# NORTH CAROLINA

# COOPERATIVE EXTENSION

## *AREERA*

## *Annual Report of Accomplishments and Results*

**Agricultural Research, Extension and Education Reform Act of 1998**

## 2003

**(submitted March, 2004)**

**North Carolina Cooperative Extension**
**North Carolina State University and North Carolina A & T State University**

# North Carolina Cooperative Extension
# North Carolina State University and North Carolina A & T State University

## Report: 2003 AREERA Report for North Carolina Cooperative Extension

**This report represents the combined Extension programs of both North Carolina State University and North Carolina A & T State University as represented in the AREERA plan of work submitted in 1999 and revised in 2000 and slight revisions each year afterward.**

*Contents:* *Page:*



## INTRODUCTION

To achieve their shared land-grant missions, the College of Agriculture and Life Sciences at NC State University and the School of Agriculture and Environmental Sciences at North Carolina A&T State University work collaboratively to provide educational opportunities that are relevant and responsive to the needs of individuals, communities, counties and the state. At the heart of their partnership is North Carolina Cooperative Extension.

Cooperative Extension's mission is to help people put research-based knowledge to work for economic prosperity, environmental stewardship and an improved quality of life. To address ever-changing needs, the organization operates under a dynamic long-range plan of work -- one that changes as circumstances indicate it should. The plan encompasses five major areas of concern statewide:

- Enhancing agricultural, forest and food systems
- Developing responsible youth
- Strengthening and sustaining families
- Conserving and improving the environment and natural resources
- Building quality communities

To achieve the plan's 50 major objectives, specialists at the state's two land-grant universities work hand-in-hand with field faculty stationed in all 100 counties and on the Cherokee Reservation. There are specific objectives within the five major program areas that specifically target limited resource audiences, while every objective have limited and non-limited resource audience parameters. A major portion of Extension at NC A&T is guided by these targeted objectives.

The Extension professionals' work is coordinated with the efforts of the North Carolina Agricultural Research Service (NCARS), the research arm of the College of Agriculture and Life Sciences (CALS) at NC State University. In fact, about 100 of the 350 Extension faculty within CALS have joint appointments with NCARS.

In addition to this alliance with research faculty, Extension benefits from the input of a well-established statewide system of lay advisers representing the state's diverse population. Also, each county routinely conducts an environmental scan to determine emerging needs and appropriate education responses. These scans give residents, advisers, commodity group representatives, volunteers and other clients the opportunity to ensure that local programs meet local needs and priorities.

In addition, to ensure that underserved and underrepresented audiences are among those included in program development and implementation, Cooperative Extension has established a new civil rights plan that includes computer monitoring of program participation by gender and race, including goals and plans for assuring that all persons have equal access to any Extension organized groups. A permanent Diversity Task Force monitors programs, suggests policy, develops, and conducts training for the organization.

Stakeholder input undergirds all of Extension's efforts, as it did and continues to do in planning and implementing the five-year AREERA Plan of Work. This report reflects impacts of the joint educational

programming efforts of the North Carolina Cooperative Extension Service of NC State University and the Cooperative Extension Program of NC A & T State University. These programs help North Carolina's 8 million citizens address critical challenges facing them today and in the future.

Funding for Extension programs was provided by Smith-Lever appropriations, state and county funds, plus public and private grants. As a proportion of overall spending, grants and contracts have become increasingly important. These funds have helped Cooperative Extension address emerging challenges in innovative ways, but declining or flat levels of appropriated support from federal, state and county governments pose significant challenges for meeting program objectives.

Additional North Carolina Cooperative Extension program accomplishments and success stories can be found at http://www.ces.ncsu.edu/AboutCES/, and http://www.ag.ncat.edu/extension/.

# A. FY 2003 Annual Report of Accomplishments and Results

## *Goal 1.* AN AGRICULTURAL SYSTEM THAT IS HIGHLY COMPETITIVE IN THE GLOBAL ECONOMY

**Overview**

Goal 1 encompasses extension programs that seek to create and support an agricultural system that is highly competitive in the global economy. The livestock sector of North Carolina agriculture is attempting to develop strategies and response plans to cope with the new post 9/11 bio-terrorism threats. This sector also continues to be faced with significant environmental regulations, training, licensing and reporting requirements. Tobacco farmers faced continued changes in marketing as all of the major buyers opted for marketing contracts instead of the traditional auction system, and in effect, changed the tobacco marketing system permanently. At the same time, growers continued to cope with the effects of large cuts in quota. Peanut farmers struggled to adjust and adapt to the termination of the federal quota program and the implementation of a new government income support program. Hurricane Isabel caused problems for farmers, mainly crop farmers in eastern North Carolina. Other issues potentially affecting agricultural competitiveness and profitability include new federal rules on large confinement livestock feeding operations (CAFOs), proposed modifications to environmental regulations to include phosphorus and the development and adoption of new state environmental rules in specific watersheds.

Field faculty and state specialists of North Carolina Cooperative Extension at NCSU and NC A&T SU responded to these and other issues with a broad array of extension programs. Livestock generate 60% of North Carolina's gross farm income. Fear of disease outbreaks such as those in prior years in Europe as well as the fears associated with bio-terriorism from continuing threats associated with homeland security and terrorism provided added impetus to expand the scope of an emergency animal response program that was initiated in the aftermath of the 1999 hurricanes. A new coordinated structure has been developed that includes both state and county animal response teams (CARTs) in all 100 counties. The North Carolina approach to disaster response is being used as a model by other states. Other, more traditional programs targeting hog, poultry, beef, dairy, goat, horse, and aquaculture producers continued but at

reduced levels because of program redirections along with reductions in staffing levels due to major state and county budget reductions.

Implementation of the new farm bill resulted in farmers required to accept new yield data or to provide the required documentation to support actual yield data, which resulted in significant guidance from Extension in assisting the farmers in this process. In addition, the peanut program buyout contributed to the need for management and marketing information as well as major need for information on alternative enterprises.

The continued reduction in tobacco quotas, uncertainty about the future of the program and low and variable profits for many traditional enterprises has created additional interest in alternative farm enterprises. Specialty crops are important segment of North Carolina's agriculture. Nursery, greenhouse and vegetable crops contribute over $1.25 billion to farm gate value and this share is growing. Program activities include regional and county workshops on alternative income sources, including commercialization of native species and the production of various ornamental crops, organic production methods, and agro-tourism. Crops included soft fruits, sweet potatoes, pumpkins, tomatoes, specialty varieties of melons, various types of beans, broccoli, squash, and peppers. These activities draw audiences of all types and levels of experience, including new producers and existing producers, and large scale, limited resource and part-time producers. Topics addressed include cultural practices and alternative marketing channels and strategies. Marketing initiatives included creating grower associations, promoting the use of local farmers markets, starting pick or cut your own operations, and combining agro-tourism and direct marketing. Livestock marketing efforts included group marketing in truckload lots and developing alliances with feedlots to enhance value and prices. Additional programs sought to assist producers through cost cutting changes in production practices and the adoption of new marketing and risk management strategies for traditional commodities. The vast array of educational programs were evaluated and reported by field and campus specialists, with primary evaluation tools used such as observation, interviews, data analysis, participant surveys and questionnaires, as well as participant pre and post tests.

Extension programming under Goal 1 matched the rich diversity of North Carolina's agriculture and reached the full range of audience types, from large commercial producers to part-time and limited resource farm families.

## FTEs & Program Cost for Goal 1

**Program cost is inclusive of federal Smith-Lever funds, state funds, Smith-Lever 1890 funds and some contracts and grant funds.**

| | | |
|---|---|---|
| State FTEs - 47.5 | County - 64 | Program cost- $6,786,305 |

| | | |
|---|---|---|
| NCCES FTEs -State 45 | County - 60 | Program cost- $6,429,255 |
| NC A & T FTEs - State 2.5 | County - 4 | Program cost- $357,050 |

## Key Theme: Animal Health

a. Issue: Building on the experience of the devastating effects of Hurricane Floyd on the livestock industry of eastern North Carolina (and on domestic companion animals) and homeland security concerns following 9/11, an interagency emergency preparedness program has been developed. This program is dedicated to preparing, planning, responding and recovering during animal emergencies, including natural disasters and disease epidemics. It operates at a grass roots level, with County Animal Response Teams organized under the State Emergency Management program. This effort has been held up as a model program for protecting animal health and welfare and is being studied by many other states. NC Cooperative Extension Service is a cooperator and county faculty and campus specialists were actively involved in developing CARTs. The need for such a program was not anticipated in the planning process for this Goal.

b. Impact: Performance measures include numerous meetings at the state and county level were held to develop and refine the State Animal Response Team (SART) and County Animal Response Team (CART) programs for rapid response to state emergencies involving animals. Several disaster response plans involving multiple state agencies (Emergency Management Services, Natural Resources, Health Departments, etc.), businesses, and key citizens were developed for several counties (i.e.,Caswell, Onslow, Duplin, Robeson, Anson, Rockingham, Wayne, Cumberland, Harnett, and Lee). The Duplin plan is one of several models that has been identified by the state response team as a model for other counties to emulate in developing their own CART plans.

c. Scope: State Specific

## Key Theme: Agricultural Profitability

a. Issue: Producers and marketers of livestock, poultry, and aquatic species will select, adopt and successfully implement practices or enterprises that will achieve individual and family goals related to profitability and quality of life.

b. Impact: Program accomplishments include increased awareness and knowledge of best management production practices by 9,065 individuals. This total included 302 dairy producers, 4,048 beef cattle producers, 1,306 hog producers, 1,598 horse producers, 1,124 sheep and goat producers, 629 poultry producers, and 58 producers of aquatic species.

7,054 producers adopted best management practices that optimized income, including 199 dairy producers, 3,338 beef cattle producers, 858 hog producers, 1,332 horse producers, 746 sheep and goat producers, 523 poultry producers, and 58 producers of aquatic species.

2,011 producers applied improved farm financial planning practices and procedures. This included 103 dairy producers, 710 beef cattle producers, 448 hog producers, 266 horse producers, 378 sheep and goat producers, 106 poultry producers.
The total impact of these activities was estimated to be $11,892,557.

c. Scope: State Specific

## Key Theme: Agricultural Profitability

a. Issue: Row crop farmers will continue to implement recommended production practices and management systems, investigate innovative agricultural opportunities, develop business ands human resource plans, and explore marketing options to ensure continued farm productivity and profits and quality of life. In particular, tobacco and peanut farmers will be assisted in investigating innovative agricultural opportunities and exploring marketing options to ensure continued farm productivity and enterprise profits.

b. Impact: Program Accomplishments: Crop producers adopted 50,886 approaches to ensure continued farm productivity and profits and quality of life, including 6,328 for cotton producers, 12,387 for grain producers, 4,928 for peanut producers, 12,571 for tobacco producers and 14,672 for soybean producers.

45,042 of the practices and alternatives adopted were in production areas such as pest control, tillage, fertilization, variety selection, and labor management. Considered individually, these changes were put into practice on 4,548,370 acres of crops and generated an impact of $70,690,295.

Increased profits through the adoption of new marketing and risk management strategies and business planning involved 5,484 producer contacts and impacted 809,097 acres for a financial impact estimated to be $4,548,370.

c. Scope: State Specific

## Key Theme: Agricultural Profitability

a. Issue: Commercial horticulture growers will continue to implement recommended production practices and management systems, investigate innovative agricultural opportunities, develop business and human resource plans, and explore marketing options to ensure continued productivity and profits and quality of life.

b. Impact: Growers adopted 8,960 individual approaches to ensure continued productivity and profits and quality of life, including 2,513 by fruit growers and 6,447 by vegetable producers. 8,203 of these practices and alternatives adopted were in production areas such as weed and disease control, tillage, soil fertility, variety selection, and labor management. Considered individually, these changes were put into practice on 228,322 acres of crops and generated an impact of $9,696,259.
Increased profits through the adoption of new marketing and risk management strategies and business planning involved 757 producer contacts and impacted 20,379 acres for a financial impact estimated to be $1,830,653.

c. Scope: State Specific

## Key Theme: Diversification and Sustainability

a. Issue: Part-time, limited resource and other farmers will increase the quality of life and the sustainability of their farms through diversification, integration of appropriate alternative opportunities and enterprises, intensive management practices, water and nutrient management, business management and expanded markets. Field faculty and state specialists of North Carolina Cooperative Extension at NC A&T SU and NCSU responded to these and other issues with a broad array of Extension programs.

b. Impacts: Producers adopted 4,434 alternative production, marketing and business practices. These practices impacted 117,130 acres and generated an additional $4,738,229 for these producers

c. Scope: State Specific

### Key Theme: Small Farm Viability

a. Issue: Limited resource and other small farmers will use an integrated, systems approach to implement alternative agricultural opportunities and enterprises. Field faculty and state specialists of North Carolina Cooperative Extension at NCSU and NC A&T SU responded to these and other issues with a broad array of extension programs.

b. Impact: Program Accomplishments: 443 producers enhanced sustainability practices covering 13,174 acres, 232 growers implemented a farming systems approach to their operations which encompassed 9,020 acres, and 247 growers developed business plans that covered a total of 4,588 acres.

c. Scope: State Specific

### Key Theme: Farm Management

a. Issue: A survey of small, part-time limited-resource farmers revealed that their records and receipts were kept on the dashboards of trucks, under truck seats, shoeboxes, paper bags, record books, and file boxes. The lack of adopting modern record keeping and filing systems reduce these farmers' abilities to obtain loans, make legal settlements and effectively market their crops. The NC A & T project, Farmers Adopting Computer Training (FACT), was implemented to assist small, part-time and limited-resource farmers in eliminating some of the problems encountered due poor record keeping and farm management practices.

b. Impacts: Approximately 50 percent of the 35 FACT participants used the computer for the first time. The computer training enhanced their confidence and reduced the fear of using computers. Eighty percent of the farmers found the computer useful in record keeping and managing their farms. Ninety-eight percent of the participants improved their computer knowledge and skills. Small, part-time, and limited resource farmers are using the skills learned in the computer training to improve record keeping and filing systems, transact business via the Internet, send correspondence via e-mail, and access information from governmental and non-governmental agencies. Partnerships have been established with community colleges to assist with the computer training for these farmers.

c. Scope: State specific

## *Goal 2.*
## A SAFE AND SECURE FOOD AND FIBER SYSTEM

To ensure an adequate food and fiber supply and food safety through science-based detection, surveillance, prevention, and education

**Overview**

The 1999-2004 Plan of Work for Goal 2 — A Safe and Secure Food and Fiber System includes eight performance goals. These goals address various aspects of the food and fiber continuums that impact the safety and security of the food and fiber supply in North Carolina. Thus, the activities and impacts described in this section are very diverse. The eight performance goals are:

1 - Agriculture and the Environment;
2 - Animal Production and Marketing Systems;
3 - Crop Production and Marketing Systems;
4 - Food Products Manufacturing;
5 - Forest Products Manufacturing;
6 - Food Safety and Quality;
7 - Biotechnology; and
8 - Residential and Community Water and Waste Management.

A brief summary of successful efforts representing the continuum from farm to table is presented below. Additional detailed information describing the accomplishments for each performance goal follows this section.

*Agriculture.* The primary effort at this point in the food chain is the delivery of educational programs designed to certify and license pesticide applicators in order to reduce the volume of pesticides used on existing acreage. The number of persons certified or re-certified in 2003 was 5,051 while19,485 persons maintained their certifications. The estimated reduction in production costs from proper use of pesticides totaled $3.1 million.

*Animal Production.* The use of alternative feed strategies resulted in beef and dairy cattle producers using over 60,000 tons of feed by-products annually. Not only did these by-products provide adequate nutrition for the animals but there were also significant cost savings for the producers in excess of $1,000,000. The changing diversity of agricultural workers in the state requires a change in how employees are educated and trained, especially on such critical issues as the spread of foreign animal diseases. A worker's poultry production field manual in both English and Spanish was developed and critiqued by industry personnel, poultry area extension agents, growers, and extension specialists. Copies of the final manual that addresses such issues as biosecurity will be distributed to key workers comprising all segments of the poultry industry.

*Crop Production.* Extension on-farm tests convincingly documented that in high-yielding environments and double crop situations, narrow row widths have greater yield and profit potential than wider row widths. Producers experienced an increase in net profits of $12,601,000 by implementing these practices in addition to a significant reduction in pesticide use.

*Food Products Manufacturing.* Faculty from North Carolina State worked with a 12-state consortium in the Southeastern United States to introduce Good Agricultural Practices ("GAPs") to the region's fresh produce growers, packers and consumers. The consortium produced a widely adopted, award winning GAPs training program and supporting materials specifically directed to Southeastern conditions and commodities. The fresh produce safety program helped to train 150 specialized food safety County Extension Agents, produced a new "Model Recall Program for the Fresh Produce Industry"

publication, formed new networks with federal risk management staff and 1890 Institutions, and instructed over 10,000 persons.

*Retail Foodservice.* 1,290 foodservice managers and 711 non-managerial foodservice workers participated in Extension-sponsored food safety trainings across 38 counties.

*Consumers.* 4,077 adults and 2,963 children, respectively, increased their knowledge about safe food handling as a result of attending one of the two training programs: For Your Health, Food Safety Begins at Home and Smart Kids Fight BAC!™.

**FTEs & Program Cost for Goal 2**
**Program cost is inclusive of federal Smith-Lever funds, state funds, and some contracts and grant funds.**

| | | |
|---|---|---|
| State FTEs - 28 | County - 37 | Program cost- $3,985,808 |

**PERFORMANCE GOAL 1: AGRICULTURE AND THE ENVIRONMENT**

## KEY THEME – Pesticide Application (also addressed under Goal 4)

a. Issue: *Agriculture.* The Pesticide Certification and Licensing Program provides a direct link between NCCES and North Carolina's farmers. All commercial pesticide applicators, public operators, consultants, dealers, and private pesticide applicators are targeted in this program to be certified and trained in pesticide Best Management Practices (BMPs) to protect worker health, crop safety, beneficial insect populations, and other environmental protection issues. To become certified, they must pass a multiple choice exam administered by NCDA. To maintain their certification, they must attend a 2-hour "safety" course and obtain 2 additional (elective) hours every 3 years. In virtually all of NC's 100 counties, an Agricultural Extension Agent serves the role as Pesticide Coordinator.

b. Impact: Of the 22,774 private pesticide applicators (farmers who use restricted-use pesticides) in North Carolina, 446 were newly certified in 2003 and 6,134 were recertified by attending CES training programs. Even with newer, safer and more concentrated products, the adoption of nearly 5,925 new pesticide BMPs such as scouting and biological control on 128,758 acres significantly reduced pesticide usage. Moreover, through the effective training and advertising of the pesticide container recycling program, 112,521 pesticide containers were recycled thus preventing them from ending up in community landfills. The estimated reduction in production costs from proper use of pesticides totaled $3.1 million.

c. Scope: State specific

## KEY THEME – Agricultural Waste Management (also addressed under Goal 4)

a. Issue: The waste management systems now used on North Carolina swine farms are under critical review by regulatory agencies and others, and the political climate has moved toward more regulation of animal farming regarding odor control and nutrient management. Objective evaluation of the present and development of alternative swine waste management systems is critical to the continued vitality of North Carolina's swine industry and for maintaining the state's environmental health. Agreements between the Attorney General of North Carolina and Smithfield Foods (SF), Premium Standard Farms (PSF), and Frontline Farmers provided resources that are managed by a NCSU Poultry and Animal Extension Specialist for use in the development and performance verification of "Environmentally Superior Waste Management Technologies". Performance standards defined in the Agreements mandate that the technologies target environmental variables including the discharge of animal waste to surface waters and

groundwater; emission of ammonia; emission of odor; release of disease-transmitting vectors and airborne pathogens; and nutrient and heavy metal contamination of soil and groundwater.

b. Impact: Detailed progress reports describing this initiative between the dates of July 25, 2000 and July 25, 2003 were published. Environmental performance data procurement and economic assessment are continuing on 14 different candidate technologies. Based on progress to date it is anticipated that approximately half will be completed (for Technology Determinations per the Agreements) by July 2004 and the remainder in 2005. Waste management technology development and performance evaluations, including economic feasibility determinations, such as the initiative described above will provide the $4 Billion NC animal industries and North Carolina policy makers and others with scientifically based information, which will allow them to make informed decisions that will affect the environment and an important segment of the state's economy.

c. Scope: State specific

**PERFORMANCE GOAL 2: ANIMAL PRODUCTION AND MARKETING SYSTEMS**

## KEY THEME – Sustainable Agriculture **(also covered under goal 4)**

a. Feed prices escalated during the year, severely reducing profit margins. By-product feeds were promoted to reduce the feed costs of livestock farmers.

b. Impact: These alternative feed strategies resulted in beef and dairy cattle producers purchasing and utilizing in excess of 60,000 tons of feed by-products from brokers and local mills. Not only were these by-products providing adequate nutrition but there were also significant cost savings for the producers in excess of $1,000,000. On four demonstration dairy farms (averaging 150 cows per farm) located in Guilford County each farm saved $10,000 by using by-product feeds.

The environmental impact of mineral emissions from concentrated poultry operations must be reduced by improving dietary nutrient utilization and utilizing animal by-products as added-value nutrient resources. North Carolina State University has applied research and extension programs dedicated to the reduction of mineral emissions through nutritional strategies that improve the efficiency of nutrient utilization, and through the recycling of animal by-products into the food chain. Through the use of lactic acid fermentation and extrusion processing, poultry protein by-products can be converted into protein meals for use in fish feeds that are about 15% more digestible than protein meals produced by conventional rendering methods. Moreover, appropriate dietary supplementation of enzymes, amino acids and organic minerals to poultry feed have been demonstrated to reduce the emissions of phosphorus, nitrogen, and other environmentally important minerals by improving diet digestibility by over 5%. The use of enzymes and feed additives was shown to reduce feed costs by at least $0.25 per ton resulting in a potential annual savings of over $1.2 million for the NC poultry industry. Through the use of feed additives (enzymes, probiotics, oligosaccharides) to improve enteric health, at least 3 major integrated poultry companies operating in North Carolina have stopped using antibiotic growth promoters so as to secure a greater share of the European and Asian export market.

c. Scope: State specific, national

## KEY THEME – Sustainable Agriculture

a. Issue: The number of Hispanic employees working on poultry farms and in hatcheries and processing plants for the NC poultry industry has reached a point where the industry must change the manner in which it educates and trains its employees. Production supervisors and other employees must be able to communicate more effectively across the current English/Spanish barrier, especially at times when biosecurity practices must be understood by all in order to alleviate the spread of animal diseases, especially foreign animal diseases such as foot and mouth disease and Exotic Newcastle disease. A survey of North Carolina broiler industry personnel (i.e. production managers, service personal, veterinarians, poultry growers) was conducted to help NC State poultry extension personnel define the type of educational materials that need to be developed to reduce the language barrier amongst their employees.

b. Impact: A field manual in both the English and Spanish languages was developed and circulated among industry personnel, poultry area extension agents, growers, and on-campus extension specialists for evaluation and editing. Copies of the final manual will be distributed to key workers comprising all segments of the poultry industry.

Improving animal health management can also reduce costs and improve animal performance. In some cases, healthy animals or products from healthy animals can receive a premium in the marketplace. Exotic Newcastle Disease (END) was identified in California in October 2002. The disease spread rapidly throughout southern California and into surrounding states. The disease was costly ($200 million spent by USDA alone) and disrupted trade for California. In an unprecedented move, the North Carolina Department of Agriculture & Consumer Services was able to secure funding from the Council of State to develop an educational program that addressed animal disease recognition and prevention utilizing END as a model. Training materials were developed in the form of presentations, pamphlets, and posters. The pamphlets and posters were written in both English and Spanish and the posters also targeted illiterate people, using pictures to describe the lesions and signs seen with END. More than twenty training sessions were held to inform agricultural workers employed by eight state and federal agencies (NCDA, NCDOL, NCWRC, NCDENR, NCEMS, NCDHHS, NCCES, and USDA). Additional training sessions were held in Vass, NC as part of an orientation for seasonal workers entering the state from Mexico. Posters were placed in all inspected migrant housing. A training session was held in all seven Extension Districts in order to train livestock, poultry and crops agents in recognizing the signs associated with END. These trainings included people from county animal response teams (CARTS), Emergency Management, Animal Control and Law Enforcement. An effort was made to target Spanish-speaking agricultural workers. Educational materials were shared with Catholic churches holding services in Spanish and were left in Hispanic grocery stores. Over 250 people were trained using the presentations developed in a didactic format. Additional people were reached during assessments of facilities with regard to poultry biosecurity to prevent the occurrence of this deadly disease in North Carolina.

c. Scope: National and State specific

## KEY THEME: Agricultural Profitability **(also addressed under National Goal 1)**

a. Issue: Several areas for enhancing agricultural profitability were demonstrated by NC Extension field faculty and specialists.

b. Impact: For example, cattle producers often need to reduce input costs to promote the profitability of their farms. Previous educational efforts initiated in 2002 by an Extension agent in Stanly county (i.e., program described mineral requirements of beef cows, components of good mineral supplementation programs, and fairly comparing different mineral mixes for purchasing decisions, etc.) have continued to demonstrate that purchasing beef cattle minerals in bulk offers substantial savings to farmers. Participants have reported savings of $120 to $140 per ton when compared to purchasing similar minerals on their own. These savings translate into a reduction in cost for participants of $5,200 to $6,100. During 2003, 83 farms in Stanly County saved $56,000 through participation in the mineral buying program.

Programs targeted at improving swine genetics and health management have also had significant financial impacts for producers. North Carolina State University scientists working with those from other universities have assisted in the improvement in genetic characteristics in pigs leading to increases in litter size, growth rate and fat to lean ratio which collectively increased prices by $9.00 per pig. For pigs raised in North Carolina this translates into $144 million annually in increased profitability.

c. Scope: State specific

## KEY THEME – Sustainable Agriculture

a. Issue: Getting a jump start on improving the growth and disease resistance potential of broilers and turkeys was the focus of a programs in Poultry Science.

b. Impact: *In ovo* feeding of solutions containing proteins and amino acids to broiler and turkey embryos a few days prior to hatch significantly increased early post-hatch growth rate by 3 to 10% over the controls. Development of the gastrointestinal tract was also accelerated by 48 hr after the *in ovo* feeding, such that the *in ovo*-fed birds had a gut at hatch that was similar to that of 2 day-old control birds. This technology was patented and is currently being field tested by the poultry industry.

c. Scope: Regional and State specific

**PERFORMANCE GOAL 3: CROP PRODUCTION AND MARKETING SYSTEMS --**

**KEY THEME – Biotechnology is addressed under Performance Goal 7.**

**KEY THEME – Pesticide Application is addressed under Performance Goal 1.**

## KEY THEME: Agricultural Profitability **(also addressed under National Goal 1)**

a. Issue: Extension on-farm tests (more than 600 replicates) convincingly documented that in high-yielding environments and double crop situations, narrow row widths have greater yield and profit potential than wider row widths.

b. Impact: In 1983, 25.3% of the state's soybeans were in rows 20 inches wide or less. By 2003, 74.0% were in 20-inch rows or narrower. This change represents an increase in net profits of $12,601,000 for our producers, along with an additional savings of $1,116,000 in weed control costs, and an additional savings of $4,203,000 in insect control costs. Accordingly, pesticide loading in the environment has been greatly reduced.

c. Scope: State specific

**PERFORMANCE GOAL 4: FOOD PRODUCTS MANUFACTURING**

## KEY THEME – HACCP

a. Issue: Specialists from the Department of Food Science assisted the food products manufacturing industry in the development of HACCP plans for both products that have a regulatory requirement and those that do not. Moreover, food safety educational programs were also developed and delivered to a variety of food industry audiences. Specific trainings included a workshop for 40 Environmental Health Inspectors with inspection responsibilities to retail food outlets, farmers markets, restaurants, and institutional feeding establishments; dairy and seafood food safety and quality workshops for 35 and 19 students, respectively; a Pasteurizer Operator's workshop for 60 students; an acid foods good manufacturing practices school for 108 students; a meat science workshop for 50 students; a national sanitation control procedures workshop for 22 students; introductory and advanced HACCP workshops for 102 students; and food entrepreneur workshops for 57 students.

b. Impact: In each of these trainings, pre- and post-assessment of the workshops and schools indicated a significant increase in basic knowledge and understanding of food safety principles as they apply to each of the workshops and schools.

c. Scope: State Specific

## KEY THEME – Food Safety

a. Issue: Faculty from North Carolina State have worked with a 12-state consortium in the Southeastern United States to introduce Good Agricultural Practices ("GAPs") to the region's fresh produce growers, packers and consumers.

b. Impact: The consortium produced a widely adopted, award winning GAPs training program and supporting materials specifically directed to Southeastern conditions and commodities. Additionally, the group initiated region-wide GAPs instructional programming using its newly-created 329 page instructor's or teacher's manual and associated compact disc containing 11 topical presentations. To fill an information void found during the initial outreach program, a publication series of 9 four-page crop-specific brochures relating GAPs to specific crop groups was created and distributed. The group also developed bi-lingual training materials and programs including a Spanish language handwashing video, GAPs training posters, and slide sets. The overall fresh produce safety program helped to train 150 specialized food safety County Extension Agents, produced a new "Model Recall Program for the Fresh Produce Industry" publication, formed new networks with federal risk management staff and 1890 Institutions, and instructed over 10,000 persons. Moreover, the consortium initiated the Southern Region

fresh produce food security network that targeted consumers, hard to reach and at-risk populations, and new federal/state agency linkages.

People who preserve food at home often take short cuts or use recipes that are outdated. Some don't operate pressure canners correctly or use water baths instead of pressure canning to process low acid foods. Families are at risk of contracting food borne illnesses such as botulism by not following safe and correct canning procedures. Thirteen canners were tested and 41 families received publications and instructions about proper canning procedures. In an effort to encourage proper canning techniques, Extension personnel provided one-on-one demonstrations, conducted 3 classes, loaned out canners to over 10 individuals and answered over 80 phone calls on proper procedures for home canning. Currently, Extension food safety programs are seen as the only resource for providing safe and reliable food preservation information.

c. Scope: Regional and state specific

**PERFORMANCE GOAL 5: FOREST PRODUCTS MANUFACTURING**

## KEY THEME – Forest Crops

a. Issue: The focus of programming at NCSU is to increase the efficiency of utilization, minimize waste, and optimize the economics of wood product manufacture and utilization.

b. Impact: In two counties, educational programs were conducted to increase consumer knowledge about the wood products industry. As a result, 494 individuals were reported to show an increase in knowledge and 168 were reported to adopt practices related to selection, use, and maintenance of wood products.

c. Scope: State specific

**PERFORMANCE GOAL 6: FOOD SAFETY AND QUALITY**

## KEY THEME – Food Safety

*a.* Issue: *Retail Food Safety.* Americans are eating more of their meals away from home — an estimated 70 billion meals and snacks. The typical person spends nearly half (46.4%) of their food dollars eating out. As more Americans eat out, more responsibility for food safety lies with the foodservice industry. In North Carolina, there are 16,822 commercial foodservice establishments and about 7,000 institutional operations employing nearly a quarter million people, making it the second largest private sector employer in the state.

b. Impact: In 2003, Extension Agents in 38 counties, representing all regions of North Carolina, sponsored trainings. As a result, 1,290 foodservice managers participated in Extension-sponsored food safety trainings. Of those participants, 90% successfully completed the course. An additional 711 non-managerial foodservice workers completed food safety training. In three counties, 99 foodservice workers participated in Spanish-language food safety trainings.

*Consumers.* The best way to reduce the incidence of foodborne illness in the home is through education. Foodborne illness is nearly 100% preventable if safe food handling practices are applied. In

2003, two educational programs that were widely used — For Your Health, Food Safety Begins at Home and "Smart Kids Fight BAC!™". Both curricula target population groups who are at high risk for foodborne illness. The former targets older adults but can be used with a general adult audience and the latter targets youth ages 5-9.

Extension Agents using the For Your Health, Food Safety Begins at Home curriculum, reported that 4,077 individuals increased their knowledge about safe food handling as a result of attending a training program. Extension agents reported that 2,963 children who were exposed to the Smart Kids Fight BAC!™ curriculum improved knowledge about safe food handling.

c. Scope: State specific

**PERFORMANCE GOAL 7: BIOTECHNOLOGY**

**KEY THEME – Biotechnology,** which is also addressed under Goal 1 and Performance Goal 3 of this Goal.

a. Issue: On-farm demonstrations and tests result in educational opportunities for growers. Biotechnology traits were emphasized and explained so farmers could make informed decisions of whether this technology would be useful for increasing their profitability, reducing mycotoxins, reducing pesticide exposures, and benefiting the environment. Feedback from Agri-business and producers was very favorable concerning the use of on-farm evaluations of corn hybrids and the impact of biotechnology.

b. Impact: As a result of other on-farm tests and demonstrations conducted by agents and specialists across several other counties, growers have adopted varieties of corn, soybeans, and cotton that have positive traits that are a direct result of biotechnology. In Pasquotank County, for example, approximately 45 percent of the corn acreage is grown with hybrids containing the Bt gene to minimize the yield reduction caused by the European Corn Borer and Corn Earworm. As a result, total corn production for the county has increased approximately 85,000 bushels valued at $200,000. In addition, applications of specific pesticides have been eliminated.

c. Scope: State specific

**PERFORMANCE GOAL 8: RESIDENTIAL AND COMMUNITY WATER AND WASTE MANAGEMENT**

**KEY THEME – Water Quality** (also addressed under Goal 4.)

a. Issue: Educational programs have been designed to help elected officials, planners, public works staffs, contractors, and citizens become aware of ground/surface water and wastewater management options, the associated consequences with improper management, and applicable regulations. Improperly protected ground and surface water and improperly discharged waste could potentially have detrimental effects on individual health and the environment.

b. Impact: One-hundred fifty-one (151) individuals adopted the following best wastewater management practices — limited disposal of trash, grease, and hazardous chemicals to sewage, conserved water use,

protected the system from physical damage, disposed of gray water in regular home wastewater system, designed landscaping to promote surface drainage, and did not add any commercial additives to their septic system.

c. Scope: State specific

# *GOAL 3*
## A HEALTHY, WELL-NOURISHED POPULATION

### Overview

The importance of promoting nutrition and wellness throughout life has been clearly established. Two major scientific reviews, the "Surgeon General's Report on Nutrition and Health" and "Diet and Health" by the National Research Council have documented several diet and chronic disease relationships and have recommended some dietary changes for the public. The Public Health Service "Year 2010 Objectives For the Nation" has also noted the major role that nutrition plays in health promotion and disease prevention. Most recently the US Department of Health and Human Services produced “The Surgeon General’s Call To Action to Prevent and Decrease Overweigh and Obesity 2001.” This document and many other scientific reviews chronicle the rising epidemic of overweigh and obesity that is plaguing the US. If this trend is not slowed or reversed, it could eliminate the progress we have made in reducing the burden of weight-related chronic diseases such as heart disease, stroke, diabetes and several forms of cancer.

### Behaviors for Optimal Health

Public interest and concern about nutrition and health issues are at an all-time high. While more consumers than ever are aware of the major issues, fewer can put those concepts into everyday practice. At the same time consumers are vulnerable to misinformation that targets their concerns and fears. Scams and misinformation abound and are costing the public billions of dollars. Consumers continue to need help in using the Dietary Guidelines and the Food Guide Pyramid to incorporate balance, moderation and variety in their diets. Research has shown that consumers do not know the food groups nor the number of servings they and their families should have from each food group. They also do not understand serving sizes and confuse a "serving" with a "helping" of foods. Programs that address these needs continue to be imperative if consumers are to adopt behaviors that optimize their health.

### Nutrition and Chronic Disease

Dietary factors are associated with five of the ten leading causes of death in N.C. (and in the U.S.), including coronary heart disease, some types of cancer, stroke, noninsulin-dependent diabetes mellitus, and atherosclerosis. Another three (cirrhosis of the liver, unintentional injuries, and suicides) are associated with excessive alcohol intake. Currently, health professionals are more concerned with excess and imbalance of certain components in the diet than the dietary deficiencies seen in former days. North Carolina has higher age-adjusted mortality rates in comparison to national averages, much of which may be related to what citizens eat. Diets in North Carolina are improving, but 1993 and 1994 statewide surveys show that people still consume too much fat, salt and sugar and too little high fiber fruits,

vegetables and whole grain foods. Many people have heard and accepted the message that they should reduce the fat, salt and sugar in their diets; however, all too often, they don't recognize where these components are in foods or how to lower their intake. As research continues in these areas and as consumers continue to seek the answers to their questions, programs will continue to be needed that address the risk factors associated with various health problems and appropriate lifestyle changes.

Overweight and obesity have reached epidemic proportions and have become on of the most pressing health issues for our nation and state. These conditions are increasing in all age groups of all races and ethnicities. Sixty-one percent of adults in the US are overweigh or obese. There are almost twice as many overweight children and three times as many overweigh teens today as there were two decades ago. Action by a broad array of individuals and public and private partners is essential to reverse this trend.

**Lifecycle Concerns**

One of the best indicators of maternal and child health is the infant mortality rate, or the number of babies per 1000 live births that die before their first birthday. North Carolina has historically had an infant mortality rate well above the national average but over the past few years has improved to 9.9. This rate, however is still high and reflects the need for continued programming in the maternal and child area.

No time is more important than childhood to promote healthy eating and health practices. Children in North Carolina do not consume enough fruits or vegetables and have diets that are low in fiber and higher in fat than recommended. Children in North Carolina need quality nutrition education to help positively influence their food choices. For nutrition education efforts to be effective they must also include parents and care givers. Helping families make informed decisions about their nutrition will help ensure that North Carolina’s children grow to reach their full mental and physical potential. Overweight in children in North Carolina continues to rise. Preventing overweight and obesity in children is essential to address this issue.

Demographic changes in North Carolina's population continue to impact nutrition and health issues. The fastest growing age group in the state is the 65 years-and-over segment. The elderly run disproportionate risks of malnutrition and poverty as well as poor overall health status. In fact, over 85% of older adults suffer from chronic diseases and could benefit from dietary intervention. The general nutrition needs of the well elderly must be addressed; however, the needs of the elderly for prevention of malnutrition and chronic disease actually begin much earlier in life. Programs addressed to young adults and the middle-aged consumers will continue to impact the health of the population as it "ages."

Women are employed in greater numbers, and many of them are among the ranks of the working poor. Over 80% of women who had school-aged children were working outside the home; 67% of women with youngest child under six years were in the labor force. For working parents with very limited resources, lack of after-school and summer programs for youth are a major concern.

**NCCES Responds**

Promoting optimum nutrition and health through diet and lifestyle in all North Carolinians regardless of gender, income, age, or race/ethnicity formed the main focus of Goal 3: A healthy, well-nourished population. Education programs addressing diet, healthy, and chronic disease prevention were offered to North Carolinians of diverse income levels, age groups, genders, and/or cultural backgrounds across the

state. Programs offered included Partners in Wellness, Give Your Heart A Healthy Beat, Our Destiny Is Our Decision, Color Me Healthy, NoonLiting, Our For Lunch, SyberShop, Women Living Healthy – Women Living Well, Expanded Food and Nutrition Education Program, and the In-Home Breastfeeding Support Program. Programs were held in many different settings including congregate nutrition sites, senior centers, schools, churches, government buildings, businesses, daycare centers, work sites and outdoors. Various methods were employed including using the Internet, computers, mailed materials, media, one-on-one contact, and public meeting. Audiences reached included children, adults and the elderly, day care workers, hospital employees, housing authorities, Head Start, Red Cross, food banks, and community coalitions, In support of these activities faculty brought in more than 11 million dollars in funds. As a result of programming, over 90,000 participants increased knowledge tat will promote a healthier diet, over 11,000 gained in knowledge concerning reducing risk for chronic disease, close to 7,000 participants adopted behaviors consistent with decreasing the risk of chronic disease, and over 90,000 changed diet and lifestyle habits, and improved their quality of life and the quality of life of others. Over 30,000 participants increased their consumption of fruits and vegetables. Over 13,000 parents and 3,500 child care providers gained knowledge about the importance of good nutrition for the children in their care. As a result, over 40,000 children adopted behaviors consistent with the Dietary Guidelines and Food Guide Pyramid including consumption of more fruits and vegetables and improving physical activity.

**FTEs & Program Cost for Goal 3**
**Program cost is inclusive of federal Smith-Lever funds, state funds, Smith-Lever 1890 funds and some contracts and grant funds.**

| | | |
|---|---|---|
| State FTEs - 7.5 | County FTEs- 21.75 | Program cost- $1,535,111 |
| NCCES state FTEs – 6.5 | County FTEs- 21 | Program cost- $1,469,511 |
| NC A & T state FTEs –1.0 | County FTEs -.75 | Program cost- $65,600 |

## Key Theme: Human Nutrition

a. Issue: Participants will adopt behaviors to promote a healthier diet. The key teaching components of the objective included Worksite Wellness programs, health fairs, workshops and demonstrations, after-school programs, parent-teacher programs, and face-to-face encounters. Media was used to effectively disseminate a clear message about healthy eating patterns. Programs such as the Physicians' Project, Partners in Wellness and Out For Lunch will help participants adopt healthy dietary behaviors.

b. Impact: Number of participants consuming more fruits and vegetables 33,273
Number of participants making one or more positive dietary change 58,311
Numbers of participants increasing knowledge that will promote a healthier diet 98,613
Numbers of participants increasing skills that will promote a healthier diet 22,396
**N**umbers of participants adopting dietary behaviors that are consistent with behaviors promoted in the dietary guidelines 91,584

c. Scope: State specific

## Key Theme: Human Health

a. Issue: Participants at risk for chronic disease/condition will change behavior resulting in reduced risk. The key teaching components of this objective include demonstrations/workshops, health fairs, video and audio tapes, home study kits, supermarket/farmer's market tours, and discussion groups and support groups. The mass media was used to effectively disseminate messages about the relationship between chronic disease and eating patterns. Programs such as Give Your Heart A Healthy Beat and NoonLiting will help participants adopt eating patterns that will decrease their risk of chronic disease.

b. Impact: Numbers of participants who increase knowledge in how to reduce risk for chronic disease 11,271
Number of participants who adopt one or more behaviors consistent with decreasing the risk of chronic disease 6,754
Number of individuals reducing risk factors for chronic diseases (heart diseases, strokes, cancers, adult-onset diabetes, arthritis, atherosclerosis, and osteoporosis) including:

- Numbers who decrease high blood pressure 36
- Numbers who decrease high blood sugar 107
- Numbers who decrease excess weight (exact amount of wt. lost/person) 404
- Numbers who increase exercise (exact amount of exercise/person) eg. so many miles/week for so many weeks/person 314
- Numbers who increase fruits and vegetable consumption 33,273

c. Scope: State specific

## Key Theme: Human Nutrition

a. Issue: Participants in nutrition and wellness programs for parents or care-givers and/or children will improve knowledge and adopt behaviors to promote a healthy diet. The key teaching points for this objective are training in nutrition for child-care providers, in-home study for parents and children, health fairs for parents and care-givers, one-on-one discussion with parents, and work in the classroom and child-care setting with children. Mass media is used to effectively disseminate nutrition messages to parents and child-care providers about the importance of helping children to form healthy eating habits early in life. Programs such as Color Me Healthy, Out For Lunch and SyberShop will be used to educate caregivers and children about healthy eating and physical activity.

b. Impact: Parents increase awareness and knowledge of importance of good nutrition for children. 13,722 Child care providers increase knowledge about the importance of good nutrition for children and the importance of teaching children about nutrition. 3567 Children adopt food behaviors consistent with the Dietary Guidelines and Food Guide Pyramid. 44,396 Child care providers teach children about the importance of a healthy diet based on the Dietary Guidelines and the Food Guide Pyramid. 3246 providers reaching an estimated 30,000 children

c. Scope: State specific

## Key Theme: Human Nutrition

a. Issue: Limited resource audiences will adopt behaviors that improve the nutritional adequacy of their diet. The key teaching components of this objective include neighborhood groups, preformed groups, one-on-one contacts, volunteers and use of the media. Programs such as the Expanded Food and Nutrition Program, Breastfeeding Program, Hey What's Cookin'? (for pregnant teens), Color Me Healthy, Project Eat Right: Add to Life, Out For Lunch, and Partners In Wellness all help limited resource audiences adopt behaviors that improve the nutrition adequacy of their diet.

b. Impact: Number who showed improvement in one or more food resource management practice 6,656
Number who showed improvement in one or more food safety practice 9,633
Number who showed improvement in one or more nutrition practice 10,893

c. Scope: State specific

# *Goal 4.*
# AN AGRICULTURAL SYSTEM WHICH PROTECTS NATURAL RESOURCES AND THE ENVIRONMENT

**Overview**

Agricultural producers, agribusiness professionals, public officials, agency personnel, special interest groups, and the general public are all concerned about environmental quality in North Carolina. Goal 4 promotes efforts to improve production practices and enhance cooperative and collaborative efforts to protect the environment and preserve natural resources while promoting strong and diverse agricultural systems. These efforts are seeing very positive results.

The performance goals under Goal 4 address animal agriculture, plant agriculture (row crops, horticultural crops, and forestry), and agriculture's interactions with the public and government. Target audiences for these action areas are broad in terms of occupation, age, economic status, and knowledge of agriculture.

Performance goal 1 targets livestock and poultry producers and provides support as they adopt and promote sustainable, economical, and environmentally sound practices to manage water and waste materials for the purpose of protecting air and water quality. Growth in the poultry industry in North Carolina has presented opportunities for Extension to promote this goal. Robeson county reports: "Sixteen existing poultry growers consulted Extension with regards to updating their nutrient management plans (NMPs) due to field and/or cropping changes, as well as poultry litter record keeping consultations including field application. Eight of these growers adopted the Extension developed, DENR-DWQ accepted standardized MS Excel spreadsheets to track and more easily document poultry house litter cleanouts, cumulative field applications and stored litter."

During 2003, more than 4,300 land application operators were trained and certified or re-certified. In excess of 47,000 acres of conservation best management practices (BMPs) were adopted on units associated with animal production. Those efforts have reduced soil loss by 37,000 tons per year. To enhance nutrient management, soil, wastewater and plant tissue analysis representing over 700,000 acres was performed. The estimated economic value of livestock organic byproducts utilized (nutrients, organic matter, etc.) was more than $14 million. Over 4,200 producers are utilizing approved waste

management plans. Over 700 farms adopted at least one BMP (walking trail, stream crossing, managed stream bank vegetation, or mortality composting) last year.

Performance goal 2 is addressed to field crop producers, nursery and greenhouse growers, turf and landscape professionals, and forestry professionals. This goal seeks adoption and promotion of economically and environmentally sound practices to manage water, soil, nutrients, and pesticides for the purpose of protecting water quality and improving management of natural resources.

The Neuse Crop Management Project highlights action taken to meet this performance goal. The Project was undertaken to significantly increase the use of production practices that improve economic and environmental performance in the Neuse River Basin. The successful accomplishment of this goal enabled farmers to adopt agronomically and economically sound practices to protect water quality and effectively deal with public and regulatory concerns. Water quality improvements were documented from different BMP installations on both farm and control locations. Overall the project made a significant contribution to the Neuse agricultural community's exceeding the 30% nitrogen reduction goal (34% actual reduction) for the entire basin.

Another example from Duplin County: “Crop rotation has been promoted through Extension programs including on-farm tests, production meetings, newsletters, and farm visits for many years. As a result, crop rotation has been widely adopted as a method for managing pests and the soil. Each year approximately 79,500 acres of agronomic crops are managed as part of a crop rotation in Duplin County. Crop rotation has been effective at reducing disease pressure from Granville Wilt and Black Shank in tobacco, cyst nematode in soybean, billbug in corn, and root-knot nematode in cotton to name a few. In 2003, approximately 5000 continuous cotton acres were planted in either corn or soybean to increase crop rotation. This rotation has resulted in excellent yields and reduced weed pressure for the 2003 crop”

During 2003, more than 23,400 pesticide application professionals were certified or recertified, and over 3,600 obtained certification (pesticide or other) specifically in the landscape, ornamental and turf sector. BMP adoption was very successful, totaling over 1,200,000 acres. Of those acres, 194,000 acres were in no-till, 176,000 acres were in conservation tillage, 167,300 acres were in residue management, 344,000 acres were under nutrient management plans, and 311,000 acres utilized crop rotations. Over 192 farms established one or more water quality BMPs (field borders, filter strips, permanent wildlife cover) during 2003. Over 1,300 producers practiced integrated pest management (IPM). Improved row crop and horticultural crop practices reduced soil loss by nearly 64,000 tons. Fertilizer use was reduced on over 131,000 acres, while pesticide application was reduced by over 56,000 pounds (active ingredient basis). Over 2,900 acres of wildlife habitat was established.

The intent of performance goal 3 is multi-faceted and relates to agriculture’s participation in general society. Specifically, it is intended that special interest groups, including producers and agribusiness professionals, public officials, environmentalists, the media, consumers, and youth will increase their understanding of and appreciation for the complex relationships between agriculture and the environment. Interagency cooperation plays a key role in achieving this overall goal. From Currituck County: “Networking with other agencies is used throughout the year in conducting programs for farmers, landowners and youth as well as commercial and private pesticide applicators re-certification programs. Through networking opportunities, program participants are able to receive a broader knowledge of educational topics and gain the knowledge of services that are offered by these other agencies. In cooperation with the Pesticide Section of NCDA&CS and US Ag Recycling, the recycling of of pesticide

containers continues to be an increasing success. Also, through participation with NRCS, CES is able to share valuable information with youth at Environmental Field Days. The Northeast Ag Expo returned this year with the Ag agents from Chowan, Perquimans, Gates, Pasquotank, Camden and Currituck working together to show the effects of alternative agriculture. Networking agencies are an excellent resource for successful CES programming." Also, from New Hanover county, "Coastal property owners provide revenue to coastal counties and municipalities through payment of taxes on some of the most valuable real estate in North Carolina. A significant amount of beach property is used for summer rentals and contributes large sums to municipalities through occupancy taxes. Conservation and enhancement of this property is important to the owners and to those benefiting from the revenue it generates. Property owners and others learned to select and plant dune vegetation to build and stabilize coastal dunes, properly fertilize existing vegetation, use sand fences and dune crossovers to direct pedestrian traffic, and conserve and enhance the barrier island ecosystem."

In 2003, over 700 people participated in education programs in land use planning and natural resource management, while over 500 people indicated that their participation in policy making increased. About 140 programs related to agricultural production and environmental regulations and constraints were implemented by multi-agency groups. Over 12,000 people – many of them youth - increased their knowledge of the link between agriculture and the environment. Illustrating educational efforts to link agriculture and the environment, over 3,200 people indicated that they adopted practices that promoted sustainable ecosystems.

Results reported in 2003 indicate significant and demonstrable improvements in, knowledge, attitude, and most importantly, practices regarding agriculture and the environment – both in agricultural and non-agricultural communities. The vast array of educational programs implemented under this goal were evaluated and reported by field and campus specialists, using primary evaluation tools such as observation, interviews, data analysis, participant surveys and questionnaires, as well as participant pre- and post- tests.

**FTEs & Program Cost for Goal 4**
**Program cost is inclusive of federal Smith-Lever funds, state funds, Smith-Lever 1890 funds and some contracts and grant funds.**

| | | |
|---|---|---|
| State FTEs – 31.85 | County FTEs – 57.75 | Program cost $5,188,057 |
| NCCES FTEs -State 31 | County - 57 | Program cost- $5,116,057 |
| NC A & T FTEs - State .85 | County - .75 | Program cost- $72,000 |

## Key Theme - Water Quality

a. Issue: Extension specialists and agents are playing a key role in basin-wide planning efforts which are required for all of North Carolina's 17 river basins. Efforts are focused on protecting both surface and ground water. Extension-initiated educational programs, for producers and the general public, are a key element in reducing nutrient and pesticide contamination in wells and surface supplies of drinking water, in waterways, and in estuaries. Agents and specialists are working with producers and other state and federal agencies to identify resources that can be used to help improve water quality in our state.

Demonstrations, workshops, and public meetings are being used to help producers and others understand the complexities of water quality and how environmental quality and agriculture can coexist.

b. Impact: “The goal of the Neuse Crop Management Project was to significantly increase the use of production practices that improve economic and environmental performance in the Neuse River Basin. The successful accomplishment of this goal enabled farmers to adopt agronomically and economically sound practices to protect water quality and effectively deal with public and regulatory concerns. Over the course of the project over 150,000 acres were placed under nutrient management plans, 7.5 stream miles of riparian buffers were installed, 150 acres of controlled drainage were installed, and water quality improvements were documented from different BMP installations on both farm and control locations. Overall the project made a significant contribution to the Neuse agricultural community's exceeding the 30% nitrogen reduction goal (34% actual reduction) for the entire basin.”

“I have had the opportunity to work on a grant funded water quality project focusing on the Core Creek watershed in Cove City, NC. The objective of the project is to improve the water quality of Core Creek via implementation of agricultural best management practices (BMPs). The BMPs to be utilized include nutrient management, controlled drainage and wetland restoration. During the nine months that I have been employed with the Cooperative Extension Service grower participation and excitement for the Core Creek project has increased. Nitrogen management plans have been written for more than 7,500 acres of agricultural farm land, 13 water control structures with a drainage area of over 1300 acres have been designed and installed, and two sites have been identified for the wetland restoration. This project has been an environmental, agricultural and economical success.”

c. Scope: State Specific

## Key Theme - Animal Waste Management

a. Issue: Extension personnel are working with swine, dairy, beef, and poultry producers to assure that they are aware of all of the new regulations and requirements for water quality and nutrient management associated with animal production. Phase out of anaerobic lagoons, requirements for alternative waste treatment technologies, waste handling certifications, nutrient management plans, and setback restrictions are just some of the topics that have seen dramatic changes recently and that are having a major impact on the operation of both large and small facilities.

b. Impact: “Improper management of animal waste has negative impacts on farming as well as the community. Swine producers must receive six continuing credits in animal waste management over a three year period in order to meet the mandates of the laws and avoid fines for violations. Cooperative Extension provided three, two-hour workshops focusing on current research and new rules and regulations involving sludge requirements for 2004. As a result, 37 operators received a total of 204 hours of credit. 100% of participants are now able measure and record sludge data on the operations. Farms are in compliance with state laws requiring training and operators were able maintain their license. The Tri-County (Cumberland, Harnett, and Lee) area raises over 200,000 hogs a year ranking them 11th in the state. These workshops ensure farmers are educated on applying animal waste at proper agronomic rates and are protecting the environment.”

“During 2003, six Davidson County corn, soybean, and small grain growers, with an average of 187 acres of corn, incorporated chicken litter into their grain production fertility program for the first time. There

was nothing new or unique about this other than none of the six were poultry growers. They gained this valuable source of nutrients and organic matter as a result of nearby poultry growers inability to utilize all of the waste their operation produced on their farms due to land, soil test nutrient levels and/or nutrient application rate restrictions. It was a win, win, situation for everyone. The poultry growers eliminated their waste overload and the grain growers lowered their cost of production by an average of $30.00 per acre. Together, these 6 growers had a variable cost saving in excess of $33,660."

c. Scope: State Specific

## Key Theme - Soil Erosion

a. Issue: Soil erosion continues to be a major concern in North Carolina, since it has both on-site impacts (loss of fertility, gullying, disruption of normal tillage operations) and off-site impacts (loss of aquatic habitat, pesticide and nutrient pollution, sedimentation in sensitive areas). Extension is working with other state and federal agencies to educate farm and non-farm communities about erosion control and stream bank stabilization. These efforts not only help keep the soil in place, but also improve water quality and recreational opportunities downstream.

b. Impact: "No-till planting and strip tillage have been promoted through Extension programs including meetings and on-farm tests. Key tests evaluating planting methods were conducted in 2002 and 2003. During the past 5 years, conservation tillage has been widely adopted in Duplin County. 18,000 acres of corn and cotton were strip-till planted in 2003, and 2 producers changed from conventional planting in 2003. In addition, no-till production has been utilized on 28,000 corn, cotton, and soybean acres. These conservation practices have resulted in less wind and water erosion of topsoil. Furthermore, these practices have reduced tillage trips by 2 per year at a savings of approximately $4.00 per acre."

"As part of the New River BMP Program, different types of groundcover are being evaluated to provide non-competitive, but better groundcover for Christmas tree fields. Research indicates good groundcover reduces soil erosion, helps retain organic material in soil, keeps soil temperatures lower, requires less use of herbicides, provides a home to beneficial insect populations. This Spring, five new demonstration sites have been successfully seeded to go along with five sites seeded last Spring. By maintaining proper groundcover, growers can reduce the number of broadcast herbicide applications which saves the grower approximately 15-20 dollars per acre. Another benefit to maintaining groundcover is the retention of organic material and nutrients in the soil, resulting in less fertilizer needed to grow quality trees"

c. Scope: State Specific

## Key Theme - Nutrient Management

a. Issue: Improper application of animal waste, as well as non agronomic application rates of inorganic fertilizers, have led to concerns that agriculture is a major contributor to water quality problems, including *Pfiesteria*, in North Carolina's rivers and estuaries. Urban sources of nutrients (lawns, golf courses, waste treatment plants) are also of major concern. Extension is involved at all levels in educating producers, land owners, and the general public on how to best manage fertility and prevent unwanted washoff or leaching of fertilizer materials.

b. Impact: “Efforts to provide Nutrient Management information to growers in both the Tar-Pamlico and the Neuse River Basins has occurred in 2003. Seventy seven growers attended and received training on January 30. An additional training session was given in July. Several meetings have taken place with NRCS and NCSU personnel to determine the amounts of nitrogen in agricultural operations. These baseline figures will help growers farm within acceptable guidelines without excess nitrogen or phosphorus applications.”

“It is essential for Animal Waste Management System Operators to keep irrigation equipment maintained in order to apply desired amounts of nutrients to crops. Specifications for nutrient application are specifically designated in their waste utilization plan, and equipment functioning has a direct relationship to meeting these specifications. In addition, the new "NPDES" permit requires selected producers to calibrate on an annual basis. Producers can learn to calibrate their equipment in order to ensure desired application rates are met. Cooperative Extension in Wayne County has provided a presentation workshop and tool for producers to learn proper techniques on calibration of their equipment. The presentation has been used in several county training sessions for teaching this technique, and in the spring of 2003, the Division of Water Quality requested and included a copy of the presentation on their web site for producers and industry supporters to browse and learn from.”

c. Scope: State Specific

# *Goal 5.*
# ENHANCED ECONOMIC OPPORTUNITY AND QUALITY OF LIFE FOR AMERICANS

Empower people and communities, through research based information and education, to address the economic and social challenges facing youth, families, and communities.

## Overview:

North Carolina is a very diverse state in every sense of the word: in terms of population, types of industry in the state, and in terms of the numerous agricultural commodities produced. The population of North Carolina is now in excess of 8.3 million people. The ethnical and racial diversity has increased greatly due to the different rates of change among the various population groups. The Hispanic population has grown by nearly 600 percent since 1990. During the same time period the Asian population grew by 150 percent while the African-American and white population grew by 15 and 17 percent respectively. In addition the Native American population has also experienced significant growth. North Carolina has a wide variety of industries contributing to the general economy ranging from the fisheries on the coast, to the Christmas tree industry in the mountains, to the furniture manufacturing in the Piedmont, to the farming/agribusiness industry that spans the state. There are large industrial components as well as a rapidly increasing value added and cottage/small business component.

The diverse population described above face many social and economic challenges. Some of these challenges stem from the fact the world functions in a global economy rather than a local economy, and that international trade policies of the USA and the different countries affect citizens in different ways. Consequently, there is a real need for citizens of North Carolina to understand the interrelationships

between what happens in the economies of other countries and how that might affect our economy. Some of the challenges are due to the war on terrorism in which the US finds itself, some are due to the growth/recovery in the US economy being much slower than anticipated, and some challenges are merely due to the increased cost of living that has forced the "second spouse" to enter the work place. All of this puts more stress on the family unit as well as creating a real need for improved child care, and more child care providers.

Other social and economic challenges that face citizens in North Carolina result from North Carolina being a prime "retirement state" and experiencing an aging population of its own. Some challenges are the result of a society that is three to five generations removed from actual production agriculture, and this has resulted in a society that is less understanding and less appreciative of production agriculture. The continual uncertainty surrounding an anticipated major change in the tobacco industry is the source of a large amount of emotional stress for many farm families. Still other challenges are the result of citizens' growing concern for a quality environment, which has led to increased regulatory legislation. These and other social and economic challenges put North Carolina youth, families, and communities at risk.

The youth, families, and communities of North Carolina are at risk of failing to reach their fullest potential because they face the economic and social challenges characterized above. Improved understanding of the economic and social issues of today, and the necessary leadership skills to face and meet these challenges is at the foundation of the Extension educational program in North Carolina. North Carolina Cooperative Extension has designed and is delivering an inclusive set of educational programs to the diverse audiences outlined above. This will improve the likelihood that they will reach their full potential. Continual evaluation of existing programs will insure that all facets of the citizenry will be reached with our educational programs and that the programs meet the needs of the diverse clientele.

North Carolina Cooperative Extension's state and county unit based professionals made major impacts in the year 2003 in five "key theme" program areas: Child Care, 4-H Youth Development, Resilient Youth, Families and Communities, Aging/Estate Planning/Retirement Planning, Community Development, and Family Resource Management.

**FTEs & Program Cost for Goal 5**
**Program cost is inclusive of federal Smith-Lever funds, state funds, Smith-Lever 1890 funds and some contracts and grant funds.**

| | | |
|---|---|---|
| State FTEs - 21 | County – 133.77 | Program cost $7,531,837 |
| NCCES FTEs -State 19 | County - 130 | Program cost- $7,304,417 |
| NC A & T FTEs - State 2 | County - 3.77 | Program cost- $227,420 |

## Key Theme – Child Care

a. Issue: The child care Cooperative Extension Major Program has two goals. These goals are to (1) improve the quality of child care in North Carolina and (2) to increase the availability of child care in North Carolina.

b. Impacts: The needs of the child care community are diverse. Primary among them is the need to improve the quality of care provided by staff through appropriate training. Agents report having trained at

least 1,943 adult child care providers in 2003. More importantly, Cooperative Extension facilitated licensing of 53 after school sites while 463 sites increased their star license due to the training and support they received from Cooperative Extension. It is not surprising; therefore, that parents, child care providers and school personnel reported that 4,546 youth improved in social/emotional, cognitive, and physical development in the centers where staff received CES training. In addition, these youth "gave back" to their community by contributing over 7,500 hours to community service projects. Thus, the North Carolina Cooperative Extension Service has an important impact on the over 29,701 children reached by these child care providers.

Child care continues to be a much needed yet under-funded, service through out North Carolina. To combat this issue North Carolina Cooperative Extension continues to seek out collaborative partnerships and grant funding to alleviate this need. Agents report developing or sustaining at least 671 collaborative relationships in support of child care. Acting in collaboration with other community groups, Cooperative Extension agents have generated over $800,000 to support child care at the local level. In addition, agents' report they manage $730,642 in child care dollars. No other organization, local or statewide, could have such wide sweeping impacts on the child care issue.

Increasing child care availability is sometimes a lengthy process that begins with technical assistance in the form of training, phone calls and site visits. North Carolina Cooperative Extension agents report that the following numbers of providers have increased their knowledge in key areas of child care quality: 2,393 increased in health, safety, nutrition; 1,110 in indoor environment space; and 1,627 in educational activity programs.

The most direct evidence of the impact of CES agents is in the 26 new programs implemented statewide and in the establishment of 942 additional spaces for youth to enjoy quality after school programming. This translates into 942 children who now have quality child care and 26 new centers and homes that are now members of the child care industry because of the agents of the North Carolina Cooperative Extension Service.

c. Scope: State specific.

## Key Theme – Building Strong Families

a. Issue: The family is the basic unit of society. North Carolina has a disproportionately high population of "working poor" families and is above the national average for the number of children living in single parent families. Many children and families have been removed from public assistance programs. To reduce some of the negative effects living in poverty, parents need opportunities to prepare them to meet the challenge that come with parenting.

North Carolina has had increasing number of substantiated child abuse and neglect cases (an increase of 23% in the past five years). According to Prevent Child Abuse North Carolina (2002), every five minutes a child in this state is abused or neglected.

Programs focused on child development and care, parenting, and family relationships. Programs reached diverse audiences including homeless families residing in transitional housing, grandparents parenting grandchildren, teen parents, Head Start parents, and mentally-challenged adults.

b. Impacts: One thousand eight hundred fifty (1850) limited-resource parents participated in educational programs. Of that number, 1072 limited-resource parents increased their knowledge of behaviors associated with nurturing children. Seven hundred sixty-seven (767) limited-resource parents reported adopting nurturing practices (such as using discipline with a balance between warmth and firmness, showing acceptance, love, and support of each child as a unique person). Two hundred sixty-six (266) limited-resource parents reported using age appropriate discipline techniques to establish and maintain reasonable limits with their children.

Four hundred eleven (411) limited resource court-mandated or Department of Social Services (DSS) referred parents participated in parenting training and education. Three hundred ninety-nine (399) limited-resource court-mandated or DSS reported improved interactions with their children. Four hundred (400) limited-resource court-mandated or DSS referred parents reported adopting nurturing practices (such as giving the child positive attention, showing patience, expressing affection in words and actions). Three hundred eighty-nine (389) limited-resource court-mandated or DSS referred parents reported using available resources to meet their needs.

Four-hundred fourteen (414) limited-resource parents participated in educational programs designed to increase their knowledge and skills in reducing family conflicts and managing stress. Nine-nine of the participants reported increased knowledge and skills in stress, conflict, and anger management. Through reduced conflicts and improved family relationships these 99 families avoided $59,400 in costs associated with absenteeism from work due to domestic violence ($40 per day per family multiplied by 15 days). Two-hundred sixty-eight (268) limited-resource parents reported using available community resources (such as assistance to families in providing for basic needs of food, clothing, and shelter).

c. Scope: State specific

## Key Theme – Resilient Youth, Families, and Communities

a. Issue: Resiliency is the ability to cultivate ones strengths to positively meet challenges. The North Carolina Resilient Youth, Families, and Communities Program is founded on a prevention model that strengthens youths “protective factors” and reduces “risk factors.” Participants bring together and involve numerous collaborators including: K-12 educators, researchers, youth serving and organizational personnel, youth, families, community leaders, advocates and practitioners who share an interest in strengthening the resiliency of North Carolina’s youth, families, and communities.

b. Impacts: Youth in 40 counties have benefited as a result of involvement in community-based programs, which focus on building resilience. More importantly, 4,445 youth have demonstrated increased life skills, 3,326 increased their academic performance, 2,208 engaged in fewer risk-taking behaviors, and in community service work. But perhaps, the most telling impact of this program is the 1,642 youth that experienced decreased involvement with juvenile courts in North Carolina in 2003.

c. Scope: State specific

## Key Theme – Youth Development

a. Issue: Youth development focuses on three major aspects of the 4-H program that contribute to the life skill and asset development of young people: the long-term 4-H Unit/Club, 4-H School Enrichment Program, and the Diverse Housing Program. Four major factors have been identified that contribute to the successful development of a child: social competence, problem solving, autonomy, and a sense of purpose and future. Those factors, along with the Search Institute's developmental assets, are incorporated into 4-H experiences. Through active 4-H participation youth learn to manage relationships, make decisions, become resilient enough to overcome the risks they face, become better communicators, and serve their communities. 4-H's hands-on, learn-by-doing approach reaches hundreds of thousands of North Carolina's youth each year in schools, in community clubs, camps, and in other settings.

A major goal of the 4-H Youth Development Program is to help young people develop life skills and assets that will allow them to become competent, caring and contributing members of society. In 2003, emphasis was placed on helping young people improve their life skills/assets in the areas of communication skills, cooperation, empathy and caring, critical thinking, planning and goal setting.

b. Impacts: During 2003, 4-H involved 187,065 young people between the ages of 5 and 19 in a variety of program areas; 115,842 youth participated in 4-H clubs and other long-term units, school enrichment, and diverse housing programs. The positive development of youth people through 4-H can be illustrated by the following impacts from selected programs: 1) 19,372 youth increased their communication skills; 2) 19,070 youth increased their decision making skills; 3) 20,756 youth increased awareness of and engaged in community service activities; and 4) 13,349 youth increased their leadership skills. Youth development professionals reported that over 13,000 families are currently involved in 4-H club programs across the state and that 177 new clubs were formed for youth ages 5 to 19.

In 2003, North Carolina 4-Hers saved their communities over $200,723 by performing community service projects. As a result of their 4-H project work, $405,762 was earned, and $163,129 was made by 4-Hers. In addition, 4-Her's received over $104,372 in scholarships to continue their education beyond high school.

c. Scope: State specific.

## Key Theme - Aging / Estate Planning / Retirement Planning

a. Issue: As the North Carolina Cooperative Extension Service strives to improve the quality of people's lives, one of the areas of focus is fostering resiliency for families during transition into retirement. Increased awareness of the need for, and the increased understanding of how to go about, estate and retirement planning will improve the likelihood of a more rewarding and financially secure retirement.

b. Impacts: Ten counties reported that they conducted educational programs to increase the awareness and understanding of estate planning, including examining retirement savings and provisions for possible future incompetency and dependency. A total of 373 people, 69 limited resource (LR) and 304 non-limited resource (NLR), reported that they had increased their knowledge of estate planning, and 218 (26LR and 192 NLR) reported that they had increased their knowledge of preparing for possible incompetency and dependency. More importantly, 113 individuals (17 LR and 96 NLR) reported having developed an estate plan or who were executing estate planning documents at that time. 76 individuals reported executing legal documents to prepare for future incompetency and dependency. In addition 332

people indicated that they will be developing estate and dependency plans appropriate for their particular circumstances.

There were a number of individuals who reported improved money management including implementing a savings plan. Specifically, there were 346 individuals (254 LR and 92 NLR) who reported developing and implementing savings plans to increase their financial security in their later years.

c. Scope: State specific

## Key Theme - Community Development

a. Issue: The economic wellbeing of communities in North Carolina is impacted by the global economic conditions (as well as national and local). The viability of these communities is also dependent upon the citizens and local leaders being well informed and involved in the community decisions regarding growth and development. Community leaders need to understand and use accepted and successful business and economic development concepts and principals to implement sustainable economic growth. It is also imperative that all segments of the citizenry be involved in these community decisions. Thus, focused efforts should be made to involve limited resource as well as other non traditional participants in the public decision making.

b. Impacts: Forty seven of North Carolina's 100 counties reported educational activities focusing on community economic development, and the development and involvement of the local citizenry in community leadership and decision making. There were 39 of these counties that reported 10,973 participants (1,189 LR and 9,784 NLR) in educational programs where participants gained knowledge of constructive solutions to community issues. There were 3,942 individuals (645 were LR) who demonstrated acquired/improved problem solving and facilitation skills. 2,767 people reported that they had participated in community collaborative problem solving. 1,268 (110 LR and 1,158 NLR) individuals reported that they participated in community/public policy leadership training. As a result of the improved skills and abilities of local citizens, there were reported 907 different communities who were engaging in some sort of visioning and planning process. There were another 1,117 communities who reported engaging in processes to deal with conflicts and reach consensus on community direction and action. It was estimated by participants that successful resolution of (a) community issue (s) resulted in a savings of $108,215. It is estimated that the value to society of these educational programs is in excess of $3 million.

There were 818 individuals who reported that they had increased their knowledge of economic development and business management principals. Of this group 203 were limited resource individuals. There were 1,667 persons who indicated that they gained knowledge of economic development opportunities. Due to these educational activities it was reported that 323 businesses had been "saved" or retained. The economic significance of this result was estimated to be $211,523. Three hundred twenty seven businesses reported that they had expanded with an economic impact of $257,343, and 35 businesses had been either attracted to communities or developed in communities resulting in an additional $400,000 of economic activity.

c. Scope: State specific

### Key Theme -- Family Resource Management

a. Issue: Current economic conditions have caused individuals and families to be experiencing financial stress. The need for families to manage their limited financial resources wisely is extremely important. Consequently, educational programs to assist North Carolinians to develop skills and strategies for managing their personal finances have been developed and delivered in over 41 of North Carolina's 100 counties. These efforts were intended to increase the awareness and knowledge of the benefit of money management practices, to change their attitudes towards developing and using money management plans, and to have them adopt decision-making practices that would help them achieve their family financial goals. These programs have included basis money management, debt management, budgeting, developing financial goals and many other topics.

b. Impacts: Thirty five counties reported that they conducted programs to motivate and assist North Carolinians, including limited resource persons and families, to develop skills and strategies to manage effectively their personal finances. These programs also were to help individuals adopt best management practices that would enable them to meet their changing needs and responsibilities over their life cycle. There were 4,208 (2,762 LR and 1,446 NLR) participants who increased their knowledge and skills regarding goal setting, budgeting, and record keeping (basic money management). As a result of such workshops,574 limited resource and 168 non-limited resource participants reported that they had in fact developed money management plans; 458 participants (318 LR and 140 NLR) indicated that they had developed debt management plans; and 847 persons (610 LR and 237 NLR) stated that they had developed written financial goals for their families.

The goal of these financial management educational programs is to help people improve their financial status, and to be better prepared for the future. There were 479 people that reported that their financial status had indeed improved due to the adoption of practices and skills learned in these workshops. Three hundred seventy four of these people were limited resource citizens. 450 individuals reported that they had achieved improvement in their financial status as a result of changing their lifestyles. As a result of these personal/family financial management educational programs, 334 individuals reported that they had already achieved some of their financial goals, and 249 people reported that they had been successful in significantly reducing their debt. Financial progress has been demonstrated.

c. Scope: State specific

## B. Stakeholder Input Process

North Carolina Cooperative Extension System has an active advisory leadership council for the state and for each of the one hundred counties and the Cherokee Indian Reservation. The Advisory Leadership System is a major partner in the continuous and dynamic review of program development including program planning, implementation, and assessment of Extension programs. The Advisory Leadership System has major responsibility in obtaining stakeholder input through out the program development process. Members of the State Advisory Leadership System and county Advisory Leadership Council represent geographical, cultural, ethnic, and economic diversity of the state's population.
In addition to Advisory Leadership Councils, each county has specialized committees with responsibilities for review of overall programming, collaborating in needs assessments and environmental

scans, and marketing extension programs and impacts. These specialized committees provide specific program input for individual commodities, issues and ongoing program needs. Membership on both the council and the specialized committees represents the diversity of the respective county population including under-served populations and retired professionals from business, extension and other relevant organizations and agencies. While the advisory council will meet quarterly, the specialized committees will meet at least annually to discuss accomplishments and needs still to be addressed and techniques to market extension. This system is monitored administratively to assure that stakeholders provide such program input and actions.

At the state level, a statewide advisory council provides programmatic inputs, review and guidance for the overall program functions for the North Carolina Cooperative Extension Service at North Carolina State University. This group meets quarterly as will as for special meetings to meet organizational review and input needs. This council is made up of influential individuals who represent a broad scope of the diverse population in North Carolina and who have distinguished themselves as respected and responsible knowledgeable leaders who can provide local perspectives into a statewide organization. In addition to being an integral part of the overall State Advisory Council, the Extension Program at NC A&T State University is also guided by a cadre of citizens who make up the Strategic Planning Council. The Strategic Planning Council includes community leaders, agribusiness persons, teaching faculty, cooperative extension team members and individuals representing non-governmental organizations.

The Strategic Planning Council meets three times a year as a group. Networking and collaboration between the State Advisory Council and the Strategic Planning Council is facilitated by two members who serve on both councils. Members of each council periodically meet jointly.

Thus, Cooperative Extension has a planned, proactive process for ensuring significant stakeholder input into program direction. The process ensures that programs are reviewed and overall needs assessed on a continuous basis, but no less than once every two years. However, with the respective advisory groups functioning on a much more frequent basis, stakeholder input produces continuous program review, allowing for adjustments as local needs change.

To ensure appropriate, inclusive, and adequate stakeholder input, the organization implements an environmental scan in each county and on the Cherokee Reservation every other year. These scans are conducted by a diverse group of extension employees, volunteers, clientele, commodity groups, and county residents. The scans provide a wide base of needs, issues, trends, and emerging issues that are representative of diverse groups throughout the county.

To assure that all programs are current and highly relevant, in late 2002 North Carolina Cooperative Extension conducted a rigorous and detailed review of its major programmatic thrusts. The review process included departments at both universities (NC State and NC A&T State); the state's 100 county Cooperative Extension centers, the Extension Center on the Cherokee Indian Reservation; the state's Advisory Leadership System members; and local Advisory Leadership Councils for each of local administrative units. The dominant change was based on the review of the previous twenty state programs (Cooperative Extension Major Programs) and yielded a new program structure with five major focal thrusts for the total program and realignment of program development teams. The program development model with fifty program objectives was approved by Extension Administration.

The new program structure was reviewed by college, department, and county program groups. College department review included a number of stakeholder and commodity groups. A major thrust of the department reviews was the construction of a "Resource Book" which portrayed the current situation in content areas, the crucial needs and issues perceived to be most important in the next 3-5 years, and a description of how those needs and issues would impact programming at the county level. Major emphasis has been to include individuals and groups that have not been traditional Extension clientele. Advisory Leadership Councils in each local area are participated with Extension staff to identify and prioritize needs and issues.

In March 2003, North Carolina Cooperative Extension (including all state and county faculty) collaborated with other university extension and engagement groups (for the first time ever) in a conference to enhance cooperation among extension groups in assessing and prioritizing needs and issues of North Carolina's people. Thousands of local and state leaders have been instrumental in the identification and assessment of needs, issues, and problems that NC Cooperative Extension major programs can address. In addition to the Extension staff and members of the advisory leadership systems, large numbers of Extension clientele and individuals who have not participated in Extension programs (including local government leaders, environmentalists, mass media personnel, local financial leaders, state and county agency members, civic groups, and educational leaders) have actively been involved in continuous scanning and assessing of needs and issues.

In 2003, a needs assessment was completed in each of the 101 Cooperative Extension's county administrative units. The goal of the assessment was to continue to obtain stakeholders' input to ensure effective program priority setting. Each administrative unit conducted independent assessments using primarily: surveys, personal interviews and group meetings. Each unit prioritized the top ten needs/issues that stakeholders had identified. The County Extension Director in each unit appointed an advisory group to give oversight to the needs assessment. There were 2,190 individuals who were members of those advisory groups. Additionally, 1,152 groups were instrumental in the county assessments. Data were obtained from 23,362 individuals altogether.

## C. Program Review Process

During the 2002-03 plan year, North Carolina Cooperative Extension conducted a rigorous and detailed review of its major programmatic thrusts. The review process included departments at both universities (NC State and NC A&T State Universities); the state's 100 counties including the Cherokee Indian Reservation; the state's Advisory Leadership System members; and local Advisory Leadership Councils for each of local administrative units. The Long Range Plan Steering Committee, with members representing NCSU and NC A&TSU, has traditionally functioned as the primary merit review group for the POW. With the change to fifty program objectives subsumed under five major focus areas, as indicated in the introduction of this report, the chairs of each of 50 plan of work objectives and their teams are now primary merit reviewers. The state program leaders and the assistant administrator for state programs have also intensified their leadership roles as key merit reviewers. The other merit review group is the AREERA Goal chairs. Collectively, these individuals provide a significant internal merit review of programs taking into consideration the needs and expectations expressed in the stakeholder input process.

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

**Multistate:**

For fiscal year 2003, NCCES had documented multistate activities using Smith-Lever B & C funds amounting to $371,398. This funding level exceeded the originally planned expenditure of $202,160 by $169,238. Altogether, the 2000 plan indicated 12 activities. Additional activities have been added for a total of 20. However, one of the originally planned activities has been removed, and another concluded, thereby making a total of 18 reportable multistate activities for 2003.

NCCES conducts a vast number of multistate collaborative programs. Beginning with the originally identified 12 activities, additional activities have been identified or initiated, with one producing results in 2000 and the others producing reportable results for 2001. The two other activities planned to begin in 2001 were on target, with appropriate results and financial contribution reported for 2002. Unfortunately, difficulties associated with the Orchard Floor Management Program as indicated in the Multistate report precludes that program from continuing as a part of the NCCES multistate plan. Also, Program 6 in Goal 1 was completed in 2002, with no additional funding required for 2003. Efforts continue to expand current programs and identify additional multistate activities for meeting or exceeding the AREERA requirements. Two such activities were added and reported on for 2002. Those include Programs 7 and 8 under Goal 1. In 2003, another program was initiated under Goal 5 entitled "Extension CARES for America's Children and Youth", which is described in program number 6. As other activities develop and are identified, they will be added to the plan and reported upon as appropriate. Also, some programs are completing their planned life cycle, and as they are completed, will be reflected in subsequent reports. The key point is that NCCES has significant multistate activities underway on a continuous basis that strive to meet the needs of clients in a most efficient and effective manner. Some of these programs are partnerships with only one other state, while others are with a vast number of states. Utilization of scarce resources by pooling expertise and conducting Extension programs across state lines is a continuing part of the NCCES mission and continuing opportunities shall be sought and subsequently reported.

Evaluation of the multistate activities is an ongoing function of program leaders and other administrators of NCCES and other states, as well as by users and cooperators with whom the multistate activities are focused upon. Such evaluations as to the utility of current activities and expansion of such activities shall be a continuous function of NCCES and our multistate partners.

**Integrated:**

Altogether, NCCES and NCARS fund more than 100 integrated Research- Extension projects. Of those projects, 52 had significant Smith-Lever B & C funding allocated for all or part of the Extension funding in 2003. For fiscal year 2003, these B & C funds amounted to $2,052,015. This funding level continued to exceed the originally planned expenditures for Integrated projects that has occurred over the span of the planning cycle. For 2003, the original plan called for an expenditure of $1,732,784. The actual expenditure exceeded the plan by $319,231. This 2003 expenditure exceeds the prior year by $331,951. This is a significant increase in both projects and funding level from the 2002 fiscal year

While the integrated projects have a greater focus on Goals 1 and 4, some projects are reported under Goals 2 and 5 as well. No projects are listed under Goal 3 because another state university is charged with conducting primary research that would be covered by this Goal. All of these projects represent

goals to achieve scientific breakthroughs for production efficiencies, environmental protection, life enhancement, stronger communities, and alternative uses of products to achieve a greater contribution to the economic, environmental and quality of life benefits to society. These integrated programs strive to gain new and improved technological advancements that can be communicated and applied to meet the needs of the population as a whole as well as for those individuals and organizations who adopt the new advancements.

These integrated projects have been developed using stakeholders inputs and are evaluated to assure that all programs represent the needs of the people of the state in protecting its environment, increasing its economic well being and enhancing the society in which the state's population lives. Needs assessments and stakeholder involvement helps to establish priority projects for funding. Efforts are made to address the needs of all of the state's citizens, with these programs effectively communicated via Extension programs to under-served and other citizens of the state who can utilize the findings for enhancement of the quality of their lives.

# E. Multistate Extension Activities

### Goal 1. AN AGRICULTURAL SYSTEM THAT IS HIGHLY COMPETITIVE IN THE GLOBAL ECONOMY

**Program 1.**

SERA-IEG
Competitiveness and Sustainability of the Southern Dairy Industry

Amount funded: 6,360

Report: This SERA is scheduled to run through 9/03. The major activity of the this SERA in 2003 was planning and conducting the Southern Dairy Conference. The 2003 conference was held in Atlanta in February, 2003. The agenda included information on industry regulations, public policy, biosecurity, biotechnology, marketing and industry dynamics as well as an information exchange and discussion of regional collaboration, and the economic, profitability and sustainability of the regional dairy industry.

**Program 2.**

Regional Orchard Floor Management Program

Serves the educational needs of growers in the North Carolina, South Carolina and Georgia mountain region.

Amount funded: 0

**Report:** This project continues as a viable multi-state Extension program. However, due to personnel losses and difficulties in refilling this position, no B & C funds were allocated to this program for 2000 nor 2001. This plan was revised in 2001 to exclude this program from the multistate plan.

**Program 3.**

Southern Region Small Fruit Consortium

This program provides grower workshops and agent training programs throughout the Southern Region and Midwest.

Amount Funded: $54,891

**Report:** In 2003, the NCCES program specialist in strawberries provided 10 out-of-state Strawberry plasticulture Workshops and Agent In-Service Trainings in Ohio (2), Virginia (2), Georgia (2), South Carolina (2), Arkansas (1), and Alabama (1). There were more than 500 producers and agents directly impacted by those meetings in these other states in 2003. A Southeastern Strawberry Consortium for 12 states was organized in July 2003 to develop an updated CUE application for methyl bromide (submitted 8-Aug-03). The BERRYagent web site (http://intra.ces.ncsu.edu/depts/hort/berrydoc/), continues to provide critical information to agents and farmers throughout the Southern Region on frost/freeze events, pest management strategies and marketing information. In just August and September 2003, over 25 advisories were posted on this BERRYagent to assist growers in a "strawberry plug crisis," including illustrations and instructions in Spanish (for transplanting fresh dug, bare-root plants, that became the alternative plant type for hundreds of farmers who were forced to abandon their anthracnose-infected plug plants (over 10 million plugs were destroyed). This program focuses on one of the fastest growing specialty crops for direct marketing in the nation, strawberry plasticulture.

**Program 4.**

Pork Industry Handbook

A consortium of states involved in developing an informational handbook for pork producers across the country.

Amount funded: $15,200

**Report:** The Pork Industry Handbook (PIH) and CD-Rom is a national continuing educational effort on all phases of pork production. The PIH is a multidisciplinary project with over 80 authors and reviewers that include animal scientists, veterinarians, ag engineers, ag economists and pork producers from 45 states. It is currently estimated that 99% of all the hogs produced in the United States come from production units that utilize some or all of the PIH fact sheets. In addition, the PIH is used as a textbook in over 100 college courses on pork production at nearly 70 colleges and universities in the U.S. Major efforts have been made in placing the handbook on CD-Rom with the addition of multimedia enhancements. States that have representatives directing the program through the PIH Advisory Committee include: North Carolina, Indiana, Nebraska, Illinois, Oklahoma, Iowa, Michigan, North Dakota, Ohio, Missouri, Georgia and Kansas.

**Program 5.**

Vegetable Crop Guidelines: For the Southeastern U. S.

This program involves the development and maintenance of an up-to-date technical and educational guide for commercial growers in North Carolina, South Carolina, Georgia, Alabama and Mississippi.

Amount Funded: $35,581

**Report:** Coordinated efforts for a regional (NC, SC, GA, AL, MS) vegetable production guide pest management supplement for 25 major vegetables and assisted with planning and conduct of a SE regional meetings of all Ext. Vegetable Specialists to develop production recommendations. As part of this program we conduct a 2 day workshop for specialists from these states and KY, TN and FL to share recommendations, research results and cooperate in program planning.

**Program 6.**

SARE Professional Development Program

The SARE Professional Development Program involves growers and faculty from all Southern Region states for preparing traditional providers for delivery of sustainable agriculture Information.

Amount funded: $0

**Report:** The outcome of this program should improve collaboration among stakeholders-especially among traditional information providers (CES, NRCS) and non traditional sources of sustainable agriculture information, identify ways to familiarize agents with the depth and breadth of sustainable agriculture materials available, and identify the means for making those materials more readily accessible through creative use of web-based electronic resources. This project ended in 2002.

**Program 7.**

Pork Production Curriculum Project

Course curriculums are being developed and implemented for all phases of pork production that are designed to address the basics of day-to-day management activities. The basic management principles are similar no matter what type of facility the grower may be using or how large or small the size of the unit. The intended audience for these curriculums is the group of people who work in the production of any type, size or kind size of pork production operation. The student may be an employee in contract production or an owner-operator. States participating include: North Carolina, Ohio, Minnesota, Tennessee, Alabama, Nebraska, Indiana, Iowa, Illinois, Maryland, Washington, South Dakota, Kansas, Georgia, Kentucky, Virginia and Pennsylvania.

Amount Funded, $32,038

**Report:** Report: Management curriculums for Farrowing, Breeding and Gestation, Nursery and Finishing were moved to a WWW delivery platform and made available for distribution and use in swine production courses and in training producers and employees in extension programs in 25 states.

**Program 8.**

National Swine Educators Conference:

The National Swine Educators Conference is a national continuing education program to provide in-service training and materials to personnel involved in providing education and outreach programs to pork producers in the United States. States participating include: North Carolina, Ohio, Minnesota, Tennessee, Alabama, Nebraska, Indiana, Iowa, Illinois, Maryland, Michigan, Missouri, Wisconsin, Washington, South Dakota, North Dakota, Texas, California, Utah, Oklahoma, Arkansas, Kansas, Georgia, Kentucky, Virginia and Pennsylvania. (Plan added beginning 2002).

Amount Funded: $12,100

**Report:** Report: The National Swine Educators Conference was planned by a representative from each pork producing states and producer education personnel from the National Pork Board. North Carolina sent sixteen participants to the 2003 Swine Educators Conference with the support of the NC Pork Council. These educators have in turn provided training to NC pork producers. The over 150 educators at this conference represented Cooperative Extension, University Academic Programs, Community Colleges and Vocational Agriculture Instructors. The program provided in depth training on the latest technologies and provided participants with teaching curriculums and resource materials that could be used in their local programs.

**Program 9.**

Title: Southeastern Dairy Youth Retreat

The Southeastern Dairy Youth Retreat is an annual event that is hosted by North Carolina, Virginia, South Carolina, Georgia and Florida on a rotation basis. Youth participate in many dairy educational events including farm tours, judging, quiz bowl, skill-a-thon, seminars and other activities. (Plan added beginning 2002).

Amount Funded: $11,800

**Report:** Twenty-four (24) youth and five (5) adults from North Carolina along with the group from Virginia traveled together to the 2003 Southeast Dairy Youth Retreat held in Madison, Georgia on July 15-19, 2003. Youth from NC, SC, VA, GA, and FL participated in this annual educational retreat. Through educational workshops, dairy farm tours and other events and activities, youth increased their knowledge of the dairy industry in the Southeastern U.S.

**Goal 2. A SAFE AND SECURE FOOD AND FIBER SYSTEM**

**Program 1.**

The Poultry Food System: A Farm to Table Model

The primary objective of this multi-state project is to improve consumer safety, consumer acceptance and the commercial profitability of poultry meat and eggs by improving or reducing critical problems associated with the quality of poultry meat and eggs; specifically color, flavor, or texture of the product, and the safety of poultry meat and eggs; specifically colonization, contamination, and subsequent pathogen growth. Twelve states are involved.

Amount funded: 46,435

Report: To improve consumer safety, acceptance, and the commercial profitability of poultry meat and eggs, NCCES has been collaborating with investigators from twelve states. In two collaborations between NCCES and Clemson, we are focused on eliminating the human pathogen *Campylobacter jejuni* from colonizing the gastrointestinal tract of broilers using *C. jejuni*-specific nanoparticles. Several *in vivo* trials were successfully conducted to test this hypothesis. In the second collaboration, the efficacy of combining in-package heat pasteurization and inhibitory packaging films on eliminating *C. jejuni* and enteropathogenic *E. coli* from ready-to-eat poultry products was assessed. These two unique on-farm and in-plant strategies are anticipated to ultimately reduce the incidence and prevalence of these pathogens in poultry products. In a third collaboration between NCCES and Ohio State University, we have successfully characterized and quantified the populations of microbial pathogens, viruses, and protozoa (*Salmonella, Campylobacter, E. coli* O157:H7, Cryptosporidium) found in commercial broiler, turkey, and swine production facilities. Moreover, we have evaluated the effectiveness of several new promising swine waste handling technologies and housing systems for eliminating these pathogens in wastes streams. This study will benefit poultry processors, consumers, and regulatory agencies in that it will quantify the level, persistence, and fate of foodborne pathogens in animal excreta before, during, and after land application. Moreover, promising new waste treatment technologies, management practices, and nutritional approaches are being identified for rearing poultry and treating poultry wastes to reduce the public health risks associated with animal agriculture.

**Goal 3. A HEALTHY, WELL-NOURISHED POPULATION**

**Program 1**

Partners in Wellness

Nutrition education for the elderly, a program involving North Carolina and other states in a collaborative arrangement for program development and implementation of nutrition education materials for older adults.

Amount funded: $20,000

**Report:** NCCES collaborated with other states in sharing the Partners in Wellness program curricula. The curriculum has been shared with the University of Georgia at Athens, 7 counties in Michigan, Colorado State University , Iowa and Pennsylvania State University. These states continue to use the materials and to collaborate with us in one form or another, including phone calls, discussions at meetings, and sharing materials. Iowa has materials that were shown to us and they are willing to share with us as well as getting materials from us. Michigan has no state specialist leading the effort but

interested county extension agents have the curriculum and have used it. Kansas State U. is still using the newsletters that they adapted from the Partners in Wellness curriculum and are currently distributing them throughout Kansas. They have shared the newsletters with NCSU and we have incorporated ideas from them back into Partners in Wellness. NCSU continues to maintain a Partners in Wellness website for information for the partners and other interested individuals across the country.

**Program 2**

Elderly Nutrition Extension (ENE) Core Group

A national core group or task force focusing on planning curricula, program delivery means and expertise in elderly nutrition programs. The states of North Carolina, Texas, Florida, Kansas, Missouri, Ohio, Iowa, and Virginia have professionals who participate on conference calls and meetings on an as need basis.

Amount funded: $24,721

**Report:** NCCES faculty chair the Elderly Nutrition Education (ENE) Core Group

Coordinating core group composed of members from Meredith College in NC, Florida International U., St. Louis U., Kansas State U., the USDA Center for Nutrition Promotion and Policy, the University of Georgia, Texas (retired Extension nutritionist), Iowa and the Ohio State University. Our goals are to support and advance the understanding, research base and promotion of nutrition education for the older adult audience. This group's efforts include increasing the awareness level of other professionals concerning the nutritional needs of older adults. Nutrition education materials including HELP: The Healthy Eating for Life Program, Partners in Wellness: the nutrition education program for limited-resource older adults, and Staying Well, the nutrition education program based on the DETERMINE Your Health Checklist continue to be shared among this group and with other interested professionals. We also have co-presented older adult nutrition education at several national meetings including the annual meeting of the American Dietetic Association and the International Aging Conference. This group has continued to develop articles that were published in the Journal of Nutrition for the Elderly. Four were published this year along with a write up about this group (ENE). We are also collaborating on a presentation to be conducted in July of 2004 at the annual meeting of the Society for Nutrition Education and have been in discussion about forming an elderly issues group for the Society for Nutrition Education which will be led by the member from Iowa.

**Goal 4. AN AGRICULTURAL SYSTEM WHICH PROTECTS NATURAL RESOURCES AND THE ENVIRONMENT**

Program 1

Regional Forestry position

A consortium of all Southern Region states for forestry program leadership and coordinative efforts in linking programs from each state to more effectively streamline the flow of information across the region.

Amount funded: $6,372

**Report:** This position has facilitated the implementation of communication among the various states in the Southern Region, assisted with the development of regional NREM programming presence and recognition, instrumental in the creation of a national organization representing natural resources extension programs. These efforts have created better collaborations and understanding among diverse program areas, including enhanced partnership for states with the US Forest Service.

**Program 2.**

Environmental Protection Agency liaison Specialist

A consortium of 8 Southern states for coordinating Extension programs with EPA and other federal agencies relating to the environment.

Amount funded: $10,463

**Report:** This position has served as an information broker for directors and program leaders on water quality and other related environmental issues. There has been promotion of training and other conference opportunity which enhances each states ability to collaborate on water quality issues and communicate with EPA.

**Goal 5. ENHANCED ECONOMIC OPPORTUNITY AND QUALITY OF LIFE FOR AMERICANS**

**Program 1.**

Southern Rural Development Center

Programs focus on fostering the economic and community development in the rural South.

Amount funded: $5,000

Report: The Southern Rural Development Center has greatly enhanced the capability and effectiveness of Cooperative Extension in the Southern Region as a whole by coordinating and facilitating conferences and meetings. In 2001, this center became a part of a newly reorganized leadership role for Extension for all of the Southern Region. The functions of the center have been subsumed under the duties of the Executive Director, ASRED. In 2003, $20,000 was expended for this effort, of which $5,000 was for providing program support.

**Program 2.**

School Age Child Care

A multistate program dealing with the educational needs of school age youth.

Amount Funded: $28,472

**Report:** 4-H Afterschool is a major multi-state program initated in 2002. 4-H Afterschool is a focused, national effort to increase Cooperative Extension's capacity to develop and implement after-school programs, work with other youth-serving organizations, organize 4-H clubs, train staff, and provide curricula to school-age youth in after-school programs to increase the quality and availability of programs throughout the United States. This work supports the work of CYFAR and the Extension Cares Initiative (ECI). Dr. Eddie Locklear, Associate Professor, North Carolina State University, serves as the National Director of 4-H Afterschool.

**Program 3.**

4-H Volunteer Leadership Development Forum
A multistate program designed to train more effective leaders for youth programs.

Amount funded: $36,540

As Chair of the Southern Regional Leader Forum Planning Committee for the 2003 event. The Southern Region 4-H Leader Forum is an annual event attended by more than 650 adult volunteers and Extension staff members from the 13 southern states and 2 territories (Virginia, North Carolina, South Carolina, Georgia, Florida, Alabama, Mississippi, Louisiana, Texas, Oklahoma, Arkansas, Kentucky, Tennessee, Puerto Rico and the Virgin Islands). The primary purpose of the regional 4-H volunteer forums is to increase the capacity of volunteer and salaried staff to contribute to the achievement of the mission of 4-H Youth Development Education and the Cooperative Extension System as a whole.

As Past Chair of the Regional Planning Committee, North Carolina 4-H staff and volunteers were responsible for completing the 2002 evaluations, serving as New Delegate Orientation Chair, and participating in all regional planning meetings and conference calls. The role of advisor to the new Chair (Florida) is also critical for the Past Chair. In this capacity, electronic files were shared, multiple teleconferences were held and additional correspondence was required to insure a smooth transition for donor and budget accountability. This year’s work included a follow up retreat for committee chairs and co-chairs from North Carolina Executive Committee (14 committees with 24 co-chairs) and a donor reception event at the North Carolina 4-H Volunteer Leaders’ Conference. North Carolina volunteers and staff also provided 15 workshops for the 2003 Forum event. The 2003 North Carolina delegation consisted of 81 volunteers and staff members.

**Program 4.**

National Parent, Family Editorial Team for the Children, Youth and Families Extension Network.

Amount Funded: $4,300

Through the annual meeting and monthly teleconference calls with the editorial board, have accomplished the following: added new to the parent/family CYFERnet database, recategorized website system to address concerns and needs of our primary audience, county-level staff and practitioners, Conducted interactive online and telephone training using the new National Education Parent Educators' Framework (NEPEF) DeBord, K., Goddard, H.W., Myers-Walls, J., Mulroy, M., Bower, D., Ozretich, R., Kirby, J., Kobbe, A. (2001), delivered seminar for 2003 CYFAR conference entitled "The Top 40 Greatest Hits" to highlight the most frequently accessed resources on the Parent/Family web site.

**Program 5.**

National Extension Parenting Educators' Framework -

Amount Funded: $8,605

Report: Report: Through collaboration with seven universities and CSREES-USDA, a national framework has been developed and is under peer review that will help drive and build the quality of parenting education outreach through Cooperative Extension. The framework has been presented at the National Council on Family Relations and is in high demand in its final form. Entities involved include Ohio State, NCSU, U. of Arkansas, U. of GA, Oregon State, U of CT., Purdue, and CSREES-USDA. This program was completed in 2002 and a website was posted in 2003. CYFAR has allocated an initial $7000 for DeBord to oversee the development of interactive online learning modules.

**Program 6.**

Extension CARES for America's Children and Youth

A National Initiative of the Cooperative Extension System that improves child care and youth programs for infants and toddlers, preschoolers, school-age children and youth, and teens in out-of-school time. The performance goals are to: increase the quality, affordability, accessibility, availability and sustainability of child care for infants, toddlers, and preschoolers, school-age care for children and youth, and programs for teens in out-of-school time.

Amount Funded: $12,520

Report: The Evaluation Committee of the School-age Initiative is charged with developing instruments and a web-based system of data collection on provider training conducted by Extension professionals. Committee members are responsible for implementing this plan in their state and acting as liaison with ECI/EC on challenges and opportunities. The Evaluation Committee also consults with individual states and agents to provide technical assistance on evaluating impacts of afterschool programs with youth and families. Ben Silliman participated in monthly teleconferences, provided research-based information on program evaluation, afterschool programming, and youth development to the project team. As a state specialist he reported on successes in and barriers to implementing the ECI online evaluation system at the county level.

---

**Summary:**

Total Extension Multistate Programs: 20

Total Smith Lever B & C funding planned: $202,160

Total Smith Lever B & C funding allocated to 18 programs for FY 2003: $371,398

**U.S. Department of Agriculture**
**Cooperative State Research, Education, and Extension Service**
**Supplement to the 5-Year Plan of Work**
**Multistate Extension Activities and Integrated Activities**
**(Attach Brief Summaries)**

**Institution** N.C. Cooperative Extension Service
**State** North Carolina

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

| | Actual Expenditures | | | |
|---|---|---|---|---|
| **Title of Planned Program/Activity** | **FY 2000** | **FY2001** | **FY2002** | **FY2003** |
| **Goal 1. A highly competitive Agricultural System** | **42,695** | **117,626** | **161,919** | **167,970** |

| | | | | |
|---|---|---|---|---|
| **Goal 2. A safe and secure food and fiber system** | **0** | **48,950** | **48,800** | **46,435** |
| **Goal 3. A healthy, well-nourished population** | **40,040** | **43,994** | **44,374** | **44,721** |
| **Goal 4. An Agricultural system protecting natural resources and the environment** | **17,471** | **19,655** | **16,835** | **16,835** |
| **Goal 5. Enhanced economic opportunity of quality of life** | **56,017** | **92,156** | **88,924** | **95,437** |
| **Total** | **$156,223** | **$322,381** | **$360,852** | **$371,398** |

**Signed by**
**Jon F. Ort** **3-12-04**

**Director** **Date**
**Form CSREES-REPT (2/00)**

# F. Integrated Research and Extension Activities

The following is the project/program names and brief descriptions of the NCCES Integrated Extension-Research programs, broken out by the respective Goal

**GOAL 1. AN AGRICULTURAL SYSTEM THAT IS HIGHLY COMPETITIVE IN THE GLOBAL ECONOMY**

| Integrated Project | ***Project #*** |
|---|---|
| **Production Strategies For Improved Vegetable Production and Alternative Crops For Diversification** | **6596** |
| **Nutrient cycling in vegetable cropping systems** | **6380** |
| **Weed management for small fruits and vegetables** | **6327** |
| **Weed management in turfgrass and** | **6453** |

| | |
|---|---|
| **forages** | |
| **Mycotoxins and their effects on dairy cattle** | **6348** |
| **Genetic improvement in pork production systems and understanding genotype by environmental interaction** | **6496** |
| **Improving reproduction and management of dairy cattle** | **6600** |
| **Genetic and production environmental influences on processing and planting quality of nutritionally enhanced soybean seed** | **6632** |
| **Management of Arthropod Pests of Turf and Peanut** | **6502** |
| **Ecology and management of European corn borer** | **0205** |
| **Plant nutrition programs for mountain crops** | **6558** |
| **Weed management and growth regulators for agronomic crops** | **6417** |
| **Risk aversion, risk shifting and alternative payment mechanisms in settlement of broiler contracts** | **6527** |
| **Fish Food Ingredients Produced By Solubilization/Reprecipitation** | **06616** |
| **Cultural Management of Strawberries and Grapes** | **6324** |
| **Economic Evaluation of Technical Change in Cotton, and Peanut Production** | **5735** |
| **Economic Decision Support For Sustainable Agricultural Production** | **6528** |
| **Use of alternative supplements in grazed, hayed and ensiled forage systems for beef cattle** | **6480** |
| **Nutritional Strategies to Improve the Growth, Productivity, and Profitability of Dairy Cattle** | **6605** |
| **Nutrient requirements of swine for profitable production** | **6495** |
| **Using Remote Sensing to Manage Nitrogen In a Corn-Wheat-Soybean Rotation** | **6425** |
| **Development and refinement of strategies for peanut production in NC** | **6466** |
| **Developing New Crops and Sustainable Production Systems For Vegetables and** | **6595** |

| | |
|---|---|
| **Medicinal Herbs** | |
| **Influence of orchard management on tree growth;<br>Rootstock and interstem effects on Pome and Stone Fruit trees** | **6196** |
| **Farming System Impacts on Strawberry and Tomato Diseases and Soil Microbial Ecology: Short and Long-Term** | **6641** |
| **Maximization of laying hen performance Economic Return, and Egg Quality** | **6184** |
| **Mountain aquaculture research** | **6153** |
| **Small fruit production systems** | **5830** |
| **Strategies to Increase Meat Goat Production** | **6701** |
| **Integrating Crops and Livestock Systems** | **6602** |
| **Price Risk Management Strategies in Food and Grains Marketing** | **6510** |
| **Integrated Peach Disease Management** | **6160** |
| **Management of Arthropods on Fruit and Vegetables** | **6402** |
| **Crop Improvement Strategies** | **6515** |

**Production strategies for improved vegetable production and alternative crops for diversification**
**Project 6596**

To meet increased demand for seedless watermelons, commercial seed companies developed new pollinizers that take up minimal space and increase production on a per acre basis, but information as to whether pollinizers will work in a commercial watermelon production system on a consistent basis is lacking. Horticulture Science faculty from North Carolina State University and the University of Florida tested three pollinizer systems in 2003, and an additional test is planned for 2004. Results indicate that an increased yield of seedless watermelon between 10 to 25% can be realized by growers who use this method.

**Rotational and compost systems in vegetable nutrient cycling**
**Project 6380**

Studies of the use of various types of compost to enhance soil microbe development were completed. The use of reactor-treated composted swine waste resulted in some crop yield reduction. Controlled microbiotic compost improved crop growth and yield in the fifth year. Compost evaluation will be continued in another study to determine if compost can be an alternative to methyl bromide.

**Weed management for small fruits and vegetables**
**Project 6327**

Palmer amaranth is a weed that drastically lowers sweet potato quality and yield. Field trails found that mowing or hand hoeing at 10 to 20 days after sweet potato transplanting prevents quality and yield reductions by this weed. Herbicide trials showed that Dual, used as a preemergence herbicide, gives good

control of Palmer amaranth. Based on these results, an emergency label for this use has been submitted to E.P.A. through the North Carolina Department of Agriculture and Consumer Services.

**Weed management in turfgrass and forages**
**Project 6453**
Research is shedding light on why weeds occur where they do in turfgrass systems. Many cultural practices influence weed occurrence. These include irrigation practices as well as design features such as topographic issues. Research shows know that many troublesome sedges occur where water drains on golf courses. Better drainage and design will help reduce weed incidence and thus reduce reliance on herbicides.

**Mycotoxins and their effects on dairy cattle**
**Project 6348**
Nutrition and feeding recommendations available to North Carolina dairy farmers are supported by research at North Carolina State University. North Carolina Cooperative Extension specialists and agents provide the latest information to dairy producers and the feed industry. Ration formulation using alternative feeds and based on feed analysis has increased annual dairy farm profits by $100 per cow. Over 80% of North Carolina dairy producers are using these feeding recommendations. Dairy producers have adopted measures to prevent mycotoxin contamination of feed and have learned to prevent and to recognize and treat problems. These adopted feed practices are estimated to have increased annual dairy farm profits by $10 million. They have also improved the safety and quality of North Carolina produced dairy products.

**Genetic improvement in pork production systems and understanding genotype by environmental interaction**
**Project 6496**
A cooperative formed with assistance from North Carolina State University initiated value-added marketing programs. A production certification and training program was developed and provided to producers. Through the North Carolina On-farm Performance Testing Program, NC State University faculty members provided muscle quality evaluations on 400 head of swine provided by 11 producers. This information has been summarized and provided to the producers along with training programs on what this data means and how to improve pork quality and receive value. Changes in management and genetics programs have been implemented to enhance the overall quality of pork products. In addition, this data has been used to secure the interest of distributors that deal exclusively with high quality pork products in both the domestic and export markets.

**Improving reproduction and management of dairy cattle**
**Project 6600**
A series of research publications, newsletter and popular press articles, and producer conferences provided information to producers about trends for declining dairy reproduction over the past 25 years. A previous and a current regional project have focused on genetic strategies to improve reproduction. As a result of these collaborative projects and through validation by the USDA Animal Improvement Programs Laboratory (USDA AIPL), a new genetic trait, daughter pregnancy rate (DPR) was included in the national dairy genetic database beginning in February 2003. With the availability of a new trait, the USDA AIPL with input from researchers at North Carolina State University and around the U.S., modified the Net Merit$ selection index to include DPR as one of the selection traits beginning in

summer, 2003. Although heritabilities of fertility traits in dairy cattle are generally low, the amount of variation in daughter pregnancy rate among sires suggests that genetic selection progress can be made.

**Genetic and production environmental influences on processing and planting quality of nutritionally enhanced soybean seed**
**Project 6632**

Soybean and peanut phytotron studies were conducted in 2003. These studies evaluated the influence of temperature during seed development on subsequent seed quality of high oleic soybeans and peanut varieties. Field studies were also conducted in 2003 to evaluate soybean planting date, row width and harvest date. Analysis will be completed in 2004.

**Management of arthropod pests of turf and peanut**
**Project 6502**

A major research effort focused on the impact of using various management strategies to minimize the incidence of tomato spotted wilt virus in peanuts. An additional study focused on the incidence of southern corn rootworm injury as related to soil characteristics, variety selection and planting date and yield impact. A publication focusing on the tomato spotted wilt virus advisory was published and was widely used by growers. This research and extension effort has produced a rootworm advisory that provides sound decision-making principles for southern corn rootworm insecticide use. The tomato spotted wilt virus risk index has been validated and presented to growers. Its full implementation took place in 2003, and research indicates that by selecting the appropriate complement of cultural practices in 2003 growers may have reduced the incidence of tomato spotted wilt virus in peanuts by over 50%.

**Ecology and management of European corn borer**
**Project 0205**

Field tests using seed coatings to protect corn from wireworms and southern corn billbug were conducted in the 2001, 2002 and 2003 growing seasons. Results were positive, and two chemical coatings, clothianidin and thiamethoxam, were commercialized for the 2004 growing season. Research data helped seed companies offer North Carolina corn growers the appropriate rates for wireworms (low) and billbugs (high). A vigorous outreach campaign educated growers, county agents and dealers of the advantages of this new technology. Insect control, human safety, and the environmental all benefit by replacing old insecticides with clothianidin or thiamethoxam seed coatings. Both compounds are much less toxic and safer for the grower to use. The new products are short-lived in the environment, have a very good environmental profile, and are used at rates from 92% to 99% lower than the products they are replacing. Since they are delivered on the seed, pesticide containers are not used, reducing exposure to the grower as well as solving container disposal problems. The new products also save time and effort. New seed treatments are priced competitively with older products but benefit the grower with improved yields. Tests showed insect control to be improved by as much as 40%, resulting in a potential profit of over $50 per acre under heavy insect pest conditions.

**Plant nutrition programs for mountain crops**
**Project 6558**

An under-the-row pre-plant method of applying phosphorus fertilizer to Christmas trees was developed and is being tested at two experiment stations and at nine on-farm locations in Western North Carolina. The method is still being tested, but increases in tree phosphorus content have been measured. If this method works as well as expected, it will drastically reduce phosphorus fertilizer applications to Christmas trees.

**Weed management and growth regulators for agronomic crops**
**Project 6417**
Italian ryegrass is the most serious weed problem in wheat across the Southeast. If uncontrolled, ryegrass can reduce wheat yields 30 to 90%. Growers have had to rely on a single herbicide to control ryegrass for the past 20 years, and as a result, resistance is now widespread. Research identified effective replacements and how best to use them. The research effort has produced the data needed to develop recommendations and educational programs on use of these new technologies as they become commercialized. The potential benefits for wheat producers could exceed $22 million.

**Risk aversion, risk shifting and alternative payment mechanisms in settlement of broiler contracts**
**Project 6527**
Virtually all broiler companies use incentives to compensate their contract growers. Changes in production technology designed to meet consumer demand require that compensation mechanisms be updated or entirely redesigned. When a North Carolina company found that its existing payment scheme did not provide correct incentives to growers producing heavier birds, the company asked for help from North Carolina State University in redesigning their broiler production contract payment mechanism. After discussing the issue with division managers and carefully reviewing the production data, an NC State faculty member provided several alternative to the existing payment mechanism.

**Functional Fish food ingredients produced by solubilization/reprecipitation**
**Project 6616**
Considerable quantities of edible meat from trimmings and deboned carcasses of meat, poultry and fish are wasted, and many smaller pelagic fish species are hardly utilized for food, being converted primarily to fish meal for animal feed. North Carolina State University researchers, working in conjunction with colleagues at the University of Massachusetts and the University of Florida, developed two important processes to address this challenge. A new method of recovering and refining such meats, which removes fat, connective tissues (including skin) and bone, was developed and is being commercially scaled. And a method of solubilizing and injecting this meat protein into intact fillets and cuts of meats, poultry and seafoods was developed. In tandem these technologies enhance the texture and taste of meat, poultry and fish products while reducing the cost to consumers. The new meat recovery method also reduces treatable effluent from meat, poultry and seafood processing factories.

**Cultural management of strawberries and grapes**
**Project 6324**
North Carolina strawberry growers faced an epidemic in the fall of 2003, when anthracnose was diagnosed in plug plants being grown in North Carolina from Canadian tips. North Carolina State University faculty members implemented an emergency program to aid growers. Faculty members traveled throughout the state to inspect numerous plug propagation facilities, while plant samples were processed at the NC State University Plant Disease and Insect Clinic. Growers received timely advice not only about the disease status of their plug plant material but also on whether it would be best to seek an alternative plant supply. Locating anthracnose-free alternative plant supplies proved difficult; there were few runner tips or plugs available from other plant suppliers. A nursery was able to furnish several million fresh dug plants to many former plug growers, who were uncomfortable with receiving fresh dug replacement plants from the same nursery supplier experiencing anthracnose problems in its runner tip production. The plant supplier could not completely make up for the deficit of plug plants across the region, so it became critical in late August to inspect fresh dug plants being grown in Canada as the next

best alternative. Faculty members developed a nursery sampling procedure for collecting petioles from mother plants in fresh dug strawberry nursery fields. A faculty member flew to Canada and systematically sampled 800 mother plants in over 20 acres of fresh dug nursery fields. This plant material was brought through U.S. customs, then kept refrigerated until delivered to an NC State University lab, where it was determined anthracnose was present in one of the two nursery fields. Nursery distributors were promptly advised to ship to North Carolina growers only plant material from healthy fields. Faculty also worked to familiarize hundreds of farmers with the very different planting and transplanting procedures required for setting highly perishable fresh dug plants. It was not clear early in 2004 how successful this emergency response effort was; however, growers have expressed appreciation for on-line advisories as well as an on-farm demonstration and publications developed to address the situation. Faculty are also working with colleagues at the University of Guelph, the Ontario Strawberry Plant Propagation Program and the New Liskeard Agricultural Research Station of the University of Guelph in Northern Ontario to improve the supply of anthracnose-free planting stock coming to North Carolina to reduce future economic losses to this disease.

**Economic evaluation of technical change in cotton and peanut production**
**Project 5735**
North Carolina State University faculty analyzed commodity buyout programs and the economic impact such programs are likely to have on farmers and rural communities. Information and consultation has been provided to the U.S. Department of Agriculture as well as farm groups and others interested in the impact of buyout programs.

**Economic decision support for sustainable agricultural production**
**Project 6528**
A framework was developed to measure sustainability at the farm and field level. This framework takes into account the technical-economic and environmental-ecological tradeoffs of ecological and production processes. The framework can accommodate various sustainability indicators that are selected depending on the specific biophysical and institutional setting. The indicators are placed in relation to their corresponding spatial scale. Depending on the purpose of the analysis, each indicator can be aggregated and used at higher spatial scales.

**Use of alternative supplements in forage systems for beef cattle**
**Project 6480**
The North Carolina Grazing Schools have impacted grazing practices throughout the state. Since the inception of the program, 525 students have been trained in 28 schools/seminars. Students rated the impact of the program on their ability to manage their farms highly (4.5 on a 1 to 5 scale) and unanimously indicated they would recommend the program to other producers. Two producer grazing schools and a 9-day school for NRCS and extension professionals were conducted in 2003.

**Nutritional strategies to improve the growth, productivity and profitability of dairy cattle**
**Project 6605**
Dairy cows were fed a diet with lower crude protein in which the protein was less degradable in the rumen and was balanced for a 3:1 ratio of the amino acids lysince and methionine. In a study of cows fed this diet, milk production was maintained while nitrogen excretion to the environment was reduced by 18%.

**Nutrient requirements of swine for profitable production**
**Project 6495**

Reducing phosphorus excretion by using phytase in sow diets was investigated in cooperation with four other states in a multi-year project. It is anticipated that phytase can be used to replace a portion of the phosphorus in the diet and reduce phosphorus excretion by approximately 30% without affecting reproductive performance. Completion of this project is anticipated in September 2004. In addition, work is underway to reduce the environmental impact of swine production by removing fiber fractions from corn through processing (dehulled, degermed corn). Effects of dehulled, degermed corn and extruded corn on growth performance of nursery pigs, growing-finishing pigs and sows were minimal. However, nutrient excretion was reduced in pigs fed processed corn products. Effects on odor are being analyzed.

**Precision agriculture for agronomic crops and nitrogen management for corn in Eastern North Carolina**
**Project 6425**

Field studies in 1998 and 1999 in North Carolina proved the value of variable rate PIX application to cotton and the feasibility of using aerial infrared images to scout fields to determine PIX rates. In 2003, further study was done to determine the accuracy of aerial scouting in determining PIX rates across a field and to determine the savings in terms of time and total amount of PIX applied. These tests found that: 1) site-specific PIX rates could be determined quickly and accurately with less field time and labor compared to other systems and 2) this system resulted in a 22% reduction in the amount of PIX applied. Based on the savings in labor and PIX observed in this study, aerial scouting reduces grower costs by $27 per acre scouted. Using the number of acres currently scouted for PIX application in the blacklands of North Carolina, this would result in an increase in grower income of $405,000.

**Cultural and pest management for optimum and stable peanut production**
**Project 6466**

Results of tillage studies indicate that reduced tillage systems can be as successful as conventional tillage systems for peanuts in some but not all situations. It appears that peanuts produced in reduced tillage systems on coarse-textured soils respond equally as well as conventional tillage systems. In contrast, positive peanut response to reduced tillage systems on fine-textured soils may be less consistent. Results from the tillage by variety by digging date studies suggest that inconsistencies noted among tillage practices that have been reported previously most likely are not associated with variety selection or digging date. A risk advisory will be published early in 2004 to assist growers in transitioning to reduced tillage systems for peanuts.

**Developing new crops and sustainable production systems for vegetables and medicinal herbs**
**Project 6595**

Heirloom vegetables are increasingly popular among U.S. consumers, and the most popular of these are tomatoes. Most heirloom tomatoes are very soft and do not ship well. As a result, heirloom tomatoes are almost always grown for local sales. In 2002 and 2003, a large number of heirloom tomato varieties were grown at the Mountain Research Station in Waynesville, North Carolina. Field days were held to introduce growers to the varieties and demonstrate the production systems needed to grow them. To judge consumer acceptance and interest, taste tests, market surveys and test market trials were conducted at the Waynesville Tailgate Market, local roadside stands, a supermarket, the Western North Carolina Farmers' Market and the Grove Arcade in Asheville, N.C. A foodservice survey was also conducted. Heirloom tomatoes generated tremendous interest among growers and local consumers. Growers indicated they would grow more heirlooms tomatoes in 2004, while consumers indicated that they would buy heirloom tomatoes if they were available. Local retailers and restaurants are interested in learning how to make arrangements with local growers to supply heirloom tomatoes throughout the growing season.

**Post-harvest quality maintenance of horticultural products; Influence of orchard management on tree growth; Rootstock and interstem effects on Pome and Stone Fruit trees**
**Projects 6717, 6196 and 1840**
Faculty at North Carolina State University developed a system that allows commercial apple operations in North Carolina to use SmartFresh, a postharvest product that extends the shelf life of horticultural crops. Apples treated with SmartFresh maintain their firmness, crunch and acidity much longer after harvest and even after being held at room temperature. Working with growers, NC State faculty showed it is possible to treat apples with SmartFresh in refrigerated trailers. Apples treated in this manner maintained their quality much longer than untreated apples. Based on this work, North Carolina growers have indicated an interest in treating their apples with Smartfresh. The economic benefit to North Carolina should be significant in that it will allow growers to maintain the high quality of North Carolina apples longer, which should extend the apple season as well as open new markets.

**Farming system impacts on strawberry and tomato diseases and soil microbial ecology: short and long-term**
**Project 6641**
Interdisciplinary, multi-state and (stakeholder) participatory research, extension and educational programs were implemented to evaluate, adopt and develop alternatives to the use of methyl bromide in strawberry and vegetable production systems. Twenty four Phase I trials (replicated trials on research stations) and 13 Phase II trials (demonstration or replicated trials on farms) were implemented from 2000 through 2003. Research focused on development of integrated approaches to manage key soilborne pests. The chemical alternatives Telone-C35, metam sodium, chloropicrin, and iodomethane produced yields equivalent to plots fumigated with methyl bromide on strawberries in North Carolina. Parallel work was done in vegetable production systems with an emphasis on tomatoes.

**Maximization of laying hen performance, economic return and egg quality**
**Project 6184**
A North Carolina State University faculty member directed and gave key presentations at the National Egg Quality School. The school is designed to give students the latest information about egg quality and the factors affecting quality. In 2003, 60 students from 20 states, one U.S. territory and Mexico joined more than 44,732 alumni from around the world who have attended this school or the Eastern/Midwest Schools over the past 73 years.

**Mountain aquaculture research**
**Project 6153**
North Carolina trout farmers have historically reported losses of up to 30% of their trout to disease. Research and demonstration work by North Carolina State University faculty members led trout farmers to a vaccine that has cut disease loss dramatically, particularly from enteric redmouth, often the most damaging disease with which growers must deal. *Yersinia ruckeri*, the causative agent of enteric redmouth disease, was reported as the primary cause of trout loss until recently, but adoption of better vaccination methods reduced mortalities from that disease and from diseases overall. Now, another method of protecting trout may be on the horizon. Working with colleagues from the National Center for Cold and Coolwater Aquaculture, NC State researchers have isolated and began genomic evaluation of a bacteriophage specific to *Yersinia ruckeri*. The virus, isolated from a trout farm in North Carolina, is lethal to the *Y. ruckeri* bacteria and may prove to be a valuable tool in the management of enteric redmouth on trout farms.

**Small fruit production systems**
**Project 5830**
Faculty at North Carolina State University identified several viruses that are likely associated with the decline of some blackberry plantings in North Carolina. The North Carolina State University Micropropagation Unit has virus tested and established in tissue culture virus-indexed nuclear stock of most of the commonly grown varieties. The certification standards will enable North Carolina to become the only state in the Southeastern U.S. to have certified blackberry nurseries. This could enable North Carolina to become the leading supplier of clean blackberry nursery stock in the region.

**Strategies to increase meat goat production**
**Project 6701**
North Carolina State University faculty members played an integral role in the organization of the North Carolina Meat Goat Producers Coop and continue to work with the organization. As a result, 400 farm families from 65 counties and four states are now certified members of the cooperative. Training sessions were held to certify 33 North Carolina Cooperative Extension agents interested in working with district affiliates of the cooperative. As a promotional effort, interested chefs from upscale restaurants were offered goat carcasses or cuts for free to add to their menus. Goat tasting days were held at the Raleigh and Greensboro farmers markets, the North Carolina State Fair and other events. Income was generated from direct sales of live meat animals and breeding stock and through an annual breeding stock sale. A coop website was developed and goat meat can be ordered on-line. The coop also works with three slaughtering/processing plants.
**Integrating crops and livestock systems**
**Project 6602**
North Carolina State University's Center for Environmental Farming Systems is providing significant educational activities for students, agricultural professionals and farmers. The center also provides important information on organic production practices and long-term systems research. The recently instituted Third Thursday Program provides a monthly workshop on a wide range of activities for agricultural professionals and farmers. The center is also a regional model for sustainable agriculture research and education. In 2003 a range of groups and organizations visited the center. These included groups from Duke University's, Nicholas School of the Environment, Auburn University's Agricultural Experiment Station, the North Carolina Environmental Coalition and the Natural Resources Conservation Service National Pasture Ecology Workshop. Wes Jackson from the Land Institute in Salina, Kansas also visited the center.

**Price risk management strategies in food and grains marketing**
**Project 6501**
Research done at North Carolina State University in collaboration with faculty at Kansas State University on the impact of food safety on meat demand suggests consumers respond differently to food safety concerns versus long-run health concerns. In particular, a meat demand model developed as part of this research effort indicates that, in general, there are no lagged effects on U.S. meat demand from publication of food safety information. This suggests that, although demand declines in the short-run in response to a food safety problem, consumers generally do not allow the food safety problem to impact their long-run consumption habits. It appears that only repeated food safety problems, which keep the issue in front of consumers for an extended period of time, lead to an ongoing adverse impact on demand. This research may be applicable to the discovery in December 2003 in Washington state of a dairy cow that tested positive for bovine spongiform encephalopathy, or mad cow disease.

**Integrated peach disease management**
**Project 6160**
Consumers expect high-quality, blemish-free peaches with bright red skin color, among other characteristics. Many of the cultivars with these characteristics are highly susceptible to a bacterial disease, bacterial spot, that can render the fruit unacceptable. Some years the incidence of diseased fruit is more than 90% while in other years the same trees may have less than 10% diseased fruit. Growers often waited to observe the disease before applying the limited chemicals available. The use of chemical sprays in this manner failed to provide adequate disease control. After analyzing weather data, North Carolina State University researchers determined that in years when the disease was severe there were frequent periods of rainfall during bloom and in the following three to four weeks. Sprays containing copper were applied prior to and during this period. This research has defined the critical fruit infection period as occurring early in the growing season near time of bloom rather than continually until fruit have ripened, thus potentially reducing the number of sprays while reducing fruit lost to this disease. The management strategy developed from this research is the basis for chemical control of bacterial spot on peaches in the Eastern U.S.

**Management of arthropods on fruit and vegetables**
**Project 6402**
An effort to manage the development by twospotted spider mites on tomatoes of resistance to various miticides was begun. Twospotted spider mite populations were collected from different locations, and dose-response curves were determined for a range of new miticides entering the market place. This serves as base-line information for future monitoring of resistance development. Crop and non-crop habitats were monitored for mites from March through September in Rowan County, North Carolina to monitor movement of twospotted spider mite during the season.

**Crop improvement strategies**
**Project 6515**
Greenhouse growers rely mainly on visual monitoring of a crop to determine the nutrient status of the crop, a method that can be costly if pH or electrical conductivity (EC) values are not optimal. In an effort to find a better way to monitor crop nutrient status, faculty at North Carolina State University studied methods of conducting in-house testing using the PourThru Nutritional Monitoring program. The required techniques were refined, crop specific recommended ranges for pH and EC developed, charts for plotting trends developed and corrective measures listed. A 3-hour presentation was developed to explain the monitoring program to growers. Growers who have attended this presentation are now monitoring their crops and using the program to prevent losses. One grower who used the program discovered that pH was excessively low. The grower was able to correct the problem and salvage a $10,000 crop.

**GOAL 2**
**A SAFE AND SECURE FOOD AND FIBER SYSTEM**

| | |
|---|---|
| **Transport phenomena in agricultural and biological processes** | **5885, 6482** |
| **Improvement of thermal processes for foods; aseptic processing and packaging** | **0836 5661** |

| | |
|---|---|
| **studies.** | |
| **The poultry food system: A farm-to-table model** | **0292** |

**Transport phenomena in agricultural and biological processes**
**Projects 5885, 6482**
Faculty at North Carolina State University have developed a radiant frying process that does not use oil. This process uses a spectrum of radiant energy of variable power and frequency in which fried characteristics can be imparted to the food without requiring immersion frying in oil.

**Improvement of thermal processes for foods; aseptic processing and packaging studies**
**Projects 0836 05, 5661**
The first pilot-plant scale installation (60 kW) of a focused continuous flow microwave system for thermal processing of foods and biomaterials was completed. This system has been integrated with existing aseptic processing and packaging equipment and tested in the Center for Aseptic Processing and Packaging pilot plant. Four faculty programs are taking advantage of this unique facility.

**The poultry food system: A farm-to-table model**
**Project 0292**
A study was done to generate bacterial transfer data that could be incorporated into a microbial risk assessment model for evaluating the degree of risk to human health associated with poor handling practices of ready-to-eat food products. The degree of transfer of *Campylobacter jejuni* and *Salmonella enterica* serovar Typhimurium was evaluated from a stainless steel contact surface to a ready-to-eat food (lettuce). This study indicated that relatively high numbers of bacteria may be transferred to a food even 1 to 2 hours after surface contamination. Consequently, there is a need for continuous disinfection practices to reduce contamination levels available for transfer as the risk of transfer of contamination is constantly present.

## GOAL 3
## A HEALTHY, WELL-NOURISHED POPULATION

**No research projects are currently underway.**

## GOAL 4
## AN AGRICULTURAL SYSTEM WHICH PROTECTS NATURAL RESOURCES AND THE ENVIRONMENT

| | |
|---|---|
| **Environmental nursery crop production** | **6224** |
| **Evaluation and modeling of riparian buffer performance in the Neuse River Basin** | **6609** |
| **Economics of adoption of agricultural technologies in waste treatment of swine** | **6610** |
| **Precision agriculture for agronomic crops and nitrogen management for corn in Eastern North Carolina** | **6652** |

| | |
|---|---|
| **Integrated vegetation management in non-cropland environments** | **6305** |
| **Nutrient and by-product utilization and health of turkeys and broilers** | **6343** |
| **Effect of management on turkey production, turkey reproduction and turkey waste handling** | **6390** |
| **Community-Wide Impacts and Management of Septic Systems** | **6372** |
| **Biology and control of Nuisance Vector Arthropods in NC** | **6479** |
| **Improved efficiency of water reuse aquaculture systems** | **3975** |
| **Bioavailability, transport and fate of contaminants in aquatic eco systems** | **6509** |
| **Evaluation of Tillage Practices, Organic Production, and trickle Fertigation for Nutrient Management** | **6648** |
| **Community-wide impacts and management of Septic Systems** | **6372** |
| **Animal Manure and Waste Utilization, Treatment and Nuisance Avoidance** | **1000** |

**Environmentally compatible nursery crop production practices**
**Project 6224**

The value of adding clay to soilless nursery container substrates has been debated since 1964. Even though amending pine bark substrates with clay would appear to have many potential benefits, there is little empirical evidence to definitively answer this question. Research at North Carolina State University evaluated different clay particle sizes and temperature pretreatments. Plant growth was comparable for all treatments, measured by shoot and root dry weight. All treatments with clay additives used less water than the pine bark and sand control substrate. Water savings varied from 9 to 18%, resulting in 3 to 6 gallons less water used per 5 gallon container to produce the same growth as control substrate. Water savings were greater with the smaller particle size. The smallest particle size saved 13.5 ounces per pot per day. Researchers calculated that savings per season per growing acre could amount to 100,000 gallons of water. Heat treatment of the industrial clays seemed to make no difference on water application rate.

**Evaluation and modeling of riparian buffer performance in the Neuse River Basin**
**Project 6609**

A study is being conducted to compare the effect of riparian buffer vegetation type and width on shallow groundwater quality in the Coastal Plain region of North Carolina. Collection of surface and shallow groundwater samples continued at prescribed intervals in 2003. Redox instrumentation and measurements also continued. This study indicates that riparian buffer effectiveness is closely linked to the site hydrology, and that implementation of riparian buffers without knowledge of site hydrology may lead to minimal water quality benefits.

**Economics of the adoption of agricultural technologies**
**Projects 6610, 9676**
North Carolina State University faculty members secured funding for four North Carolina Cooperative Extension county agricultural agents to attend the Southern Outlook Conference in Atlanta and attended the conference with the agents. Attendance improved the agents' ability to obtain the correct information to produce their own economic outlook presentations to be given in their counties and in surrounding counties. The trip also sparked the agents' enthusiasm about economic issues and their capability to analyze such issues to the betterment of the farmers with whom the agents work.

**Precision agriculture for agronomic crops and nitrogen management for corn in Eastern North Carolina**
**Project 6652**
Nitrogen fertilizer management guidelines such as optimizing nitrogen rate and placement have been refined and, in some cases, used with precision farming tools. This information is included in ongoing education programs for farmers and county agents. This program enhances voluntary adoption of best management practices and generates acceptance of mandatory practices needed to achieve nutrient reduction goals for runoff into rivers.

**Integrated vegetation management in non-cropland environments**
**Project 6305**
Weeds in aquatic and non-cropland environments interfere with intended uses of the areas, pose a potential threat to human health or safety and cost millions annually for management. Seed germination tests and greenhouse studies on tree of Heaven, a serious pest tree along highway rights-of-way, found that immature seeds could germinate and that even small root fragments left in place could resprout. This research showed that mowing would lead to more serious infestations along roadsides and, ultimately, could cost the taxpayers more money for roadside vegetation maintenance. Studies on the control of variable-leaf watermilfoil, a serious pest in ponds, showed that the timing of aquatic herbicide fluridone applications was critical to successful control. Early spring treatment gave excellent results, whereas mid-summer treatment gave only partial milfoil suppression, with complete regrowth by the end of the season. This research will provide taxpayers and private pond and lake owners a more effective tool for management of this weed, while saving thousands of dollars that might be otherwise wasted by applying the treatments too late in the season. This project was concluded during 2003 with the departure of the PI.

**Nutrient and by-product utilization and health of turkeys and broilers**
**Project 6343**
A new technology called *in ovo* feeding (administration of nutrients into the amnion of embryos) was developed to improve early enteric development of poultry and improve resistance to enteric disease. *In ovo* feeding of solutions containing protein and amino acids increased early growth rate by 3 to 10% over controls. Enteric development was accelerated 48 hours after *in ovo* feeding, such that the *in ovo*-fed birds had a similar gut at hatch as 2-day-old control birds. This technology was patented and is being transferred to the poultry industry for further research and development. Information from this program was disseminated to the poultry industry by extension demonstrations, county and state-wide meetings, workshops, conferences and popular press.

**Effect of management on turkey production, turkey reproduction and turkey waste handling**
**Project 6390**

A novel poultry litter material called agro-chips made from old newsprint, cotton waste and gypsum was evaluated to determine its suitability as an alternative to the pine shavings now widely used. An experiment was conducted to examine the effect of litter type on commercial turkey tom and hen performance. Birds reared on pine shavings were compared to birds reared on agro-chips. All the pens in this study had considerable caked litter by the end of the rearing period. Further testing under field conditions is desirable to compare agro-chips litter to pine shavings under commercial conditions; however, this study indicated that agro-chips litter is a potential alternative litter material to pine shavings, especially during the brooding period when relatively little litter caking occurs.

**Communitywide impacts and management of septic systems**
**Project 6372**
This project is analyzing the flow dynamics and nitrogen removal (on a mass basis) from on-site septic systems serving selected homes in a small watershed within the Neuse River Basin. Total potential nitrogen contributions due to septic systems across the state exceed 30 million pounds per year without accounting for losses due to plant uptake, denitrification or in-stream removal. Depending on the watershed, septic system use in North Carolina ranges from less than 40 percent to more than 80 percent of the population. Density of septic system usage exceeds 40 systems per square mile (a level proposed by Environmental Protection Agency as high) in the Catawba, White Oak and Pasquotank River basins. Total potential nitrogen contributions within the Neuse River Basin exceeds 4 million pounds per year, a significant level compared to total potential nitrogen contributions due to urban lawn fertilization (3 million pounds per year) and agriculture (84 million pounds per year). Further research will refine this estimate of nitrogen due to septic system usage.

**Biology and control of nuisance vector arthropods in North Carolina**
**Project 6479**
The vertebrate animals fed upon by mosquitoes in Memphis County, Tennessee are being investigated in a collaborative project involving the University of Alabama and the Centers for Disease Control and Prevention, Division of Vector-borne Infectious Diseases. The goal of the project, which continues in 2004, is to determine which species of birds are utilized as hosts by mosquitoes in areas where West Nile virus transmission occurs. Results of the project should help to elucidate which bird species are reservoirs of West Nile virus.

**Improved efficiency of water reuse aquaculture systems**
**Project 3975**
North Carolina State University faculty members conducted a demonstration and evaluation of the BenRad water purification system in intensive aquaculture applications during 2003. BenRad AB is a Swedish firm specializing in the development of new technology for sterilizing water. The water purification system was evaluated for use in intensive fish farming. An initial test was completed in late 2003. While the unit (when clean) provided a 99.7% kill of total coliform bacteria, the results were variable when the unit became coated with minerals from the water. This study continues in 2004.

**Bioavailability, transport and fate of contaminants in aquatic ecosystems**
**Project 6509**
The common carp, Cyprinus carpio, was used as a biomarker to evaluate the presence of estrogenic chemicals in Falls Lake, the drinking water supply reservoir for Raleigh, North Carolina. Mean plasma vitellogenin concentrations in Falls Lake carp were consistent with concentrations expected in normal,

sexually mature male and female fish of the species, indicating that the carp and by extension, the people of Raleigh, had not been exposed to estrogenic chemicals.

**Evaluation of tillage practices, organic production, and trickle fertigation for nutrient management**
**Project 6648**
North Carolina State University scientists have developed conservation tillage systems that reduce or eliminate water and soil runoff from farm fields. A majority of farmers across Western North Carolina, where the terrain tends to be steep and erosive, have adopted these conservation tillage practices for corn production. Farmers have started to use these methods for tobacco and vegetables. Farmers using conservation tillage and winter cover crops leave plant residue on the soil surface. This surface coverage reduces water and soil runoff to streams and improves water infiltration into the soil, reducing irrigation costs.

**Community-wide impacts and management of septic systems**
**Project 6372**
On-site wastewater systems account for 50% of the wastewater treatment systems in North Carolina. The current best management practices for siting systems may lead to premature failure of systems. Research at North Carolina State University has shown that the current method of assessing soil wetness overestimates the depth to seasonal wetness. Seasonal wetness is a major cause of system failure, thus overestimating its depth results in systems being installed too deep in the soil, which can lead to premature failure. Locating and installing systems shallower in the soil based on revised soil criteria may save the cost of repairing or replacing a failing system. Approximately $70 million is spent annually to repair failed systems. Proper siting of systems based on more conservative soil criteria could save North Carolinians upwards of $35 million as well as alleviate an environmental and public health risk.

**Animal manure and waste utilization, treatment and nuisance avoidance**
**Project 1000**
A substantial portion (estimated at 40-60%) of manure produced by swine is directly related to the fiber content of the diet fed. Removing this fiber prior to feeding may reduce nitrogen and organic waste production. Corn was processed to remove hulls and germ, both high-fiber components, leaving the endosperm as a feed ingredient for pigs. Feeding pigs degermed, dehulled corn reduced waste production by approximately 40% while possibly reducing odor emission without negative effects on animal performance. Degermed, dehulled corn has the potential to reduce manure production substantially without negative effects on animal performance.

| **GOAL 5**<br>**ENHANCED ECONOMIC OPPORTUNITY AND QUALITY OF LIFE FOR AMERICANS** |
|---|

| | |
|---|---|
| **Implications of Technological and Social Changes for the Food System** | **6565** |

**Implications of Technological and Social Changes for the Food System**
**Project 6565**
Researchers have analyzed consumer acceptance and behavior related to biotechnology over time and across many countries. At the same time, a range of stakeholder groups from leading academic, business and government organizations have been polled on biotechnology issues. These efforts have provided

insight that has aided in the development and regulation of agricultural biotechnology and improved private and public sector decision making related to biotechnology.

---

**Summary:**

**Integrated Extension-Research Projects reported: 52**

**Smith Lever B & C funding Planned: $1,732,784**

**Total Smith Lever B & C funding allocated to the 52 projects for FY 2003: $2,052,015**

---

**U.S. Department of Agriculture**
**Cooperative State Research, Education, and Extension Service**
**Supplement to the 5-Year Plan of Work**
**Multistate Extension Activities and Integrated Activities**
**(Attach Brief Summaries)**

**Institution** N.C. Cooperative Extension Service
**State** North Carolina

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

| | Actual Expenditures | | | |
|---|---|---|---|---|
| **Title of Planned Program/Activity** | **FY 2000** | **FY 2001** | **FY 2002** | **FY 2003** |
| Goal 1. A highly competitive Agricultural System | 337,491 | 456,627 | 1,131,749 | 1,405,681 |
| Goal 2. A safe and secure food and fiber system | 30,893 | 98,804 | 100,795 | 93,558 |
| Goal 3. A healthy, well-nourished population | 0 | 0 | 0 | 0 |
| Goal 4. An Agricultural system protecting natural resources and the environment | 382,620 | 328,702 | 432,398 | 508,130 |

| | | | | |
|---|---|---|---|---|
| **Goal 5. Enhanced economic opportunity of quality of life** | **81,456** | **79,605** | **55,222** | **44,646** |
| **Total** | **$832,460** | **$963,738** | **$1,720,164** | **$2,052,015** |

**Signed by**
**Jon F. Ort** **3-12-04**

**Director** **Date**

**Form CSREES-REPT (2/00)**