on the protection of drinking water is a very positive and critical outcome.

Syracuse's 1st Comprehensive Urban Forest Management Plan

The Labor Day Wind Storm of 1998 left central New York communities with an estimated $60-$75 million damage to local governments, $20 to local utility companies, and loss of 2 lives. Power was restored and life returned to normal within about two weeks time, except for the green infrastructure of the urban forest. Thousands of trees were uprooted, damaged property, and created public health concerns as hazardous limbs were left hanging in neighborhoods.

As with most natural disasters, government and utility funding became available to help restore the damage in the form of tree restoration grants. However, grant funding required a plan for future management in hopes of mitigating future storm related costs caused by inadequate planning of forests in the places that people live and work. Of 35 municipalities surveyed in Onondaga County, none had an urban forest plan that would sustain, manage, and enhance their green infrastructure in a manner that would reduce the risk of future damage while enhancing the benefits of a healthy community forest.

CCE of Onondaga County successfully acquired a Sustainable Development Grant from the Environmental Protection Agency. Funding was used to assist the City of Syracuse in development of an urban forest plan, and to share knowledge gained through this planning process with other communities

CCE coordinated efforts of the USDA Forest Service, NYS DEC, city of Syracuse, SUNY College of

Environmental Science and Forestry, and local residents to produce Syracuses first urban forest master plan. The plan was printed as an USDA Forest Service technical bulletin, formally adopted by the Syracuse common council, and unveiled on Arbor Day 2001 by Congressman James Walsh.

This plan is unique in that it combines the latest in satellite digital analysis, on site physical inventory, social survey of community residents, and establishes goals based on the integration of this material. USDA Forest Service is producing the plan as a technical bulletin that will serve nationally as a model for community forestry planning.

Outcomes and Impacts:

- Syracuse has begun implementing the plan to acquire funding from Niagara Mohawk Power Corporation to replant 1000 of the 3000 lost street trees at a savings of $30,000 to the city
- Syracuse became designated as a Tree City USA and received a growth award through the National Arbor Day Foundation for its community forestry planning efforts
- Syracuse has leveraged $25,000 in potential funding to develop an urban forest operations plan
- Nine municipalities across Onondaga County began planning green infrastructure using the Syracuse example through CCEs outreach efforts to municipal boards

GOAL 5 – ENHANCED ECONOMIC OPPORTUNITIES AND QUALITY OF LIFE FOR AMERICANS

Economic and social well-being are deeply intertwined through opportunities for healthy human development that is nurtured by strong families and communities. Over the next five years, the significance of the local community in economic and human development will become increasingly important as federal and state governments continue to devolve authority and accountability for employment, education, public health, social services and general enhancement of a more self-reliant population.

Cornell's research program in these areas includes faculty from the College of Human Ecology and the College of Agriculture and Life Sciences. Their interests are in economic development (especially in rural communities), human development from pre-natal through elderly stages of the life-course, and design that centers on human environment, health, and well-being. Research areas of current interest include the following:

The Economy

- Collaboration with New York State business and industry in fiber science such as ceramic composites, adhesion problems in fiber glass reinforced circuit boards, and fatigue of joints in plastic pipes, and application of computer-assisted design and manufacturing to the textile and apparel industry through the Apparel Industry Outreach that provides educational programming to firm in the New York metropolitan area and throughout New York State;
- Health and welfare economics, local economic effects of changes in the health sector including mandated managed care for Medicaid and Medicare recipients, consumer behavior in medical care choice and disease prevention, effects of taxation policies on alcohol consumption, health impact of unemployment, and the effects of public finance policies on low-income households and development of human capital;
- Family-based businesses and the interplay between family dynamics, inter-generation transfer of ownership, and economic viability, and time-use in households as it affects household and non-household productivity;
- Management of the nonprofit sector including improved techniques for planning and evaluation, inter-organizational collaboration at the community level, strengthened volunteer involvement in local communities, and organizational change.

Family and Community

- Human development and family functioning, including cognitive and personality dynamics, biological bases of personality and abnormal development, language development and intellectual growth in infancy and early childhood, the effects on human growth and development of parenting practices, family and school environments and child care programs, and the impact rural work opportunities and community resources on retirement and life-transition decision making;
- Health care cost and quality including finance and organization of health care, employer-financed health insurance, the effects of managed care on service quality, equity and access, and Medicaid and Medicare policy, health and menopause among rural women;
- Social welfare and family policies and programs including issues of child support, foster care, adoption of hard-to-place children, the effects of divorce on children, and management, leadership and evaluation of human service organizations, food security and food resource management;

- Rural economic and community development including local government and business collaborations on job development and community decision making, rural housing quality and community vitality including issues of affordability, energy efficiency and structural integrity, rural housing conditions and children's psychological development, youth development and mentoring, housing for the elderly and disabled, interior design including furniture and facilities for the elderly, Alzheimer's patients, and child care facilities.

The Human Environment

- The effects of the physical environment on the workplace and employee including innovative workplace design, non-territorial offices, technological infrastructure, work processes, and formal and informal organizational policies and practices, home-based telecommuting and virtual work environments, the effects of ergonomic factors such as office lighting, computer stations and ventilation systems on employee health and productivity, impact of environmental toxicants such as low-level lead exposure on child development, air and water quality and toxic substance safety for households and communities;
- Innovative uses of computers in design decision making and design education, creative problem solving, human/computer interface issues, and visual, historical and cross-cultural bases of interiors, apparel and textiles;
- Health and safety issues including apparel design that protects employees from workplace contaminants and injury including HIV and other blood borne pathogens, development of new methods to determine skin exposure from pesticide contaminated clothing;
- Fiber science applications to understand the mechanics of fibrous materials, the micromechanics of failure processes, plasma surface modifications, and the development of fiber-based synthetic prostheses and surgical aids.

Future investments in research should be targeted at efforts that (1) link empirical findings to planned economic development and other extension programs; (2) integrate economic with other social science perspectives for a deeper understanding of the influence of family, organizational and community factors on long term development of human capital; (3) integrate biological and psychological approaches to healthy human development; (4) strengthen collaboration among and between business and community organizations in furtherance of economic development and the quality of community life; (5) speed the diffusion of scientific innovation to commercial development that benefits small business and community-based enterprise, (6) integrate the social sciences with information science and its application.

Key Themes Summary

Appendix A indicates those themes identified in the Annual Report Guidance that are represented in reported activities for FY01. Appendix B provides a detailed listing of research problem areas, number of associated research projects, and presence/absence indication for reported extension activity.

PERFORMANCE GOALS FOR INITIATIVES RELATED TO GOAL 5

Develop the competence and character of youth and adults in families and communities.

- build strong families;
- develop capable, responsible, and caring young people;
- promote healthy, supportive communities;
- increase financial well-being
- support informed housing choices

Strengthen the economic and social vitality of communities.

- empower communities so that they are viable, dynamic, and sustaining;
- expand skills of both the current and future workforce;
- leverage and apply private and public sector resources wisely;
- enhance small business development and management; and
- develop, enhance, and retain a strong agricultural industry.

Indicator Data Specific to Goal 5

(For each indicator, both actual and annual target results are included, the latter in parentheses.)

INDICATOR 5.1 The total number of refereed or peer reviewed articles or materials reporting research on community or family economic or social well being.

Year	# refereed items
2001	245 (200)

OBJECTIVE 5.1 To increase the capacity of communities and families to enhance their own economic well-being.

INDICATOR 5.1.2 The total number of public officials and community leaders completing non-formal education programs on economic or enterprise development and the total number of these public officials and community leaders who actually adopt one or more recommended practices to attract new businesses or help expand existing businesses within six month after completing one or more of these programs.

Year	Output: # persons completing programs	Outcome: # who actually adopt practices
2001	2572 (3500)	1910 (850)

OBJECTIVE 5.2 To annually improve the financial status of families through financial management education programs implemented in which CSREES partners and cooperators play an active research, education, or extension role.

INDICATOR 5.2.1 The number of persons completing non-formal financial management education programs and the total number of these persons who actually adopt one or more recommended practices to decrease consumer credit debt or increase savings within six months after completing one or more of these programs.

Year	Output: # persons completing programs	Outcome: # who actually adopt practices
2001	14980 (10500)	9878 (4000)

OBJECTIVE 5.3 To increase the capacity of communities, families, and individuals to improve their own quality of life.

INDICATOR 5.3.1 The total number of persons completing non-formal education programs on community decision making or leadership development and the total number of these persons who actually become actively involved in one or more community projects within six months after completing one or more of these programs.

Year	Output: # persons completing programs	Outcome: # who actually become involved
2001	17865 (6500)	6270 (3000)

OBJECTIVE 5.4 To annually increase the incidence of strong families resulting from non-formal education programs.

INDICATOR 5.4.1 The total number of dependent care providers completing non-formal education programs and the total number of these dependent care providers who actually adopt one or more new principles, behaviors, or practices within six months after completing one or more of these programs.

Year	Output: # persons completing programs	Outcome: # who actually adopt new principles, etc.
2001	9625 (7500)	5330 (3200)

INDICATOR 5.4.2 The total number of persons completing non-formal education programs on parenting and the total number of these persons who actually adopt one or more parenting principles, behaviors, or practices within six months after completing one or more of these programs.

Year	Output: # persons completing programs	Outcome: # who actually adopt principles, etc.
2001	12755 (20010)	7302 (8500)

INDICATOR 5.4.3 The total number of persons completing non-formal education programs on youth development and the total number of these persons who actually adopt one or more youth development principles, behaviors, or practices within six months after completing one or more of these programs.

Year	Output: # persons completing programs	Outcome: # who actually adopt principles, etc.
2001	87026 (18000)	28303 (11000)

Resources Allocated to Goal 5 (FFF and Match)

Dollars x 1000 and (FTE) or (SY)

	FY2001 Target	FY2001 Actual
Extension Total	4,842 (80.6)	5,156 (82.0)
Research Total	1,825 (11.5)	1,526 (9.3)

Impact Examples Related to Goal 5

Gardening & Landscape Workshops

Consumer investments of time and capital in gardening and landscape oriented resources are significant. 90% of Ontario County households are involved in the production and maintenance of ornamental and/or food crops in the form of home landscapes and gardens. The estimated annual expenditure by Ontario County residents for gardening activities is 17.9 million dollars. The average investment per home in landscape components and plant materials is $8500.00.

Homeowners/gardeners seek reliable technology for the culture of ornamental, fruit and vegetable plant materials, i.e. efficient management of soils, insects, disease and weeds, the use of landscape/garden maintenance service and/or equipment. This audience also seeks reliable information in reducing or eliminating pesticides and their proper use and storage to prevent accidents and undue human exposure and environmental degradation.

Research-based horticultural information is provided to residents of Ontario County using multiple and varying educational program delivery methods. Most notable is our volunteer Master Gardeners who we have recruited, trained and supported with resources to respond to the needs of individuals and communities. Through such programming homeowners/gardeners acquired the knowledge and skills necessary to efficiently select, plant and maintain ornamental, fruit and vegetable plant material in the home garden and landscape and to increase their awareness and adoption of least toxic pest management alternatives in and around the home.

Ten new Master Gardener volunteers were recruited and trained bringing the total number of active Master Gardeners to 34 in Ontario County. The Master Gardeners are responsible for many of our on-going programs in horticulture for the general public. These M aster Gardeners contributed 1664 hours of volunteer time at a value of $26,369.00 this past year.The Homes and Grounds/Community Horticulture Program continues to reach more residents (4600) within the county, up 15% from last year. 63 percent reported that Cornell Cooperative Extension had helped them in reducing the amount of chemicals they use to manage pests in the garden. 85 percent have become more skilled at inspecting or monitoring plants for insects and diseases, while 83 percent are more skilled at selecting disease and pest resistant varieties for their home landscape and gardens. 86 percent are influenced in their decision making by Cornell Cooperative Extension about managing pests in their gardens.

Online Outreach Services Educate Youth about Career Options.

Both rural and inner city youths need high-quality occupational information to make informed choices about career options. Rapidly changing economic conditions and the rapid pace of information technology require that young people understand their abilities and motivations so that they can target their educational goals and job skills to match the workforce needs of agriculture and business in both New York State and the U.S. economy.

Cornell's eXploring Careers project has worked with the New York State Department of Labor (NYDOL) to develop innovative online applications of the federal O*NET database of occupational information. In addition to supporting development of the NYDOL CareerZone program (www.nycareerzone.org), the eXploring Careers web site (www.exploringcareers.org) was developed to provide a portal of career information to students in middle and high school grades. Building on this foundation, eXploring Careers has worked to develop industry-specific

food and fiber occupational information for the Mid-Atlantic Consortium (www.workforcepathways.org) and with the USDA to create a web site to help rural youths expand their occupational horizons (www.ruraldreams.org). Within the Department of Education at Cornell University, eXploring Careers has worked to develop standards for providing educational resources in a distance learning format.

Public schools and one-stop job centers are using the resources developed and hosted by the eXploring Careers project across New York State and across the country. The web sites receive hundreds of thousands of annual hits from both young people and disenfranchised workers looking for career and occupational information. With resources to help develop self-knowledge about interests, skills, and abilities as well as information about the world of work, eXploring Careers helps students plan and act on career goals. In 2002 eXploring Careers in collaboration with EdWeB and the Cornell Education Resources Program (CERP) (www.cerp.cornell.edu) will be releasing online curriculum materials to support and facilitate career exploration for all youths as well as targeted materials to support exploration in agriculture and the food and fiber systems.

Individual Economic Risk Over the Life Course

Public debate about socioeconomic risk and welfare safety net programs designed to ameliorate risk is lacking is misleading and lacks basic information. Much of the dialogue presumes that the events of poverty and welfare recipiency occur within a circumscribed minority of the American population, and that the elderly are especially well protected from risk. This lack of basic information has the potential to distort perceptions among decision makers, and ultimately lead to ill-advised policies.

A program of research was initiated to identify the life-time incidence of poverty and welfare use. This program utilized 30 years of information on 5,000 families, and resulted in 8 refereed journal articles. Among the facts uncovered are that 58 percent of Americans will have one or more years below poverty sometime during their adult life course, and that 60 percent will utilize a means-tested welfare program. Forty percent of the elderly will experience poverty. Hence poverty and welfare use are normal life course events in America.

The research findings were disseminated via the mass media. Specifically, project findings were reported in the October, 2001 issue of Readers Digest, and the October 28 issue of the Sunday Washington Post. The investigator also provided information to U.S. Senate Finance Committee. As a result of this research, specific and persistent myths extant within national poverty and welfare policy discussions regarding the poverty “prone” and the poverty “life cycle” have been appropriately challenged.

Friendship Riders 4-H Club: Providing Horseback Riding Lessons for Individuals with and without Disabilities

Youth with handicapping conditions need, and their parents desire for them, strengthening exercise and confidence-building activity. 4-H members without handicapping conditions have a strong interest in horse care, horseback riding and community service. The therapeutic riding program needs many youth and adult volunteers to conduct a safe and effective program.

CCE of Onondaga County provided information on the 4-H club program structure and policies; maintained contact with initial inquirer over 18 months, supporting the club formation process; provided a forum for club leader to educate current 4-H members and parents on the principles and practices of therapeutic riding; advertised volunteer opportunities to all 4-H Horse Program participants; documented volunteer participation and collected impact statements from individuals involved in Friendship Riders and the Special Olympics Equestrian Competition.

Outcomes and Impacts: Nine adults and 15 youth learned the necessary skills to assist riders with handicapping conditions, in 7 sessions of training.They used those skills in riding sessions and the Special Olympics Equestrian Competition in Cazenovia, NY, on June 9, 2001. Forty-seven youth from 12 NY counties rode horses in the Equestrian Competition. Members of Friendship Riders rode in the Onondaga County Youth Fair Horse Show at the State Fairgrounds for the first time, on July 28, 2001. Friendship Riders members learned concentration, independence and responsibility in a supervised setting. Riders increased strength, flexibility, coordination and balance through use of the horse.

Testimonials:

> Parent: My daughter has had a lot of problems over the past 2 years. In the year she's been in the therapeutic riding 4-H club, she is much calmer and more focused.
> School employee: When I first met this girl in elementary school, she was using a wheelchair. She's in junior high school now. Through this (therapeutic riding) she's gained the strength and coordination so she no longer needs the wheelchair.
> Competitor to his coach: If I can get through this, I can get through anything! [And he did get through the class, winning a blue ribbon.]

Home Environmental Programs

EPA random sampling testing data of the early 1990s show Delaware County ranking 15th highest in NYS for elevated radon levels. In this Delaware River watershed region of the Catskill Mountains, environmental issues related to the water quality are a high priority. Fourteen point four percent of families living in poverty are an audience for indoor quality issues. Home-A-Syst and radon education has helped address environmental issues in Delaware County.

Since 1997, CCE staff have been trained and supported by Cornell's staffs on Home*A*Syst, Housing, Food Safety, and Indoor Air Quality/Radon issues. CCE Executive Director, Nutrition Teaching Assistants and Program Assistants present and distribute Fact Sheets, radon test kits, and teaching materials in schools, WIC Sites, Senior Meal Sites, community sites, homes through EFNEP, worksites, banks, through press releases, radio, and newspapers. CCE moves into its fifth year of funding to provide educational outreach and radon test kits.

With funding from Catskill Watershed Corporation (CWC), and in a five county Extension partnership in Spring 1999, HOME*A*SYST was adapted into a curriculum (Home-A-Syst) and piloted with Middle School and 4-H Youth. Approximately 175 students, 3 school teachers, 65 CWC Board Members and its Audience, and 50 parents at one participating school's Science Fair on Home-A-Syst learned the importance of identifying environmental health risks around and in their homes. At least 150 Middle School students and their families corrected potential risks, while 16 students tested their homes for radon (with one home showing a need to retest). Since Winter 1998, NYS Department of Health has supported the testing of approximately 600+ homes for radon levels. An estimated 100 homes indicated a need for retesting because of

elevated levels, and four homeowners have mitigated. In fact one homeowner has expressed his continued satisfaction with the radon mitigation system because it continues to monitor a very low radon reading and reduces his family's risk for lung cancer from radon gas.

Government Leadership in the New Millennium

The Putnam County Administration sought the assistance of Cornell Cooperative Extension to develop a professional development leadership program for County Government department heads, managers and top level supervisors to expand their personal leadership skills and create effective work teams to deliver high quality, efficient, cost-effective services of Putnam County residents.

Cornell Cooperative Extension and the Cornell Community and Rural Development Institute assisted the Putnam County Executive and Management Committee in defining needs, goals, and desired outcomes. With Cornell Cooperative Extension leadership and faculty assistance from the Johnson Graduate School of Management, the Putnam County Management Committee has developed a 3 year progressive leadership development program, entitled "Government Leadership In The New Millennium," for Putnam County's 80 department heads, managers and supervisors. This initiative is modeled after Cornell's Parks Leadership Fellows Programs combining theory learning, personal skill assessment and development, and experiential learning in a year-long leadership development experience. Action learning projects focusing on county problems and strategic issues integrate training with relevant project assignments to practice and develop leadership, teambuilding, and management skills. The focus of this is government leadership program on leadership styles, team and project management, leadership skills, strategic planning and change management, servant leadership, organization management and change.

Outcomes and Impacts: 74 Putnam County department heads, managers and supervisors participated in Government Leadership In The New Millennium - Part II (2001), representing a 15% increase in participation in year two. 74 department heads, managers and supervisors enhanced, in varying degrees, their leadership/management and strategic planning skills: 1) increased self-awareness of leadership / management skills (strengths and weaknesses) through participation in SKILLSCOPE, a 360 - degree feedback assessment tool developed by the Center for Creative Leadership; 2) developed and implemented personalized learning plans for addressing areas of personal need using SKILLSCOPE feedback; 3) practiced and developed skills in a supportive project team environment.

Resulting action learning projects will make substantive contributions to the strategic goals of Putnam County: 1) 8 multi-functional action learning projects teams developed strategic plan proposals to address issues and concerns identified during the data gathering process. such as changing demands for service, employee recognition, technology, workplace security, interdepartmental communications, and employee training and development; 2) the County Executive has given preliminary approval for the all of the project teams to implement their strategic plan proposals. These projects address critical issues, fulfill unmet needs, save time and/or money, and provide for efficient delivery of services.

Additonal benefits include strengthened relationships between the County Administration and management: 1) county management is encouraged by the administration's positive response to issues such as technology, better communication, and employee morale; 2) County Administration is encouraged by the management group willingness to work together to address

strategic issues. Interdepartmental relationships also were strengthened - managers and supervisors have a better understanding of the responsibilities, goals, and challenges of other departments.

STAKEHOLDER INPUT PROCESS

During this reporting period, and as mentioned in last year's report, the stakeholder input approach jointly utilized by Cornell Cooperative Extension (CCE) and the Cornell University Agricultural Experiment Station (CUAES) underwent major transformation. In essence, a statewide program development structure and process substantially based on the efforts of several statewide program committees was replaced by a two-tiered system involving advisory councils and work teams. The intent of the change was to markedly improve program focus, relevance, development and priority-setting via greater stakeholder engagement, campus-field staff interaction, and research-extension integration.

For projects under consideration for FFF support beginning with the 2001-02 fiscal year (October 1, 2001), CCE and CUAES utilized the existing stakeholder input process elucidated on page 29 of the approved FY2001-2004 Plan of Work. Under this established structure and process, stakeholder-identified program needs and priorities were channeled and amplified through 12 joint (extension and research) Statewide Program Committees (SPCs), composed of researchers, campus and county-association extension educators, and external stakeholders. These joint SPCs not only helped to heighten research-extension program integration, but also to inform, guide, and help review research and extension efforts. The SPCs covered 12 issue areas, including *Agricultural and Food Systems Economic Vitality, Community and Economic Vitality, Crop and Soil Management, Dairy Industry Competitiveness and Profitability, Design and Technology, Environmental and Natural Resources Outreach, Fruit Industry Competitiveness and Profitability, Health, Nutrition and Food Systems, Human Development, Youth Development, Landscape Horticulture, and Vegetable Industry Competitiveness and Profitability.*

SPCs submitted priority areas for integrated research and extension program attention. Subsequently, the CCE and CUAES directors referred faculty to these lists of priority areas as part of the annual calls for preproposals. These lists were then referenced and used by the directors when allocating federal formula funding (Hatch and Smith-Lever). SPCs were also asked to review (for relevancy and potential impact) virtually all the research and extension project/program preproposals requesting federal formula funds. Lastly, SPC-identified priorities were again used to call for special Research/Extension Integration Grants preproposals. These REIG preproposals were required to directly address SPC needs, and to demonstrate local extension association participation, research-extension elements that were heavily integrated, and multi-disciplinary effort. Submitted preproposals were then reviewed by the appropriate SPC.

In early 2001, CCE's new *Committed to Excellence* strategic plan (available at http://www.cce.cornell.edu/revitalize/Revitalization-Final.cfm) called for supplanting SPCs with a new stakeholder input structure and process. Therefore, the year 2001 saw the winding down of SPC activity (SPCs were officially dissolved as of Sept. 30, 2001) and the simultaneous gearing up of a new two-tiered structure/process characterized by Program Councils (PCs) and Program Work Teams (PWTs).

An open petitioning process resulted in CCE/CUAES jointly approving 35 Program Work Teams (see list of these PWTs at the website noted below). These teams were self-selected and self-directed groups of external stakeholders, county extension educators, and campus-based researchers and extension specialists. PWTs were required to identify program needs in their selected issue areas and carry forth plans of work to meet those needs. In keeping with several

of the hallmarks of the successfully piloted REIG Program, PWTs were expected to nurture research-extension integration, to encourage campus-field interactions and collaborations, to take multi-disciplinary approaches, to evaluate their efforts, and to involve their external members in all aspects of their work. They were also expected to seek external funding support, and to report annually on their accomplishments to an appropriate Program Council. All 35 PWTs began their work efforts between May and late fall 2001, and were sanctioned for 2 or 3 years. Well over 700 individuals now serve on at least one PWT, including more than 245 external stakeholders.

Five Program Councils were established in each of the common CCE/CUAES theme areas, including *Community and Economic Vitality, Quality of Life for Individuals and Families, Natural Resources and Environment, Youth Development,* and *Agriculture and Food Systems.* Each council is composed of external stakeholders, Cornell department chairs, and county extension association executive directors. In all, the total number of individuals serving on the councils tallies 136, including 67 externals. The Councils advise the directors of CCE and CUAES on annual statewide program priorities, review PWT performance and "gaps" in programmatic coverage, and comment on the relevancy of preproposals seeking FFF support. The PCs held their inaugural set of annual conferences on the Cornell campus during the week of January 14-18, 2002.

Because the new Program Councils were yet to be formed by fall of 2001, annual priorities (used in soliciting FFF preproposals for the FY02-03 funding cycle) were distilled from individual county extension association plan-of-work updates, priorities previously developed in 2001 by Statewide Program Committees, and program needs identified by the new PWTs in their originating petitions. In future cycles, the Program Councils will develop and convey the annual program priorities for inclusion in the FFF RFP.

A publicly-accessible website (http://www.cce.cornell.edu/admin/program/pwts) now provides comprehensive background and details about the new Program Council-Program Work Team structure and process, including listings of works teams and councils, membership information, public announcements, originating PWT petitions, and PWT annual reports.

Throughout the transition year, each of CCE's 55 county extension associations continued to work closely with stakeholders in their counties via stakeholder participation in their local governance (i.e. board of directors) and program guidance (i.e., advisory committee) structures. Formal advisory committees were also used to guide New York City Extension programs. In 2001, a new statewide Council of Extension Associations was established (as recommended in the *Committed to Excellence* plan), providing another venue for enhanced stakeholder input and engagement within the CCE system. In all, over 2500 stakeholders were engaged and heard through these locally-focused mechanisms, and well over 60,000 stakeholder volunteers from all walks of life continued to participate and assist in the direction, priority setting, and delivery of extension programs throughout the state.

Lastly, CCE, the colleges of Agriculture and Life Sciences and Human Ecology, and numerous academic departments and specialized programs within those colleges maintain active advisory committees or councils having broad external stakeholder representation. These groups help to bring relevancy and focus to program decision-making and investments.

PROGRAM REVIEW PROCESSES

A revised program review process was implemented during 2001 to reflect our new program development and stakeholder involvement processes. This process will complete its first "full cycle" during FY02.

Review Process (Research Projects and Extension Projects with Designated Funding)

1. Principal investigators are asked to consult program priorities (established as outlined in the stakeholder involvement section above) and develop two-page pre-proposals for new or revised projects funded by Federal Formula Funds.

1. Pre-proposals are reviewed for significance and relevancy by advisory Program Councils (see Stakeholder Involvement section), the principal investigator's department chair, Extension Program Associate/Assistant Directors, and Experiment Station Directors (Ithaca and Geneva).
2. Pre-proposals are discussed with department chairs during annual budget conferences to put work in broader perspective of department program.
3. Pre-proposals are accepted/rejected; accepted proposals are developed into full project outlines by the Principal Investigator.

For research proposals:

1. The Department Chair recommends two or three peer reviewers to the Director's Office.
1. The Director's Office obtains the necessary reviews in accordance with CSREES rules using standard format.
2. Changes suggested by the peer reviewer are conveyed to the Principal Investigator. Peer reviewer names are not revealed to the Principal Investigator.
3. The revised proposal, with required CRIS forms, is submitted to the Director's Office.
4. The Director's Office submits the package to CSREES along with an attached statement certifying the peer review was completed.
5. Reviews are kept on file in the Director's Office.
6. The Director's Office attaches a statement to the proposal and sends this with the proposal and Form 10 to the CALS Research Office.
7. After approval by CSREES, funds are allocated to the appropriate research account.

For extension proposals:

5. Extension Program Directors receive Program Council and Dept. Chair comments on extension preproposals related to their program areas.
5. Extension Program Directors rank/recommend EXTENSION preproposals.
6. Extension Program Directors meet with Experiment Station (Ithaca and Geneva) staff to discuss potential R-E linkages among extension preproposals.
7. Extension Program Directors finalize Smith-Lever funding recommendations and communicate decisions and needed modifications

Cornell Review Criteria

1. Scientific merit of objectives
1. Clarity of objectives
2. Appropriate methodology
3. Feasibility of attaining objectives
4. Accomplishment during preceding project (for revisions)
5. Research performance and competence of investigator(s)
6. Anticipated significance of results for agriculture/forestry/rural life
7. Relevance of the proposed work to regional or national goals

Review Process Calendar

The calendar of our new, integrated research and extension review process follows below (dates are approximate):

Date	Step
SEP 20	Priorities established for federal formula funds (FFF) preproposal RFP
OCT 1	RFP for preproposals issued
NOV 15	Deadline for FFF preproposal submission
DEC 3-15	Preproposals provided to Program Councils for review
JAN 14-18	Annual Program Council Conferences (campus); discussions held on preproposal relevance. Preproposals available to P.I.s' department chair on-line for review and comment
FEB 10	Extension Program Directors' written comments on program-related RESEARCH preproposals due
FEB 25	Deadline for Program Councils and department chairs to comment on preproposals
MAR 6	Extension Program Directors receive Program Council and Dept. Chair comments on extension preproposals related to their program areas
MAR 4 – APR 17	CCE-CUAES program conferences with department chairs
MAR 18	Extension Program Directors rank/recommend EXTENSION preproposals Recommendations are forwarded to CCE director and CCE Assoc. Director for Finance
APR 1	Extension Program Directors meet with Experiment Station (Ithaca and Geneva) staff to discuss potential R-E linkages among extension preproposals
APR 8	Extension Program Directors meet to finalize Smith-Lever funding recommendations, which are then forwarded to CCE Director and CCE Associate Director for Finance
APR 1-15	CUAES and NYSAES Directors consider all research preproposals and make tentative funding decisions
APR 15	Joint session of CUAES, NYSAES and CCE Directors and Extension Program Directors to discuss/coordinate funding decisions and notification
MAY 15	FFF preproposal decisions communicated to principal investigators and Program Councils
JULY 1	FFF full proposals due
JUL-AUG	FFF full proposals peer reviewed
AUG	Program Councils finalize priorities for next FFF cycle
OCT 1	FFF FY begins; proposed projects funded

EXTENSION MERIT REVIEW

As described above, our governance and advisory structures, including the new Program Advisory Councils, serve primary roles in identifying and determining merit of extension initiatives. In addition, annual program reviews and conferences are conducted with each academic department. In those sessions, the extension and research priorities of each unit are discussed, accomplishments are summarized in general (e.g., number of educational activities, number of people attending, number of fact sheets, bulletins, videos, documented outcomes and impacts, etc.), and products and outcomes from funded projects are reviewed. The indicators of performance are discussed relative to current program priorities, and extension investments for each unit are adjusted accordingly. Extension projects receiving designated funding are an integral part of the review process outlined above. Final funding decisions are recommended by

the extension program directors, all of whom serve as liaisons to Program Councils and work closely with a number of Program Work Teams.

MULTISTATE AND JOINT ACTIVITIES

Our multistate, multi-institutional, and multi-disciplinary activities occur within the same stakeholder involvement and program development processes as in-state activities and as such are directed to priority needs of priority audiences. Our program development structure for federal formula funds is interdisciplinary by definition (see stakeholder involvement and review processes above). All projects are expected to outline expected outcomes and report against them. We are working to strengthen specific documentation of multi/joint programs and have included evidence of such activity directly in our pre-proposal and reporting criteria. The fundamental purposes of these efforts are to strengthen quality of programming by bringing together required disciplines and to assure efficient use and maximum leveraging of federal formula funds. The sections below and Appendices C and D provide additional detail.

MULTISTATE EXTENSION ACTIVITIES

Multistate extension activity is documented in Appendix C.

INTEGRATED RESEARCH AND EXTENSION ACTIVITIES

During 2001 we continued and expanded upon our integrated research and extension collaborative strategy as outlined in the approved plan of work. Of most import, the revised program development process in the Stakeholder Involvement Section above was fully implemented. Background information on the new program development process and specific information on the new program development structure are available at:

http://www.cce.cornell.edu/revitalize/Revitalization-Final.cfm
http://www.cce.cornell.edu/admin/program/pwts/

Specific documentation of integrated activities is included in Appendix D.

MULTI-COUNTY INITIATIVES

Multi-county initiatives are fostered through active encouragement of formal and non-formal program partnerships. At present time, there are 8 regional extension program teams involving 30 counties in which Cornell University is a formal funding partner. In addition, at least 12 collaborative relationships involving at least 30 counties exist without formal Cornell sponsorship.

To further enhance collaborative programming, two experimental regional learning centers were initiated in 2001:

- *A Virtual Multi-Cultural Workforce Resource Center* - This was submitted by CCE of Wayne County on behalf of a coalition of regional organizations in that area.
- *The North Country Learning Center* - This project came from a coalition of CCE associations in the North Country but also included other educational organizations, agencies, and industry as collaborators.

These experimental programs are funded for an initial two-year pilot period.

As a result of our commitment to Learning Centers, in early summer, we received an additional $300,000 from Cornell University to support the development of distance learning technology classrooms. Current plans include the development of two distance-learning classrooms as a part of the North Country Learning Center. We are also moving ahead with plans to develop classrooms in eight regional locations. We also are in the process of

implementing a statewide, wide area network linking all of our extension offices to facilitate collaborative programming.

Appendix A – Key Themes Identified in the Annual Report Guidance Reflected in FY01 Reported Research or Extension Activity

GOAL 1: An Agricultural Production System That is Highly Competitive in the Global Economy

Adding Value to New and Old Agricultural Products
Agricultural Competitiveness
Agricultural Profitability
Animal Genomics
Animal Health
Animal Production Efficiency
Apiculture
Aquaculture
Biobased Products
Biotechnology
Bioterrorism
Diversified/Alternative Agriculture
Emerging Infectious Diseases
GIS/GPS
Grazing
Home Lawn and Gardening
Innovative Farming Techniques
Invasive Species
Managing Change in Agriculture
New Uses for Agricultural Products
Niche Market
Organic Agriculture
Ornamental/Green Agriculture
Plant Genomics
Plant Germplasm
Plant Health
Plant Production Efficiency
Precision Agriculture
Rangeland/Pasture Management
Risk Management
Small Farm Viability
Tropical Agriculture
Urban Gardening

GOAL 2: A Safe and Secure Food and Fiber System
Food Accessibility and Affordability
Food Handling
Food Quality
Food Recovery/Gleaning
Food Resource Management
Food Safety
Food Security
Foodborne Illness
Foodborne Pathogen Protection
HACCP

GOAL 3: A Healthy, Well Nourished Population
Birth Weight
Health Care
Human Health
Human Nutrition
Infant Mortality
Medicinal Plants

GOAL 4: Greater Harmony Between Agriculture and the Environment
Agricultural Waste Management
Air Quality
Biodiversity
Biological Control
Drought Prevention and Mitigation
Endangered Species
Energy Conservation
Forest Crops
Forest Resource Management
Global Change and Climate Change
Hazardous Materials
Integrated Pest Management
Land Use
Natural Resources Management
Nutrient Management
Pesticide Application
Recycling
Riparian Management
Soil Erosion
Soil Quality
Sustainable Agriculture
Water Quality
Weather and Climate
Wetlands Restoration and Protection
Wildfire Science and Management
Wildlife Management
Yard Waste/Composting

Goal 5: Enhanced Economic Opportunity and Quality of Life for Americans

Aging
Agricultural Financial Management
Character/Ethics Education
Child Care/Dependent Care
Children, Youth, and Families at Risk
Communications Skills
Community Development
Conflict Management
Consumer Management
Estate Planning
Family Resource Management
Farm Safety
Fire Safety
Home Safety
Home-based Business Education
Impact of Change on Rural Communities
Jobs/Employment
Leadership Training and Development
Literacy
Parenting
Promoting Business Programs
Promoting Housing Programs
Retirement Planning
Supplemental Income Strategies
Tourism
Workforce Preparation - Youth and Adult
Workforce Safety
Youth Development/4-H
Youth Farm Safety

Appendix B – Research Problem Areas Represented in FY01 Reported Extension and Research Activity

The number of research projects and presence or absence of reported extension activity are indicted for each RPA in the form (P=X; E=Y/N) where X = the number of research projects and Y or N indicates presence or absence of reported extension activity.

GOAL 1: An Agricultural Production System That is Highly Competitive in the Global Economy

Objective 1.1 To produce new and value-added agricultural products and commodities

204 Plant Product Quality and Utility (Preharvest)
(P=30 E=Y)

308 Improved Animal Products (Before Harvest)
(P=6; E=Y)

501 New and Improved Food Processing Technologies
(P=29; E=Y)

502 New and Improved Food Products
(P=22; E=Y)

511 New and Improved Non-Food Products and Processes
(P=6; E=N)

Objective 1.2 To increase the global competitiveness of the U. S. agricultural production system

121 Management of Range Resources
(P=0; E=N)

122 Management and Control of Forest and Range Fires
(P=0; E=N)

123 Management of Forest Resources
(P=17; E=Y)

125 Agroforestry
(P=5; E=Y)

201 Plant Genome, Genetics, and Genetic Mechanisms
(P=43; E=N)

202 Plant Genetic Resources and Biodiversity
(P=27; E=Y)

203 Plant Biological Efficiency and Abiotic Stresses Affecting Plants
(P=46; E=Y)

205 Plant Production Management Systems
(P=38; E=Y)

206 Basic Plant Biology
(P=32; E=Y)

211 Insects, Mites and Other Arthropods Affecting Plants
(P=66; E=Y)

212 Diseases and Nematodes Affecting Plants
(P=70; E=Y)

213 Weeds Affecting Plants
(P=16; E=Y)

214 Vertebrates, Mollusks, and Other Pests Affecting Plants
(P=5; E=Y)
301 Reproductive Performance of Animals
(P=22; E=Y)
302 Nutrient Utilization in Animals
(P=19; E=Y)
303 Genetic Improvement of Animals
(P=13; E=Y)
304 Animal Genome
(P=7; E=N)
305 Animal Physiological Processes
(P=43; E=Y)
306 Environmental Stress in Animals
(P=6; E=Y)
307 Animal Production Management Systems
(P=13; E=Y)
311 Animal Diseases
(P=63; E=Y)
312 External Parasites and Pests of Animals
(P=8; E=Y)
313 Internal Parasites in Animals
(P=6; E=Y)
314 Toxic Chemicals, Poisonous Plants, Naturally Occurring Toxins, and Other Hazards Affecting Animals
(P=5; E=Y)
315 Animal Welfare/Well-Being and Protection
(P=7; E=Y)
401 Structures, Facilities, and General Purpose Farm Supplies
(P=2; E=Y)
402 Engineering Systems and Equipment
(P=11; E=Y)
404 Instrumentation and Control Systems
(P=12; E=Y)
405 Drainage and Irrigation Systems and Facilities
(P=1; E=Y)

Objective 1.4 To improve decision-making on public policy related to productivity and global competitiveness of the U. S. agricultural production system

601 Economics of Agricultural Production and Farm Management
(P=8; E=Y)
602 Business Management, Finance, Taxation, and Estate Planning
(P=10; E=Y)
604 Marketing and Distribution Practices
(P=8; E=Y)
606 International Trade and Development Economics
(P=6; E=Y)
611 Foreign Policy and Programs
(P=4; E=Y)

GOAL 2: A Safe and Secure Food and Fiber System

Objective 2.1 To improve access to an affordable, healthful, and culturally relevant food supply

503 Quality Maintenance in Storing and Marketing Food Products
(P=11; E=Y)

512 Quality Maintenance in Storing and Marketing Non-food Products
(P=0; E=N)

603 Market Economics
(P=10; E=Y)

Objective 2.2 To improve food safety by controlling or eliminating foodborne risks

711 Ensure Food Products Free of Harmful Chemicals, Including Residues From Agricultural and Other Sources
(P=12; E=Y)

712 Protect Food From Contamination by Pathogenic Microorganisms, Parasites, and Naturally Occurring Toxins
(P=23; E=Y)

722 Zoonotic Diseases and Parasites Affecting Humans
(P=5; E=Y)

GOAL 3: A Healthy, Well Nourished Population

Objective 3.1 To optimize the health of consumers by improving the quality of diets, the quality of food, and the number of food choices

504 Home and Commercial Food Service
(P=0; E=Y)

701 Nutrient Composition of Food
(P=8; E=Y)

702 Requirements and Function of Nutrients and Other Food Components
(P=25; E=Y)

703 Nutrition Education
(P=18; E=Y)

Objective 3.2 To promote health, safety, and access to quality health care

721 Insects and Other Pests Affecting People
(P=1; E=Y)

723 Hazards to Human Health and Safety
(P=15; E=Y)

GOAL 4: Greater Harmony Between Agriculture and the Environment

Objective 4.1 To develop, transfer, and promote the adoption of efficient and sustainable agricultural, forestry, and other resource conservation policies, programs, technologies, and practices that ensure ecosystems integrity and biodiversity

101 Appraisal of Soil Resources
(P=5; E=Y)
102 Soil, Plant, Water, Nutrient Relationships
(P=41; E=Y)
103 Management of Saline and Sodic Soils and Salinity
(P=0; E=N)
104 Protect Soil From Harmful Effects of Natural Elements
(P=7; E=Y)
131 Alternative Uses of Land
(P=6; E=Y)
135 Aquatic and Terrestrial Wildlife
(P=34; E=Y)

Objective 4.2 To develop, transfer, and promote adoption of efficient and sustainable agricultural, forestry, and other resource policies, programs, technologies, and practices that protect, sustain, and enhance water, soil, and air resources

111 Conservation and Efficient Use of Water
(P=5; E=Y)
112 Watershed Protection and Management
(P=27; E=Y)
132 Weather and Climate
(P=8; E=Y)
215 Biological Control of Pests Affecting Plants
(P=33; E=Y)
216 Integrated Pest Management Systems
(P=38; E=Y)
403 Waste Disposal, Recycling and Reuse
(P=13; E=Y)

Objective 4.3 To improve decision-making on public policies related to agriculture and the environment

133 Pollution Prevention and Mitigation
(P=28; E=Y)
605 Natural Resource and Environmental Economics
(P=9; E=Y)
610 Domestic Policy Analysis
(P=12; E=Y)

Goal 5: Enhanced Economic Opportunity and Quality of Life for Americans

Objective 5.1 To increase the capacity of communities and families to enhance their own economic well-being

607 Consumer Economics
(P=3; E=Y)
608 Community Resource and Development Economics
(P=12; E=Y)
609 Economic Theory and Methods
(P=24; E=N)
801 Family Resource Management
(P=4; E=Y)

Objective 5.2 To increase the capacity of communities, families, and individuals to improve their own quality of life

124 Urban Forestry
(P=2; E=Y)
134 Outdoor Recreation
(P=2; E=Y)
802 Human Development and Family Well-Being
(P=24; E=Y)
803 Sociological and Technological Change Affecting Individuals, Families, and Communities
(P=22; E=Y)
803 Human Environmental Issues Concerning Apparel, Textiles, and Residential and Commercial Structures
(P=12; E=Y)
805 Community Institutions and Social Services
(P=21; E=Y)
903 Communication, Education and Information Delivery
(P=41; E=Y)

Appendix C – Multistate Extension Activities Report

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

Institution Cornell University
State New York

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

Title of Planned Program/Activity	FY2001 Expenditures
Natural Resource, Agric. and Engineering. Service	16,000
Lake Erie Regional Grape Program	7,700
Northeast Extension Leadership Development	3,400
Mid-Atlantic Workforce Development	45,000
Northeast Collaborative Programming	22,000
System Initiatives	37,000
Consumer Policy	35,000
Health Policy	35,000
Family & Social Welfare	37,800
Housing	20,000
Indoor Air Quality	10,000
Nutrition Professional Development	91,000
Youth Development and 4-H Nutrition	27,000
Support Food Preservation	5,000
Youth at Risk	13,000
Child Care/Family Support	13,000
Safety, Health Chemicals & Textiles	15,000
Science Education for Youth	15,000
Dairy Waste Management	73,800
Spray Technology Program	8,750
Food Safety	55,000
Youth & Adult Fruit and Vegetable Sciences	25,000
Youth and Adult Entomology Extension	30,000
Natural Resource Based Economic Development	45,000
Wildlife Damage Management	31,500
Potato Breeding	2,000
Landscape Horticulture Industry	18,500
West Nile Virus	6,000
Work Force Training	86,500
CED Tool Box	17,000
Total	**846,950**

_____ _____
Director Date Form CSREES-RPT (2/00)

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

Institution Cornell University
State New York

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

Our total multistate extension expenditures of $846, 950 represents 9.4 % of our total Smith Lever 3b & 3c funding of $9,007,662 exceeding our FY2001 target of 8.0%. The FY2001 project listing follows.

Natural Resource, Agricultural, and Engineering Service
Purposes are to improve competitiveness and sustainability of agricultural and natural resource enterprises and promoting food safety and environmental enhancement. Primary activities include publishing resource materials and conducting conferences on current issues. Thirteen states plus the District of Columbia currently participate. For more info: http://www.nraes.org

Lake Erie Regional Grape Program
On-going, joint research and extension program with Penn State serving the grape industry along Lake Erie. For more info: http://lenewa.netsync.net/public/lergphom.htm

Northeast Extension Leadership Development
Cornell Cooperative Extension has been a regular participant in the Northeast Leadership Development Program. The purposes of NeLD are to enhance leadership in the Cooperative Extension and to help current and future Extension leaders examine Cooperative Extension's organizational, discipline, and programming structures so that future programs, resources, and methods are designed to meet new and emerging needs.

Mid-Atlantic Workforce Development and Workforce Training
Major multistate initiative with diverse funding directed to workforce development needs of the food system. These efforts are based in the Cornell Education Department.
http://www.workforcepathways.org/

Northeast Collaborative Programming
See approved FY00-04 plan of work. On-going collaboration on wide variety of topics.

Extension System Initiatives
Cornell University contributes actively to program and administrative leadership initiatives at the regional and national levels. Examples are various task forces, leadership initiatives, and national committees.

Consumer Policy
Project of Department of Policy Analysis and Management. Multi-state curriculum development and resource sharing. “Money 2001” program is a major activity.

Health Policy
Project of Department of Policy Analysis and Management. Participation in an in-state Rural Health Alliance linked to neighboring states.

Family and Social Welfare
Project of Department of Policy Analysis and Management. Multi-state instructional resource development and sharing.

Housing
Project of Department of Design and Environmental Analysis. Joint project with Wisconsin Extension and national multi-state committee.

Indoor Air Quality
Project of Department of Design and Environmental Analysis. Joint training project with New Jersey Extension.

Nutrition Professional Development
Project of Division of Nutritional Sciences. Nationally used WWW resource "Ask the Nutrition Expert".

Youth Development and 4-H Nutrition
Project of Division of Nutritional Sciences. Collaborative with Penn State Extension and focusing on outcome measures for youth nutrition programming.

Support Food Preservation
Project of Division of Nutritional Sciences. Collaborative training project with University of Georgia Extension.

Youth at Risk
Project of Department of Human Development. Teen Assessment Program collaboratively conducted with two other states.

Child Care/Family Support
Project of Department of Human Development. CYFAR conference and National Child Care Network.

Safety, Health, Chemicals & Textiles
Project of Department of Textiles and Apparel. Nationally distributed materials.

Science Education for Youth
Project of Department of Textiles and Apparel. Provided national satellite training and materials.

Community Economic Development Toolbox
This is a collaborative project of Penn State University and Cornell. For program details: http://www.cardi.cornell.edu/cd_toolbox_2/cdindex.cfm

West Nile Virus Resources

This project is based in the Cornell Center for the Environment and includes extensive collaboration with states in the New York Metropolitan area and elsewhere. For information: http://www.cfe.cornell.edu/erap/wnv/WNVupdate.html

For the following projects, Principle Investigators have indicated significant collaboration with partners in other states for program development, resource sharing, and/or program delivery.

Dairy Waste Management
Project of Department of Agricultural and Biological Engineering.

Spray Technology Program
Project of Department of Agricultural and Biological Engineering.

Food Safety
Project of Department of Food Science.

Fruit and Vegetable Sciences Youth & Adult
Project of Horticulture Department.

Youth and Adult Entomology Extension
Project of Department of Entomology.

Enhanced Entomology Diagnostics
Project of Department of Entomology.

Natural Resource Based Economic Development
Project of Department of Natural Resources.

Wildlife Damage Management
Project of Department of Natural Resources.

Potato Breeding
Project of Department of Plant Breeding.

Landscape Horticulture Industry
Project of Horticulture Department.

Appendix D – Integrated Activities Report

Form CSREES-REPT (2/00)

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

Institution Cornell University
State New York

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

Title of Planned Program/Activity	**Expenditures FY2001**
Research/Extension Integration Grants Program	99,997
Departmental Support for Integrated Activities	1,213,791
Total	**1,313,788**

March 1, 2002

Director **Date**

Form CSREES-REPORT (2/00)

Form CSREES-REPT (2/00) – Smith-Lever

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

Institution Cornell University
State New York

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

Title of Planned Program/Activity	**Expenditures FY2001**
Research/Extension Integration Grants Program	130,984
Program Work Teams & Other Projects	28,419
Departmental Support for Integrated Activities	2,084,740
Total	**2,244,143**

_____ _____
Director **Date**

Form CSREES-REPORT (2/00)

Form CSREES-REPT (2/00) – Hatch and Smith-Lever Integrated Activities Narrative

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

Institution Cornell University
State New York

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

For nearly a decade, we have progressively integrated planning processes for federal formula fund allocation for research and extension. Our joint plan was a natural extension of that effort. This year, our joint research and extension Statewide Program Committees reviewed virtually all project support proposals and allocations were made reflecting that input. In identifying our target percentages for integrated activities, and in accordance with the final administrative guidance, we used two criteria:

803.Review and support of projects by Statewide Program Committees, OR,
803. Support to persons with joint appointments

Research/Extension Integration Grants Program
Please see approved FY00-04 plan of work page 36, paragraph 4 for a description of this program. Projects funded with Smith-Lever funds in FY01 include:

- Pollution Prevention Survey in the CWC Region: Seeking Equity in Phosphorous Emissions Reductions
- NYS Agritourism 2001: A Research and Extension Initiative
- Evaluation of the Use of Anaerobic Digestion Effluent on Dairy Farms
- Welfare to Entrepreneurship: An Alternative to Wage Employment
- Insurance Choices: Knowledge, Confidence and Competence of NY Consumers
- Partnership to Establish a Youth Worker Training and Credentialing System in NYS
- Community Food Security in the North Country: Participatory Evaluation of Working Group Progress
- Marketing and Management of Sheep and Goats from NY Family Farms
- Building Cooperative Community Coalitions to Support Small Business Skills Education
- Reducing Pesticide Exposure from Indoor Carpets
- Assessing Molybdenum, Copper and Sulfur Risks from Lime-treated Sludge in Soil-Plant-Animal Systems
- Creating Sustainable Growing Conditions for the Urban Forest
- Communicating Environmental Quality to Influence Citizen Perceptions and Community Conservation
- NY Greenhouse Business analysis & Competitive Enhancement
- Changing Patterns of Sweet Corn Marketing & Consumption in NYS
- The Development of a Comparative Testing Scheme for Pesticide Application Equipment in the NE Fruit Industry
- Characteristics of Rumen Papillae throughout the Life of a NYS Dairy cow
- Community based Wildlife Research & Education

- Genetically Improved Forages in Diets for Transition Dairy Cows
- Practical Mgmt Strategies for Reducing Risk of Exposure to Indoor Air Pollutants
- Engaging Extension Educators in Science Education Reform
- Integrated Environmental & Economic Analyses of Indices at Farm & Watershed Levels
- Managing Community Water Supplies in Rural Communities: Comparing Private & Public Options
- Comparison of Asynchronous & Synchronous distance Learning of Hands-on Horticultural Skills

Departmental Support for Integrated Activities

As per the final administrative guidance, this item consists of support to programs carried out by persons with joint extension and research appointments in academic departments.

Cornell Cooperative Extension provided Smith Lever 3 b and c funds totaling $2,084,740 to support faculty and staff who were responsible for research and extension programs in the Colleges of Agriculture and Life Sciences and Human Ecology and the Geneva Experiment Station. Total faculty equaled 47.50 FTEs and Senior Extension and Extension Associates equaled 3.80 FTE. These expenditures are fully documented by department and university financial and human resource records. This support in combination with integrated project specific support totals $2,244,143 or 24.9% of our total S-L 3b & 3c funds for FY01 exceeding our target of 22.5%.

The Cornell University Agricultural Experiment Station and the New York State Agricultural Experiment Station provided Hatch and Hatch-Multistate funds totaling **$**1,213,791 to support faculty and staff who were responsible for research and extension programs in the Colleges of Agriculture and Life Sciences and Human Ecology and the Geneva Experiment Station. Total research and extension appointments equaled 110.4 FTEs for faculty who were responsible for research and extension programs in the Colleges of Agriculture and Life Sciences and Human Ecology and the Geneva Experiment Station. These expenditures are fully documented by department and university financial and human resource records.