# NORTH CAROLINA

# COOPERATIVE EXTENSION

## *AREERA POW REPORT*

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

**2002**
**(submitted February, 2003)**

**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: 2002 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 in 2001 and 2002.**

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## *INTRODUCTION*

To achieve their shared land-grant missions, the College of Agriculture and Life Sciences at NC State University and the School of Agricultural 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 -- one that changes as circumstances indicate it should. The plan encompasses 20 major programs that focus

on five major areas of concern statewide:

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

To achieve the plan's 75 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 ten objectives within the 20 major programs that specifically target limited resource audiences. A major portion of Extension at NC A&T is guided by these ten 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 the North Carolina Cooperative Extension program impacts through 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 program results reflect Cooperative Extension's program impacts resulting from educational opportunities to help North Carolina's 8 million citizens address critical challenges facing them today and in the future.

Funding for these 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 on the NCCES Web site at http://www.ces.ncsu.edu/, and then to http://www.ces.ncsu.edu/AboutCES/, and at the North Carolina A&T State University Web site at http://www.ag.ncat.edu/extension/index.htm.

# A. FY 2002 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 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. Crop farmers were faced with very low prices for many traditional farm commodities as well as the effects of a statewide drought, but continued large federal and state government payments prevented a major financial disaster. Other issues potentially affecting agricultural competitiveness and profitability included 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 almost 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 bioterriorism from continuing threats associated with homeland security and terrorism provided added impetus to, and created an incentive to expand the scope of an emergency animal response program that was initiated in the aftermath of the 1999 hurricanes. 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.

Tobacco companies continued to increase the amount of tobacco they would buy through marketing contracts with growers, bypassing the traditional auction. 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.

Low commodity prices for traditional row crops, continued chaos facing tobacco quotas and uncertainty about profitable opportunities for many traditional enterprises 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 types 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. This latter factor regarding risk management helped producers to better adapt to the severe drought that impacted the entire state, and resulting yield and performance reductions. 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.

## Key Theme: Agricultural Competitiveness

a. Crop farmers, farm organizations, and agribusiness's will become knowledgeable of local and global market factors and develop strategies to cope with or take advantage of these factors to maximize farm profits.

b. Program Accomplishments: 3,620 program participants increased their knowledge of the impacts of global market trends and trade policies. 778 participants adopted practices associated with new products. 1,336 participants adopted practices that impacted marketing successes. Estimated financial impacts included $2,150,436 in increased profitability through adoption of local and global marketing strategies and $1,721,050 increased profits through adoption and marketing of new products.

c. Smith-Lever Act funds and State funds.

d. State Specific

**Key Theme: Agricultural profitability**

a. 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. Program accomplishments include increased awareness and knowledge of best management production practices by 19,699 individuals. This total included 673 dairy producers, 9,588 beef cattle producers, 2,124 hog producers, 1,188 horse producers, 3,068 sheep and goat producers, 2,637 poultry producers, and 421 producers of aquatic species.

10,176 producers adopted best management practices that optimized income, including 274 dairy producers, 3,440 beef cattle producers, 837 hog producers, 2,213 horse producers, 1,506 sheep and goat producers, 1,665 poultry producers, and 241 producers of aquatic species.

4,277 producers applied improved farm financial planning practices and procedures. This included 144 dairy producers, 968 beef cattle producers, 628 hog producers, 796 horse producers, 541 sheep and goat producers, 1140 poultry producers, and 60 producers of aquatic species.

c. Smith-Lever Act funds and State funds.

d. State Specific

## Key Theme: Agricultural profitability

a. Tobacco and peanut farmers will be assisted in evaluating alternative production practices to ensure continued farm productivity and enterprise profits.

b. Program accomplishments include the adoption of practices such as field selection, pest management, improved varieties, harvest techniques, and equipment adaptability. The number of producers adopting these practices was 3,008 and 145,550 acres were impacted. The financial impact of adopting these practices was estimated to be $12,940,683.

c. Smith-Lever Act funds and State funds.

d. State and Multistate

## Key Theme: Agricultural profitability

a. Farmers will continue to evaluate recommended or conventional production practices and management systems, integrating them into sustainable farming systems.

b. Program Accomplishments: 8,369 producers adopted best management practices in such area as pest control, tillage, fertilization, labor management, etc, that increased their yields. 20,172 producers increased their knowledge of production systems. 4,784 producers adopted practices that lowered production costs or kept production costs below income from the farm. 624,275 acres were affected.

The financial impacts were as follows: Increased profits through adoption of practices such as choice of high yield varieties, tillage, pesticide application timing, improved marketing of $10,857,735 and reduced costs through improved pest management of $4,947,149.

c. Smith-Lever Act funds and State funds.

d. State Specific

## Key Theme: Animal Health

a. In response to the devastating effects of Hurricane Floyd on the livestock industry of eastern North Carolina (and on domestic companion animals), 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, and has been help up as a model program for protecting animal health and welfare. 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. 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., Duplin, Robeson, Anson). 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. Smith-Lever Act funds and State funds.

d. State Specific

## Key Theme: Diversified/Alternative Agriculture

a. 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. Performance measures include 3,310 producers who adopted new market options and 1,687 producers who gained an increased knowledge of alternative production systems. A total of 175,943 acres were affected. The increase in profitability through the adoption of new marketing options was estimated to be $25,866,216.

c. Smith-Lever Act funds and State funds.

d. State Specific

## Key Theme: Diversified/Alternative Agriculture

a. Producers will identify, create and develop alternative agricultural opportunities and enterprises.

b. Program Accomplishments: 7,264 producers gained knowledge about alternative production and market practices. 2,274 producers indicated an interest in developing alternative enterprises and producers tried alternative enterprises, methods, and practices. $2,000,982 was invested in the production and marketing of alternative enterprises and $3,748,980. in gross income resulted from this new investment.

c. Smith-Lever Act funds and State funds.

d. State Specific

## Key Theme: Small Farm Viability

a. Limited resource 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. 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. Program Accomplishments: 1071 limited resource producers increased their awareness and knowledge of best management production practices. 458 producers adopted best management practices that optimized income. 147 producers adopted improved farm financial planning practices and procedures. Estimated financial impacts on producer income were $255,211. This included income that resulted from improvements in animal nutrition, breeding practices, marketing, buildings and facilities, and health and general management practices.

c. Smith-Lever Acts funds and State funds.

d. State Specific

## Key Theme: Small Farm Viability

a. Part-time and limited resource farmers will increase the sustainability of their farms through crop diversification, intensive management practices, water and nutrient 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. Program Accomplishments: 2,787 producers adopted best management practices such as nutrient management, etc. on 24,623 acres. 1,553 producers increased their knowledge of marketing options and 838 started to use multiple markets. 1411 producers increased their knowledge of irrigation and management systems and 532 producers adopted new crops on 3,340 acres.

c. Smith-Lever Acts funds and State funds.

d. State Specific

## Key Theme: Small Farm Viability

a. Limited resource 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. Program Accomplishments: 1,306 producers were interested in this approach, 4,595 gained knowledge about alternative production and market practices, and 798 tried alternative enterprises, methods, and practices. Outside funding support was obtained in the amount $102,955.

c. Smith-Lever Acts funds and State funds.

d. State Specific

## FTEs & Program Cost for Goal 1

| | | |
|---|---|---|
| State FTEs - 47 | County - 62.57 | Program cost- $5,621,361 |

| | | |
|---|---|---|
| NCCES FTEs -State 45 | County - 60 | Program cost- $5,449,479 |
| NC A & T FTEs - State 2 | County - 2.57 | Program cost- $171,882 |

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# *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 summary of successful efforts representing the continuum from farm to table are below. Additional information describing the accomplishments for each performance goal follow 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 2002 was 12,022. As a result, the number of pounds of pesticides was reduced by 87,654.

*Animal Production.* The use of alternative feed strategies resulted in cattle producers using over 1100 tons of feed by-products from brokers and local mills. Not only were these by-products providing adequate nutrition but also there were significant cost savings for the producers in excess of $80,000 or about $50 per ton.

*Food Products Manufacturing.* Extension Specialists within the Department of Food Science conducted HACCP training for the meat, dairy, and seafood industries. Each of these industries is required by law to have a validated HACCP plan.

*Retail Foodservice.* Forty-three (43) counties offered 176 food safety training programs and certified 2,216 food managers/supervisors.

*Consumers.* Family and consumer educators delivered hundreds of food safety programs to consumer audiences in order to help them to recognize their role in keeping their food safe. County extension centers reported an increased knowledge about safe food handling by 13,249 and 9,887 adopted safe food handling practices. The wide array of educational programs associated with this goal 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, and certification tests.

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

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

a. *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.

b. Impact - The NCCES provides pesticide training for both private and commercial applicators. Commercial applicators are those pesticide users who receive financial compensation for their services, e.g. landscapers, utility right-of-way managers, etc. In 2002, 12,022 persons were certified or re-certified. As a result of the training, the use of pesticides on NC cropland was reduced by 87,654 pounds of the active ingredient. The number of applicator citations for improper pesticide application or handling practices was 48 and there were only 26 cases of pesticide worker illness. Even with newer, safer and more concentrated products, the adoption of nearly 7,980 new pesticide BMPs such as scouting and biological control on 740,000 acres reduced pesticide usage. Over 34,000 new acres were established as field borders, filter strips and permanent wildlife cover. New riparian buffers were established along 739 stream miles of intermittent and perennial streams.

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

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

a. In 2002 many counties in North Carolina suffered sever drought conditions that severely limited the availability of hay and pastureland for cattle production. To address this problem, NC Cooperative Extension agents and specialists identified and implemented several solutions including the purchase and feeding of alternative feed materials including a wheat-middlings by-product, the use of performance testing records to reduce herd size by culling out old and low producing cows, the development and maintenance of county and regional hay and straw directories to aid growers and livestock producers in marketing and locating forages, and the development of a nitrate testing program for identifying toxic levels of nitrates in grasses and hay.

b. Impacts: These alternative feed strategies resulted in cattle producers purchasing and utilizing in excess of 1100 tons of feed by-products from brokers and local mills. Not only were these by-products providing adequate nutrition but also there were significant cost savings for the producers in excess of $80,000 or about $50 per ton. For the producer who applied performance test records as a basis for reducing cow herd size by 30%, this farmer saved approximately 24 tons of hay valued at $1,500. Moreover, he also identified 12 superior replacement heifers to keep for breeding purposes. The published hay directories that included available forages in over 20 counties were widely distributed to over 400 livestock producers and helped growers market their products, livestock producers locate forages, and educated

clientele on hay production, nitrate and forage analysis, and marketing of large quantities of hay produced as a by-product of the animal waste management systems in Eastern NC. The nitrate testing program helped to identify 16 toxic forage samples of the 80 that were submitted. Had this problem not been discovered, these toxic forages could have poisoned hundreds of beef cattle valued at more than $100,000.

Other approaches for sustaining animal agriculture included the development of alternative agriculture products such as produced through aquaculture technologies. For example, with the help of cooperative Extension significant strides were made in developing the yellow perch industry. In 2002 there was a 250 increase in yellow perch fingerling producers in the state. Following recommendations from NC Cooperative Extension agents on recommended pond fertilization practices and the use of concrete catch basins for harvesting, over 250,000 fingerlings were produced in three acres. One producer yielded a 50% increase in sales over the previous year. Although this fledging industry is still very young, it has attracted considerable national attention. Orders for NC yellow perch fingerlings were projected to exceed 10 million in 2002. Other examples of where Extension personnel have aided the aquaculture industry include identifying fresh water prawns as a suitable species to culture following harvesting of the yellow perch (gross income of $3000-$8000/acre), providing assistance to a NC eel farmer in meeting all regulatory approvals prior to marketing them as bait eels (farm gate value of $750,000), and assisting hybrid striped bass fingerling (farm gate value of $68,000) and catfish (farm gate value of $102,000) producers in fertilizing and management strategies and eliminating algal-associated off-flavor problems, respectively.

Other notable activities involving Extension field faculty included participation in numerous meetings at the state and county level to develop and refine the State Animal Response Team (SART) and County Animal Response Team (CART) programs for rapidly responding to state emergencies involving poultry and livestock. Several individual disaster response plans involving multiple state agencies (Emergency Management Services, Natural Resources, Health Departments, etc.), businesses, and key citizens were completed for several counties

A number of other significant impacts included an evaluation of whether chopped Bermuda hay could serve as an alternative poultry litter bedding material equal to that of pine shavings. There remains a continued interest by the poultry industry to identify new and alternative litter materials for rearing poultry. While many materials have been identified and tested, very few have replaced pine shavings, which have served as the standard and most used bedding material. However, shortages of pine shavings will become more prevalent as new and more economical uses for pine shavings are developed. In eastern North Carolina, hog lagoon effluent is typically sprayed on Bermuda hay fields to utilize hog manure nutrients. Generally, more hay is being produced than can be utilized in viable markets. The results of a study conducted by NC poultry Extension specialists demonstrated that chopped Bermuda hay could be successfully used as a litter material, especially during the brooding period when relatively little litter caking occurs.

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

a. Several areas for enhancing agricultural profitability were demonstrated by NC Extension field faculty and specialists. For example, cattle producers often need to reduce input costs to promote the profitability of their farms. Purchasing beef cattle minerals in bulk offers opportunity for substantial savings to farmers. With guidance from the Extension Agent in Stanly County, the local cattlemen's association started a group mineral buying project in 2002. Extension planned and coordinated an educational meeting highlighting the mineral requirements of beef cows, components of good mineral supplementation programs and fairly comparing different mineral mixes for purchasing decisions.

b. Extension personnel also provided advice on mineral formulations and logistics of bidding, ordering and distributing their mineral order. Participants reported savings of $120 to $140 per ton when compared to purchasing similar minerals on their own. This translates to a reduction in cost for participants of $5,200 to $6,100. Cattlemen participating in this effort increased their profit making potential by reducing input costs while purchasing a superior product.

The Wilkes county area feeder calf sale was held Oct. 10, 2002. This sale is designed to increase prices on feeder cattle by selling them in uniform lots sorted by weight, sex, grade and breed. There were 67 consignors form 9 counties that sold 411 steers and 342 heifers. Working together, NCCES, the NC Cattlemen's Association, Kilby's Livestock Market, NC Department of Agriculture and cattle producers helped to make this sale successful. The sale returned premiums on all categories when compared to a weekly auction. An estimated $30,000 was returned to the producers.

Efficiency of dietary nutrient utilization and enteric health are two issues that are important to the sustainability and profitability of the poultry industry in North Carolina. Research and extension programs in Poultry Science are dedicated to the reduction of mineral emissions through nutritional strategies that improve the efficiency of dietary nutrient utilization and recycling animal by-products into the food chain. Through the use of acid preservation, flash dehydration, and extrusion processing, poultry and swine protein by-products can be converted into protein meals that are about 15% more digestible than protein meals produced by conventional rendering methods. The work on converting mortality into value-added feed ingredients has resulted in a new product that has been approved by the American Feed Control Officials for registration as hydrolyzed whole swine (or whole poultry) protein. This technology could save the North Carolina poultry and swine industries over $5 million in mortality handling and disposal costs.

Appropriate enzyme applications to poultry feed have been demonstrated to reduce the emissions of phosphorus, nitrogen, and other minerals by improving diet digestibility by up to 5%. Dietary supplementation of novel enzymes, oligosaccharides, and betaine was found to stabilize gut microflora, discourage enteric pathogen colonization, and improve enteric health. Over 60% of poultry feed now includes supplemental enzymes to improve nutrient utilization, resulting in about 5-10% reduction in phosphorus emissions, better nutrient utilization, and improved enteric health. About half of the North Carolina poultry and swine industry is supplementing diets with mannanoligosaccharides, betaine, and other alternatives to antibiotics

in order to maintain enteric health. Also, a new technology called in ovo feeding was discovered to improve early enteric development of poultry and improve resistance to enteric disease.

**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.**

**PERFORMANCE GOAL 4: FOOD PRODUCTS MANUFACTURING**

## KEY THEME – HACCP

a. 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.

*Fresh Produce.* A training program and associated training materials were developed for extension agents in the southeast U.S. Nine commodity specific brochures were developed to assist growers in understanding Good Agricultural Practices (GAPs) with respect to the specific crops they produce. In addition, funds were obtained from the NC Department of Agriculture to produce a video that explains GAPs and the significance of GAPs implementation. This program has increased the awareness of extension agents and the producers of fresh produce regarding the significance of on-farm production practices and food safety.

b. Impact — Program participants are now aware of that appropriate agricultural practices are necessary to reduce the risk for foodborne illness associated with the production of fresh produce.

*Dairy processing.* The 1997 National Conference on Interstate Milk Shipments (NCIMS) appointed a committee to address how a voluntary HACCP System should be implemented, evaluated, monitored and enforced under the National Conference on Interstate Milk Shipments (NCIMS) as an alternative to the traditional Inspection/Rating/Check Rating System. The 1999 NCIMS Conference authorized the committee to conduct a voluntary pilot study to evaluate the proposed plan. The study was conducted in six plants from different states and FDA regions. Plants were chosen to represent a range of plant sizes and product mixes. Sites were selected from volunteer plants with state regulatory approval. The HACCP Committee made changes to the HACCP system as a result of information gathered from the pilot. The voting delegates at the 2001 NCIMS Conference voted to continue the pilot until the 2003 conference and include additional plants. The evaluation included the use of questionnaires to industry and regulatory personnel and on-site visits at the five continuing Phase I and the three, Phase II plants listed at the time of the Evaluation Team visit. These visits included seven states. On-site activities included review of plant facilities, extensive reviews of HACCP records, plant employee and regulatory personnel interviews and evaluation of state regulatory systems, including records. NCSU Food Science had a primary member on the team. This team has developed a report for publication.

b. Impact — The evaluation team recommended that the NCIMS HACCP Committee modify the pilot document incorporating the team's interim findings and recommendations. The committee recommended the NCIMS implement HACCP as a voluntary alternative to the traditional NCIMS program.

*Meat processing.* Specialists in conjunction with the Meat and Poultry Inspection Division of the North Carolina Department of Agriculture developed a validation and verification workshop. The first workshop was taught in November and was attended by state and federal
regulatory agency representatives as well as 30 representatives of every major processor in North Carolina.

b. Impact — Participants reported that they would be better able to validate the technical information in their HACCP plans.

*Food Safety Courses.* A three credit, on-line course in food sanitation (FS 495K) was developed and delivered through distance education to food industry personnel across the United States and other countries, including China and Canada. Tyson Foods has selected this course as an elective in their manager training program, which will provide hundreds of students.
In the past semester, 17 industry persons took this course for credit and received training in developing and conducting a food sanitation program. This course is one of a six course food safety managers certificate program developed in the Department of Food Science that targets the food processing industry.

*Seafood.* North Carolina's largest fishery enterprise, the blue crab industry, has suffered severe economic pressure from foreign competitors for the last seven years. According to the National Marine Fisheries Service, the volume of imported crabmeat has tripled since the mid-1990s, and local processors have seen their market share decline by 40%. As a result, the number of processors in the state declined by half from 1994 to 1999. With domestic markets now saturated with lower-cost imported crabmeat, local processors can no longer compete with their overseas counterparts solely as commodity distributors. Since 2000, specialists wrote or co-wrote proposals to the North Carolina Fishery Resource Grant Program (FRG) on behalf of three blue crab processors requesting assistance to develop value-added products as well as marketing programs to better sell processed seafood to retail and wholesale buyers.

b. Impact — Sea Safari produced a line of 26 new products under FRG 01-ST-01. Several items are now selling in local restaurants and two in-state grocery chains. One product will soon be test-marketed for a national fast food chain. Pamlico Packing Company developed a line of 11 ready-to-eat products under FRG 02-ST-04 that will debut in retail by Fall 2003. A line of food service seafood meals were developed for Carolina Seafood Ventures under FRG 02-ST-05. The company will begin advertising their items at the March 2003 Boston Seafood Show.

## KEY THEME – Food Safety

a. In an effort to reduce the threat of food borne illnesses associated with the consumption of contaminated poultry products, the NCSU Poultry Coordinating Committee comprised of Extension specialists from Poultry Science, Food Science, Entomology, and the Vet School have completed the development of an on-farm pre-harvest food safety distance education program for on- and off-campus students and poultry integrators and producers. This program is intended to reach all phases of the poultry production continuum by developing best management poultry production practices that ensure the production and delivery of reduced levels of contaminants or contaminant-free poultry to processing plants.

b. Twelve separate teaching modules were developed consisting of a HACCP approach to food safety, breeder and hatchery, feed manufacturing, biosecurity, integrated pest management, preventive health, grow-out, and loading and transport. This training program will provide the foundation for an on-going dialog involving the University, integrators, processors, and growers. Moreover, the distance education course is currently being beta tested with on-campus students. Additionally, each module will be field tested with our commercial integrator partners and then offered to the industry for individualized instruction.

**PERFORMANCE GOAL 5: FOREST PRODUCTS MANUFACTURING**

## KEY THEME – Forest Crops

a. The goal of the NCSU program is to: increase the competitiveness and profitability of North Carolina's wood products industry, improve markets, and increase consumer understanding of wood products and their proper use. To achieve this goal, educational programs were conducted for forest industry and consumer audiences.

b. Impact — Four firms adopted new manufacturing techniques. Fourteen consumers adopted practices related to selection, use, and maintenance of wood products; 135 increased their knowledge about the economic importance of the wood products industry; and 155 increased their understanding of forest products and their proper use.

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

## KEY THEME – Food Safety

*a. Retail Food Establishments.* Americans are eating more of their meals away from home — an estimated 54 billion meals in 2002 alone. The typical person eats an average of 218 meals away from home each and spends nearly half (46.1%) of their food dollars ($855) eating out. The result of eating out increases the chance for unsafe food handling practices to occur. In North Carolina, there are over 25,000 foodservice establishments employing nearly a quarter million people, making it the number retail employer. The challenges faced by this industry include high rates of turnover as well as language and literacy barriers. As a result, many foodservice operators do not have the resources to provide in-depth food safety training. Family and Consumer Educators have been meeting the needs of both small and large foodservice operations

since 1996 by providing low cost, high quality training that is accessible and that can be tailored to meet specific county needs. The curriculum used to deliver these trainings is the National Restaurant Association ServSafe: Serving Safe Food. In 2002, 43 counties, representing all regions of North Carolina, sponsored trainings with environmental health specialists from their local health department.

b. Impact — In 2002, 176 trainings were conducted for 2216 foodservice workers. In three counties — Harnett, Lee, and Wake — four Spanish-language food safety trainings were offered to 55 Spanish-speaking foodservice workers. Adoption of safe food handling practices is the primary way to prevent foodborne illness in the foodservice environment. The National Restaurant Association estimates that it would cost a restaurant approximately $75,000 if cited in a foodborne outbreak.

*Consumers*. It is widely accepted that unsafe food handling in the home is a significant source of the estimated 76 million cases of foodborne illness that occur each year in the U.S. The literature supports this premise as a number of studies have demonstrated that consumer safe food handling knowledge and practices needs to be improved. Some of these deficiencies could perhaps be explained by the fact that less 50% of consumers believe that they are responsible for the safety of their food. Extension educators in NC have delivered a wide variety of programs to consumers on issues related to safe food handling in the home as well as home food preservation.

b. Impact -- 1,106 programs were conducted for consumers. Of these, five were Master Food Preserver programs involved 306 individuals. Of all consumer programs, 13,249 increased knowledge and 9,887 adopted safe food handling practices.

**PERFORMANCE GOAL 7: BIOTECHNOLOGY**

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

*a. Agriculture.* Educational programs were conducted for 3003 farmers and the non-farm public to increase their knowledge about biotechnology and the use, benefits, and risks associated with the production of genetically engineered crop plants.

b. Impact — Over 1000 farmers adopted biotechnology applications to crop production through the use of genetically engineered varieties on 284,977 acres of North Carolina farmland. Nearly 2,500 non-farm citizens demonstrated knowledge and understanding of the use, benefits, and risks associated with using genetically modified crops in agriculture.

*Consumers*. Education efforts targeting consumers with information about the safety and acceptability of the use of biotechnology in the general food supply were conducted in one county.

Impact -- The program reached 1,034 consumers. Of those reached, 734 were reported to have improved their attitudes about the safety and acceptability of the use of biotechnology.

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

**WASTE MANAGEMENT**

## KEY THEME – Water Quality

a. Programs have been designed to help elected officials, community well owners, environmental health specialists, and citizens understand water regulations and implement strategies to protect and improve drinking water quality. Unsafe water supplies could potentially have detrimental effects on individual health and the environment.

b. Impact – In 2002, 130 improved their existing wells. An additional 1601 persons adopted practices to minimize chance of contaminating their wells. Practices that were adopted included not housing animals or storing chemicals, such as pesticides, fertilizers, paint, and motor oil, in the well house; mixing agricultural chemicals a safe distance from the well; rinsing mixing tanks a safe distance from the well; and separating the well by at least 100 feet from the septic or animal manure systems. Also, 571 persons had their water tested and/or treated properly. Fifteen (15) individuals had their unused wells properly closed and 1027 had their old or hand-dug wells replaced with modern well or hookup to a municipal water supply. Of those participating in educational programs, 179 reported that they believed that these best management practices were beneficial.

**FTEs & Program Cost for Goal 2**

| | | |
|---|---|---|
| State FTEs - 28 | County - 37 | Program cost- $3,190,239 |

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

**OverviewIssue**

The importance of promoting nutrition and wellness throughout life has been clearly established. Two recent 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 Surgeon General has also recently emphasized the need to address overweight prevention and treatment as the rate of overweight in the US rises. The Public Health Service “Healthy People 2010" has also noted the major role that nutrition plays in health promotion and disease prevention.

- **Behaviors for Optimal HealthBehaviors 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 the myriad of 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 DiseaseNutrition 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 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.

- **Lifecycle ConcernsLifecycle 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 recommend. 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 insure that North Carolina’s children grow to reach their full mental and physical potential.

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, many joining 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.

- **NC Cooperative Extension 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 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 14 million dollars in funds. As a result of programming, over 70,000 participants increased awareness of their need to have good nutrition habits, over 67,000 gained in knowledge concerning reducing risk for chronic disease, and over 40,000 changed diet and lifestyle habits, and improved their quality of life and the quality of life of others. Over 18,000 participants decreased dietary fat consumption, over 16,000 decreased dietary sodium consumption, over 17,000 increased fruit and vegetable consumption and over 19,000 increased dietary calcium consumption. As a result of the changed diet and lifestyle over 1,100 decreased high blood cholesterol levels, over 1,200 decreased high blood glucose levels, over 1,500 decreased high blood pressure levels, over 1,300 decreased excess body weight and over 7,000 adopted behaviors to improve their chances of delivering an normal weight baby.

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, questionnaires, as well as participant pre and post tests, and testimonials.

**Performance Goal #1Performance Goal #1**

Participants will adopt behaviors to promote a healthier diet.

**Output IndicatorsOutput Indicators**

Numbers of participants increasing knowledge that will promote a healthier diet. 64,594
Numbers of participants increasing awareness of need to have good nutrition habits: 73,999
Numbers of participants changing attitudes and aspirations that will promote a healthier diet. 42,233

**Outcome IndicatorsOutcome Indicators**

Numbers of participants adopting dietary behaviors that are consistent with behaviors promoted in the dietary guidelines: 30,772

**Key Program ComponentsKey Program Components**

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

**Performance Goal #2Performance Goal #2**

Participants at risk for chronic disease/condition will change behavior resulting in reduced risk.

**Output IndicatorsOutput Indicators**

Numbers of participants who increase knowledge in how to reduce risk for chronic disease: 30,331
Numbers of participants who increase skills that will promote reducing risk of chronic disease: 17,669
Numbers of participants who change attitudes and or aspirations that will promote reducing risk of chronic disease: 18,652

**Outcome IndicatorsOutcome Indicators**

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 cholesterol level:1,199
- Numbers who decrease high blood pressure: 1,595
- Numbers who decrease high blood sugar: 1,224
- Numbers who decrease excess weight: 1,303

- Numbers who decrease fat in diet to below 30% of calories: 18,269
- Numbers who decrease sodium in diet: 16,263
- Numbers who increase fruits and vegetable consumption: 17,587
- Numbers who increase calcium in diet: 9,109

**Key Program ComponentsKey Program Components**

The key teaching components of this objective will 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 will be 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.

**Performance Goal #3Performance Goal #3**

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.

**Output IndicatorsOutput Indicators**

Parents increase awareness and knowledge of importance of good nutrition for children: 12,916
Parents increase knowledge about good eating habits for children: 12,916
Parents and children participating in food and nutrition activities together: 13,362
Child care providers increase knowledge about the importance of good nutrition for children and the importance of teaching children about nutrition: 5,200

**Outcome IndicatorsOutcome Indicators**

Parents adopt food behaviors consistent with the Dietary Guidelines and the Food Guide Pyramid: 10,278
Children adopt food behaviors consistent with the Dietary Guidelines and Food Guide Pyramid: 6,837
Child care providers teach children about the importance of a healthy diet based on the Dietary Guidelines and the Food Guide Pyramid: 4,800

**Key Program ComponentsKey Program Components**

The key teaching points for this objective will be 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 will be 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 HomePlate, Be Active Kids, Out For Lunch and an interactive multimedia CD-ROM for adolescents will help young people adopt healthy eating patterns for a lifetime of good

health.

**Performance Goal #4Performance Goal #4**

Limited resource audiences will adopt behaviors that improve the nutritional adequacy of their diet.

**Output IndicatorsOutput Indicators**

Numbers who increase in knowledge or change attitude/behavior: 35,263
Numbers who increase awareness by participants of available programs such as Food Stamp, WIC, free/reduced school meals which lead to improved health: 12,588

**Outcome IndicatorsOutcome Indicators**

Numbers who made dietary improvement: 30,867
Numbers of pregnant women seeking prenatal care: 8,242
Numbers adopting behaviors that reduce low-weight births: 7,132
Number of Food Stamp recipients in PEARL program who adopted behaviors to reduce the consumption of salt, fat and sugar: 1,576
Number of Food Stamp recipients in PEARL program who increased their consumption of fruits and vegetables: 760

**Key Program ComponentsKey Program Components**

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 Cooking? (for pregnant teens), Be Active Kids, Out For Lunch, and Partners In Wellness will all help limited resource audiences adopt behaviors that improve the nutrition adequacy of their diet.

**Target Audiences for Performance Goals 1-4Target Audiences for Performance Goals 1-4**

General population above 2 years of age
Other food, nutrition, and health professionals
Teachers
Child-care providers
Parents
Business/industry
4-H leaders, volunteers, and youth
Coaches
Working families
Unemployed families
Young families with children who qualify for food assistance (WIC, Food Stamps, reduced price or free school lunch)

Pregnant women
Pregnant and parenting teenagers
4-H aged youth
Elderly
Individuals (above age 2) with increased risk of chronic disease (such as heart disease, cancer, stroke, and diabetes or conditions (allergies, osteoporosis) that require some special dietary need)
Minorities (generally at a higher risk than rest of population)
Limited resource individuals (limited culturally, financially, etc.)
Work-site groups in business and industry Extension Homemakers
Individuals referred by physicians for risk-reduction programs.

**Internal and External Linkages (for Performance Goals 1-4)**

There is limitless opportunity to network, collaborate and form coalitions with others to provide the public with quality nutrition education. Such opportunities include but are not limited to:
North Carolina Universities and Colleges
Federal and State Agencies
Media
Faith Community
Child-care Centers and Family Day Care Homes
Local and regional hospitals
Physicians
Boys and Girls Clubs
Head Start
Parent and Teacher Organizations
Family Resource Centers
After School Programs
Pubic Schools
4-H Youth Development
Corporate Partners

**FTEs & Program Cost for Goal 3**

| | | |
|---|---|---|
| State FTEs - 7.5 | County FTEs- 21.75 | Program cost- $1,259,474 |

| | | |
|---|---|---|
| NCCES state FTEs – 6.5 | County FTEs- 21 | Program cost- $1,193,874 |
| NC A & T state FTEs –1.0 | County FTEs -.75 | Program cost- $65,600 |

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## *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 a strong and diverse agriculture 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 improving air and water quality protection. Iredell county reports: "The Iredell Center of the North Carolina Cooperative Extension Service is continuing its efforts to train poultry farmers in the best management practices needed to properly handle and apply their animal waste. In cooperation with 4 local poultry companies, the area poultry agent trained 27 newly established growers in the rules and regulations governing the application of the poultry litter generated on their farms. As requested by Tyson's of Wilkesboro, the area agent conducted a workshop for 40 of their growers on soil and litter analysis, record keeping, and litter application."

During 2002, more than 3,440 land application operators were trained and certified. In excess of 149,000 acres of best management practices (BMPs) were adopted on units associated with animal production. Those efforts have reduced soil loss by 274,000 tons per year. The estimated economic value of livestock organic byproducts utilized (nutrients, organic matter, etc.) was more than $14 million. 87% of producers (10,770 of 12291) are now utilizing approved waste management plans. Over 160 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 improving water quality protection and management of natural resources. For example,

"Nutrient Management is a huge component of nursery production. With fifty-four nurseries and greenhouses occupying over 900 Acres in the Neuse River Basin, it is critical that nursery growers in Johnston County adopt sound best management practices. A North Carolina Cooperative Extension agent in Johnston County arranged for Nursery Specialist, Ted

Bilderback and NC State Professor, Stu Warren to share research on cycled irrigation, controlled release fertilizer, and irrigation timing with over thirty nurserymen. She also hosted Nursery Nutrient Management Training. This information was also given to nurserymen not attending the meetings through newsletters, e-mails, and consultations. As a result, five nurserymen have adopted improved Best Management Practices. Currently, there are 454 acres of nurseries in Johnston County with erosion control intact, 6000 Tons of water has been reused, 360 Acres have been under water management, and 846 acres have been under nutrient management. Savings in efficiency due to controlled release fertilizers is 13,000 dollars. There is no telling how many thousand of dollars have been saved by protecting ground water."

132 industry meetings and trade shows which promoted environmentally sound agriculture were held in 2002. Agribusinesses sponsored at least 90 environmentally focused programs. During 2002, more than 21,200 pesticide application professionals were certified or recertified. Over 140,000 tons of soil were saved through reduced soil loss from row crop, horticultural crop, or forested land. Over 8,400 acres of wildlife habitat was established. BMP adoption was very successful, with over 521,000 acres in no-till, 396,000 acres in residue management, 575,000 acres using integrated pest management, and 169,000 acres utilizing improved forestry practices. Over 1,560 farms have established one or more water quality BMPs (field borders, filter strips, permanent wildlife cover, or forestry practices).

The intent of performance goal 3 is multi faceted and relates to agriculture's participation in general society. Specifically, it is intended that producers and agribusiness professionals will become knowledgeable of regulations and environmental constraints on production practices; evaluate the impacts of these constraints on their farms; will gain knowledge, awareness, understanding, and skills to develop plans for overcoming barriers that prevent them from realizing the link between informed decision making and the capacity to sustain natural resources; and will become involved in the process by which agriculture and natural resource issues, legislation, rules and regulations are developed. From Chatham County: "Agents with the Chatham County Center of the North Carolina Cooperative Extension Service have worked to educate all citizens of Chatham County about the Chatham County Voluntary Agricultural District Ordinance. At the end of the first month of taking applications the county Agricultural Advisory Committee voted to place over 3800 acres of applied for Chatham farmland into Voluntary Agricultural Districts. This ordinance will help protect farmland and farmers from nuisance suits and infrastructure development within the county."

In 2002, more than 30,600 individuals attended environmental policy seminars and workshops. Multi agency groups delivered more than 170 programs on regulations and environmental constraints. There were at least 107 organized contacts between the agricultural community and special interest groups. As a result of these meetings, over 4,350 individuals indicated that their knowledge of the policy making process had increased. Over 1,075 people indicated that their participation in policy making increased.

The programmatic efforts under Goal 4 are targeting producers, agribusiness, youth, municipal and county leaders, environmental groups, news media, financial organizations, and the general public. Our overall intent is to produce a better understanding of the current situation and of the ways and means to accomplish agricultural activities while preserving and improving environmental quality. Notable efforts are occurring in such areas as water quality, animal waste management, soil erosion, recycling, and natural resources management. Watauga County reported: "One of agriculture's most valuable resources (valuable farmland) is at risk, with prime farmland and open space being converted to housing subdivisions and shopping malls. Land Use Planning/Zoning is a hot topic for Watauga County. Many conservation/environmental groups in the High Country are also concerned and desire to know what other groups have as a focus and how they can work together. Cooperative Extension along with Mountain Keepers, Appalachian State University and the Boone Area Chamber of Commerce held the High Country Conservation Summit in April. This Summit attracted 65 participants representing over 30 conservation/environmental groups. These participants got to network and share their ideas, concerns and activities, and to see how they can work together to accomplish many times more. They began to move area Conservation efforts forward with collective knowledge and understanding. Members of these groups are already working on a Conservation Expo to be held in the fall."

Results reported in 2002 indicate significant and demonstrable improvements in performance, knowledge, and attitude 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, with primary evaluation tools used such as observation, interviews, data analysis, participant surveys and questionnaires, as well as participant pre and post tests.

## Key Theme - Water Quality

a. 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. "Wayne County Extension personnel and five volunteers conducted one Nutrient Management Training class for sixteen participants, five Nutrient Management Plan Development workshops for 132 students, and almost 100 individual consultations on writing nutrient management plans. Participant farmers, dealers, and lawn maintenance personnel learned the basic principles of

nutrient management and how to use soil surveys in developing nutrient management plans. As a result, 16 professionals were certified in nutrient management training and 130-plus Wayne County producers developed nutrient management plans for almost 70,000 acres of cropland, putting Wayne County very close to compliance with the Neuse Agricultural Rule about nine months ahead of schedule."

"Over the past few years water quality has become a major issue with the school system. Extension has been presenting water quality and conservation programs to numerous city and county schools. This year the program was expanded and reached over 1200 students. Evaluations returned reported a 100 percent increase in water quality and management with each of the students. Forty percent reported that students implemented at least one of the water conservation strategies and sixty percent reported telling their parents about the presentation. The success of the programs has spread by word of mouth and an increase in request from school teachers have almost doubled in the past two years. From these presentations a new program developed, Water Works. The program was designed for eighth grades students and expanded their current knowledge of water from the water cycle to watersheds to water systems to water quality. Again, teachers reported a 100 percent increase in water quality knowledge. The program has already been requested for the upcoming year."

c. Smith-Lever Act funds and State matching funds.
d. State Specific

## Key Theme - Animal Waste Management

a. 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. "Animal Waste Operators are required to obtain six hours of recertification credits every 3 years. 64 animal waste operators attended training, and 34 have completed their required 6 hours one year ahead of schedule. This indicates the value the farmers place on this program's ability to keep them current with animal waste regulations, as well as their efforts to comply with the regulations. One animal waste operator who has always received a notice of violation following inspection successfully passed inspection for the first time this spring."

"Poultry growers in Iredell, Alexander, and Wilkes Counties have been assisted by the North Carolina Cooperative Extension Service in Iredell County to properly manage the waste produced on their farms. 87 growers were able to realize a cost savings of $1,142,970.00 in commercial fertilizer cost by utilizing poultry litter as the nutrient source for crops grown on their farms. Growers were assisted in litter analysis, soil testing, and crop nutrient requirements.

3529 acres of crop land and 15,676 tons of litter were analyzed and applied according to agronomic rates and in an environmentally friendly manner."

c. Smith-Lever Act funds and State matching funds.
d. State Specific

## Key Theme - Soil Erosion

a. 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.

a. "The benefits of conservation tillage practices such as no-till and strip-till for cotton have been discussed at meetings and during farm visits. These practices have been demonstrated through on-farm tests and field days. Cotton growers have been assisted with adapting pest management practices for optimal production using these systems. This year, approximately 13,000 acres of cotton in Duplin County was planted using no-till or strip-till practices. One test this year demonstrated that no-till and strip-till planting resulted in 68 pounds of additional lint per acre valued at 0.54 cents per pound. In addition, these conservation practices are reducing production costs by approximately 4.50 dollars per acre and reducing soil losses due to erosion. As a result of Extension programs in 2002, 2000 additional acres of conservation tillage is planned for cotton acres in 2003."

"Environmental impacts of agriculture are often targeted by media as major contributors to the decline in environmental quality. A major effort through the Macon County RDP/FAC committee is to reduce sedimentation from farm and pasture land. Extension's advice is used to properly fertilize, apply herbicide, and maintain forage stands on local participating farms. Seventy-two acres were improved in the spring and fall of 2001 increasing profits for producers and reducing erosion by over seventy tons, utilizing the notill drill maintained by RDP/FAC along with Extension advice and recommendations."

a. Smith-Lever Act funds and State matching funds.
b. State Specific

## Key Theme - Nutrient Management

a. 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.

a. "Extension worked in various ways with over 130 Wayne County farmers to help them develop comprehensive nutrient management plans that comply with the Neuse Agricultural Rule. Using a spreadsheet and forms developed in the local Extension office, agents conducted six community workshops and provided scores of one-on-one consultations to produce certifiable nutrient management plans for over 65,000 acres. Agents also cooperated with DENR personnel in adapting the spreadsheet program so it would include Phosphorus and Nitrogen plans and be applicable statewide."

"Many Robeson County growers experienced soil fertility problems during the 2002 season. Robeson County Extension Field Crops Agent assisted growers with soil sampling, understanding soil test reports, nutrient management, and proper waste applications. In order to distribute information to limited resource farmers, the Field Crops Agent worked with other agents on staff and the area North Carolina Department of Agriculture Regional Agronomist to conduct a Soil Management Workshop. Growers learned proper soil sampling techniques, how to understand soil test results, how to deal with soil compaction, and managing waste applications. 100% indicated increased knowledge and 95% intend to make changes on their farms. Proper lime, fertilizer, and waste applications could save these 40 growers more than $5,000 in unwarranted applications."

a. Smith-Lever Act funds and State matching funds.
b. State Specific

**FTEs & Program Cost for Goal 4**

| | | |
|---|---|---|
| State FTEs – 30.85 | County FTEs – 57.5 | Program cost $4,130,897 |
| NCCES FTEs -State 30 | County - 57 | Program cost- $4,100,247 |
| NC A & T FTEs - State .85 | County - .50 | Program cost- $30,650 |

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## *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 terms of population, industry types, and agricultural

commodities produced. The 6.8 million people who live in the state are diverse in terms of racial make-up (Spanish speaking, African-American, and Native American residents), age (infants, youth, working age, and retirement age), and financial well being. 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 industry that spans the state. There are large industrial components as well as a rapidly increasing 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 now functions in a global economy rather than the local economy that was the situation in the past. 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 increased cost of living that has forced the "second spouse" to enter the work place. 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 challenges occur as a result of North Carolina becoming a prime "retirement state" as well as 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. An impending major change in the tobacco industry is causing a large amount of economic uncertainty and 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 that exist 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 educational program to the diverse audiences outlined above which 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. The vast array of educational programs were evaluated and reported by field and campus specialists, with primary evaluation tools used such as observation, interviews, participant and observer surveys and questionnaires, testimonials, as well as participant pre and post tests.

North Carolina Cooperative Extension's state and county unit based professionals made major impacts in the year 2002 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.

## Key Theme - Child Care

a. 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 24,475 youth and adult child care providers in 2002. Cooperative Extension has offered a total of 22,460 training hours for these providers, which at $20.00 per hour calculates to a cost benefit of $449,200. More importantly, 1,321 of these providers report that they increased their knowledge, attitudes, and skills as a result of this training, and 958 report implementing quality child care practices in one or more of the state mandated functional areas (topics). It is not surprising, therefore, that parents, child care providers and school personnel report that 28,728 children improved in social/emotional, cognitive, and physical development in the centers where staff received CES training. Thus, the North Carolina Cooperative Extension Service has an important impact on the 44,640 children reached by these child care providers.

Child care continues to be an under-funded community need. The North Carolina Cooperative Extension Service has begun to seek collaborative relationships and grant funding to alleviate this need. Agents report developing or sustaining at least 639 collaborative relationships in support of child care and developed or sustained 7,333 community-networking relationships to support child care. No other agency, local or statewide, could have such a statewide impact on the child care issue. Acting in collaboration with other community groups, Cooperative Extension agents have generated at least $917,927 to support child care at the local level. In addition, agents report that they manage $985,364 in child care dollars.

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 2,648 potential providers and 2,343 current providers reported improving knowledge and skills in increasing or maintaining child care availability due to technical assistance received through Extension.

The most direct evidence of the impact of the work of CES agents is in the 1,228 new slots for children and the 39 new centers or family child care homes that were created across the state in 2002. This translates into 1,228 children who have care and 39 centers and homes that are now members of the child care industry because of the efforts of the agents of the North Carolina Cooperative Extension Service.

c. Smith-Lever Act funds and State funds.

d. State Specific

## Key Theme - Leadership and Volunteer Development

a. Citizens from varying socio-economic levels gained knowledge and skills that facilitated their

participation in community problem solving and in local public policy decision-making. Local citizens (2,541) improved their problem solving skills with 1,245 taking action and participating in the community/public policy process as a result of the training they received. A number of community issues (328) were addressed. Of those that were resolved successfully, local communities were spared $295,299 in cost.

b. Impacts: Limited resource and other non-traditional participants (2,865) were involved in leadership training. The participants identified community problems and took steps to solve them. Their actions resulted in 2,265 problems being resolved or projects completed to address the problems. To continue finding solutions to problems, these individuals formed 100 community organizations.

Many volunteers increased their capacity to lead and contribute valuable service to others. Those increasing knowledge they could pass on to others totaled 25,591. A number of these volunteers became part of volunteer management systems (11,234) where their advanced skills were used to facilitate the accomplishment of community projects or build skills in youth and adults that enhanced their personal development.

c. Smith-Lever Act funds and State funds.

d. State Specific

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

a. Resiliency is the ability to cultivate strengths to positively meet challenges. The program focuses on prevention programming, which strengthens “protective factors” and reduces “risk factors.” Participants bring together and involve educators, researchers, agency and organizational personnel, youth, families, communities, advocates, and practitioners who share an interest in strengthening the resiliency of North Carolina’s youth, families, and communities.

b. Impacts: Youth in 43 counties have benefited as a result of involvement in community-based programs, which focus on building resilience. Youth in high-risk environments have increased coping skills, are making more informed decisions, and have a sense of purpose for the future.

Families in 15 counties have benefited from financial management programs conducted to help them learn basic money management skills such as budgeting and investing, allowing them to reallocate resources to meet pressing family financial demands. Volunteers have been trained and matched to mentor Work First participants. Through these efforts, program participants have become employed, retained employment, and improved employment status. Three primary themes have emerged from this objective this year. Family coping and nurturing programs were instrumental in providing families with parenting guidance, family communications skills and family violence prevention. Adolescent pregnancy prevention programs have targeted young men as well as young women. Thirdly, Mentor Education programs served to address day-to-day needs of those women who have been involved in Work First programs.

c. Smith-Lever Act funds and State funds.

d. State Specific

## Key Theme - Youth Development

a. 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. 4-H club activities, presentations, record keeping, judging teams, school enrichment experiences, peer helper/mentoring programs, community service projects, and recognition programs are designed to give the participants an opportunity to develop the life skills/assets that any child will need to succeed in life.

A major goal of 4-H Youth Development Program is to help young people participating in 4-H programs to develop life skills and assets that will allow them to become competent, caring and responsible citizens. In 2002 emphasis was placed on helping young people improve their life skills/assets in the areas of communication skills, cooperation, empathy and caring, critical thinking and planning and goal setting.

b. Impacts: During 2002, a total of 195,080 young people between the ages of 5 and 19 participated in 4-H programs with 123,599 participants involved in 4-H clubs and other long-term units, school enrichment and diverse housing programs. The positive development of young people through 4-H participation can be illustrated by the following results from selected programs: 1) 37,033 youth increased their communication skills; 2) 35,002 youth have increased their decision making skills; 3) 36,712 youth increased their awareness of community service; 4) 71,974 youth increased their knowledge in various curriculum areas; and 5) 43,438 youth increased their self confidence. In addition, counties reported that as a result of the 4-H community service projects, their communities saved $1,257,136. Additionally, 724 youth, ages 8 - 12, and 91 volunteers were involved in the Mini Society program facilitated by N C A&T SU. Six hundred fifty-eight youth increased their knowledge in money management and demonstrated skills in designing, development and implementing a mini society.

In 2002, scholarships totaling $349,679 were received by 4-Hers. As a result of 4-H project work, $534,060 was earned, and $377,157 was made by 4-Hers as a result of their project work.

c. Smith-Lever Act funds and State funds.
d. State Specific

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

a. There were 25 Extension units who submitted reports on efforts to accomplish the following objective, "Participants in aging issues programs will increase awareness, gain knowledge, change attitudes, develop skills, and adopt practices and behaviors to help make their later years more financially secure to include, but not limited to, financial planning, estate planning for

individuals and family owned businesses, preparing for dependency, retirement planning, and consumer fraud against the elderly.

b. Impacts: There were 2,552 participants reporting improved financial status through adoption of consumer and financial management practices. A total of $77,706 in increased savings and/or retirement contributions was reported. There were 590 estate plans reported to have been developed and implemented; and 911 plans for possible future incompetency and dependency were developed.

c. Smith-Lever Act funds and State funds.

d. State Specific

## Key Theme - Community Development

a. Twenty-five different counties of the 101 in North Carolina reported organized efforts: (1) to increase citizens' awareness of economic trends affecting local economics; (2) to increase special audiences skills to participate in the community development process, and (3) to have citizens use economic development concepts to implement policies promoting sustainable economic development. Again in 2002, nine of these counties reported efforts to encourage the development of home based business plans, to encourage new business starts, and to encourage participation in community economic development programs.

b. Impacts: Conference attendance was 1,561 where participants received information concerning economic conditions and economic trends for their local communities. Twenty-one counties reported that due to efforts to increase awareness of opportunities and improved skills of special audiences: 613 persons participated in local public hearings, 12 additional persons participated in the voting process, 47 joined the local labor force, 563 citizens attended conferences to increase their skills and abilities to use economic development concepts to implement policies to promote sustainable economic development in their local communities. Eleven counties reported educational efforts to promote sustainable economic development, however, only one new business was reported to have been attracted to one of these counties in 2002. Ten counties reported over 458 persons attended workshops where they gained knowledge of collaborative and cooperative marketing and how to construct marketing and business plans. As a result, there were 28 new business start-ups with an estimated payroll of $124,005, and it was reported that 21 small and home base businesses developed business plans. The value to the local communities that was reported by these 25 counties was $3.264 million.

c. Smith-Lever Act funds and State funds.
d. State and Multistate

## Key Theme - Community Development

a. NC A & T led program efforts in helping communities who are increasingly expected to design more local solutions to problems and issues as the government continues to decentralize.

b. Impacts: Citizens from varying socio-economic levels gained knowledge and skills that facilitated their participation in community problem-solving and in local decision-making. Of the 2,280 local citizens who improved their problem-solving skills, 520 actually took action and participated in the community / public policy process as a result of the training they received. One hundred forty three community issues were addressed. Of those resolved successfully, local communities realized an estimated $16,100 in savings and avoided another $16,400 in additional costs.

There were 3,988 limited resource and other non-traditional participants involved in leadership training with 2,808 adopting sound leadership and decision making practices. One thousand six hundred six of these participants in 31 counties identified community problems and took steps to solve them. Their actions resulted in 328 problems being resolved or projects completed to address the problems. To continue finding solutions to problems, these individuals formed 69 new community organizations.

Many volunteers increased their capacity to lead and contribute valuable service to others. Those increasing knowledge they could pass on to others totaled 25,591. As a result of this increased knowledge, 617 new volunteer management systems were established where advanced skills were used to facilitate the accomplishment of community projects and/or build skills in youth and adults that enhanced their personal development.

c. Smith-Lever Act funds and State funds.

d. State Specific

## Key Theme -- Family Resource Management

a. Twenty counties reported that they conducted programs to increase individuals' and families' knowledge of and ability to implement financial planning techniques, and to adopt best management practices that would enable them to meet their changing needs and responsibilities over their life cycle. Twenty seven counties also reported that they focused programming efforts toward the limited resource individual and family audience. These efforts were intended to increase their awareness and knowledge 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. Ten county extension units reported efforts to increase the awareness, knowledge, and skills of individuals and families to adopt best management practices to extend or increase their current incomes to meet their changing needs.

b. Impacts: While the number of persons who actually increased their knowledge of the value of financial planning numbered 3,142, the number who actually demonstrated success in the planning process was 1,054. An additional 795 persons reported ongoing success in implementing goal setting, family budgeting, and record keeping. There were an additional 258 persons who actually developed and implemented a "life cycle plan." Twenty counties reported that as a result of conducting best management financial planning educational programs, 814 persons reported improving their financial status by reducing their total debt by $425,570, and

increasing savings and investments by $47,638. The 27 counties reporting impacts for limited resource audiences, reported that 769 persons had collectively reduced debt by an estimated $118,660. In addition, 1,278 persons attained their financial goals, and 1,932 improved their family financial self-sufficiency with resources available to them.

c. Smith-Lever Act funds and State funds.

d. State Specific

### FTEs & Program Cost for Goal 5

| | | |
|---|---|---|
| State FTEs - 22 | County – 132.77 | Program cost $5,789,156 |

| | | |
|---|---|---|
| NCCES FTEs -State 19 | County - 130 | Program cost- $5,609,736 |
| NC A & T FTEs - State 2 | County - 2.77 | Program cost- $179,420 |

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## *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 background, and economic diversity of the state's population. In addition to Advisory Leadership Councils, each county has specialized committees whose responsibilities include 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 to include 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.

With these organized groups functioning as a planned emphasis on significant stakeholder into program direction, a planned and proactive process is operational that assures that programs are reviewed and overall needs assessed on a continuous basis, but no less than once every two years, with greater frequency encouraged. However, with the functioning of the respective advisory groups on a much more frequent basis, stakeholder inputs are producing a continuous process of program review and 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 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 which are representative of diverse groups throughout the county.

In order to assure that all programs are current and highly relevant, in 2002 North Carolina Cooperative Extension (NC Cooperative Extension Service and NC A&T Cooperative Extension Program) 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 dominant change was based on the review of 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 approximately fifty program objectives were approved by Extension Administration upon recommendation from the long-range planning task force.

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. All of the local administrative groups are preparing to conduct needs assessment at the local 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 partnering with Extension staff to identify and prioritize needs and issues.

In March of 2003, the NC Cooperative Extension System (including all state and county faculty) will collaborate with other university extension and engagement groups (for the first time ever) in a conference format to enhance cooperation among extension groups in assessing and prioritizing needs and issues of the people of North Carolina. More than 25,000 local and state leaders have been instrumental in the identification and assessment of needs, issues, and problems that NC Cooperative Extension System's major programs can address. In addition to the Extension staff and members of the advisory leadership systems, more than 20,000 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.

## *C. Program Review Process*

During the 2002 plan year, North Carolina Cooperative Extension System 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. Additionally, the co-chairs of each of 20 state plan teams are merit reviewers. The state program leaders and the assistant administrator for state programs also serve as reviewers. The other merit review group is the POW 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. There has been no significant changes in this plan since the initial AREERA 5 year plan was submitted.

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

**Multistate:**

For fiscal year 2002, NCCES had documented multistate activities using Smith-Lever B & C funds amounting to $360,852. This funding level exceeded the originally planned expenditure of $207,825 by $153,027. Altogether, the 2000 plan indicated 12 activities. Additional activities have been added for a total of 19. However, one of the originally planned activities has been removed, thereby making a total of 18 reportable multistate activities for 2002.

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.
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. 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, 46 had Smith-Lever B & C funding allocated for all or part of the Extension funding in 2002. For fiscal year 2002, these B & C funds amounted to $1,720,164. This funding level exceeded the originally planned expenditure of $1,575,259 by $144,905. This 2002 expenditure exceeds the prior year by $755,426. This is a highly significant increase in both projects and funding level from the 2001 fiscal year. Two of the 46 funded projects were not totally completed during the fiscal year because of unexpected project leader departure, with one via resignation and the other by sudden death. Three additional projects have been targeted to continue to meet and exceed the funding goals that were established in 2000.

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*

North Carolina Cooperative Extension Service AREERA 2002 Multistate Activities Report (Smith-Lever B & C funded)

**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 2002 was planning and conducting the Southern Dairy Conference. The 2002 conference was held in Atlanta in February, 2002. 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.

**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: $45,900

**Report:** This program focuses on one of the fastest growing specialty crops for direct marketing in the nation, strawberry plasticulture. In 2002, the NCCES program specialist in strawberries provided 10 out-of-state Strawberry plasticulture Workshops and Agent In-Service Trainings in Ohio (2), Virginia (1), Georgia (1), South Carolina (3), Arkansas (2), and Alabama (1). There were more than 600 producers and agents directly impacted by those meetings in these other states in 2002. A Southeastern Strawberry Consortium for 7 states was organized in August 2002 to develop a CUE application for methyl bromide (submitted 9-Sep-02). The combined 4,040 acres of commercial plasticulture strawberries in the 7-state region represented by this consortium generated an estimated $83 million dollars in gross revenues and more than $25 million in profits for over 700 farm families in 2001. A new web site called BERRYagent (third year of operation (http://intra.ces.ncsu.edu/depts/hort/berrydoc/), and is proving to be a critical resource for agents and farmers throughout the Southern Region for its timely information on frost/freeze events, pest management strategies and marketing information. There were over 500 Preplant Strawberry Production Guides (154 pp) distributed to commercial strawberry plasticulture growers in 3 states (NC, AR and SC).

**Program 4.**

Pork Industry Handbook

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

Amount funded: $17,300

**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: $26,600

**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: $4,959

**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, $38,000

**Report:** Management curriculums for Farrowing, Breeding and Gestation, Nursery and Finishing phases of production were developed and distributed nationally to swine educators on CD-Rom. Curricula for risk management, business planning, and human resources management were developed. In addition, curricula for environmental assurance, quality assurance, and odor assessment were developed and distributed. Nursery management was beta-tested with WWW delivery. These curricula and instructional materials were used in swine production courses and in training producers and employees in extension programs in 20 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: $13,400

**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 to send twelve participants to the 2002 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: $9,400

**Report:** Twenty-two (22) youth and seven (7) adults from North Carolina along with the group from Virginia traveled together to the 2002 Southeast Dairy Youth Retreat held in Okeechobee, Florida on July 10-14, 2002. 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: 48,800

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 a partnership between NCCES and Clemson, the elimination of the human pathogen *Campylobacter jejuni* from broilers is under investigation using organism-specific nanoparticles that have an affinity to bind to *Campylobacter jejuni*, thus preventing its colonization in the gastrointestinal tract. This unique on-farm strategy is anticipated to reduce the incidence of this organism in poultry flocks thus improving the safety of poultry products. In a second collaboration between NCCES and Ohio State University, a study was initiated to investigate the relationship of animal production/waste management practices and the fate of bacterial and viral pathogens that pose a potential risk to humans via contamination of ground and surface waters. We have begun to characterize and assess populations of microbial pathogens and protozoa (*Salmonella, Campylobacter, E. coli* O157:H7, Cryptosporidium) in commercial poultry and swine waste systems, as well as several new promising waste handling technologies and housing systems. 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 as it is applied to crop land. Moreover, promising new waste treatment technologies, management practices, and nutritional approaches will be explored 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 and Pennsylvania State University. These states continue to collaborate with us in one form or another, including conference calls and meetings. Michigan has no state specialist leading the effort but interested county extension agents have it and have used and reported on it. Kansas State U. has adapted it into newsletters which have been and are currently being distributed throughout their Kansas. They have shared the newsletters with NCSU and we are currently critiquing them. NCSU continues to maintain a Partners in Wellness website for information for the partners and other interested individuals across the country.

**Program 2.**

Elderly Extension Core Group

A 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 a regular basis.

Amount funded: $24,374

Report: NCCES faculty chair the Elderly Nutrition Education (ENE)
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, Texas (retired Extension nutritionist), Iowa State U. 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 presented older adult nutrition education at several national meetings including the annual meeting of the American Dietetic Association and the Priester Conference in Orlando, Florida.

**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 that 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 2002, $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: $26,425

**Report:** The Extension Cares Initiative (ECI) Management Team provides training and technical support to states working in the areas of: Early Childhood, School-Age care, and Working with Teens In Out Of School Time. An extensive, web-based evaluation system has also been designed to evaluate work in these areas. The ECI work is being closely coordinated with the CYFAR work. Dr. Eddie Locklear, Associate Professor at NCSU, serves as a co-chair of ECI.

4-H Afterschool is another major multi-state program initated in 2002. 4-H Afterschool is a special 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. Dr. Locklear 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: $33,505

North Carolina served as Chair of the Southern Regional Leader Forum Planning Committee for the 2002 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 Chair of the Regional Planning Committee, North Carolina 4-H staff and volunteers were responsible for the overall logistics of the October meeting, including the responsibility of selecting and booking keynote and capnote speakers, organization of conference meals and activities, and communicating with the other states in the region all information regarding progress in planning and marketing materials. In order to accomplish this task, 14 state level volunteer committees were established, with the 24 committee chairs and co-chairs serving on the state's executive planning committee. This group met three at three weekend retreats for planning, conducted two teleconferences and communicated via an electronic e-group process. More than 200 adult and youth volunteers across the state assisted in preparation for the event. At the October 3-6, 2002, meeting, North Carolina's delegation of 153 individuals worked to make the event a success.

**Program 4.**

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

Amount Funded: 14,894

Through the annual meeting and monthly teleconference calls with the editorial board, have accomplished the following: added over 1300 new documents and moved all remaining documents from previous National Network for Family Reiliency website to the parent/family CYFERnet database, recategorized website system to address concerns and needs of our primary audience, county-level staff and practitioners, Conducted raining 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), developed proposal for 2003 CYFAR conference entitied "The Top 40 Greatest Hits" to highlight the most frequently accessed resources on the Parent/Family web site, conducted two interactive telephone trainings: (1) Couples Education Interactive Telephone Training: Relationships In Good Times and Bad (October 16, 2001); (2) Redefining Parent Involvement: Parents Making a difference in Their Children's Lives (December 11, 2001)

**Program 5.**

National Extension Parenting Educators' Framework -

Amount Funded: $9,100

Report: Through a 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 is now being reported in journal articles and conference presentations.

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**Summary:**
Total Extension Multistate Programs: 19
Total Smith Lever B & C funding planned: $207,825
Total Smith Lever B & C funding allocated to 18 programs for FY 2002: $360,852

**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** |
| **Goal 1. A highly competitive Agricultural System** | **42,695** | **117,626** | **161,919** |
| **Goal 2. A safe and secure food and fiber system** | **0** | **48,950** | **48,800** |
| **Goal 3. A healthy, well-nourished population** | **40,040** | **43,994** | **44,374** |
| **Goal 4. An Agricultural system protecting natural resources and the environment** | **17,471** | **19,655** | **16,835** |
| **Goal 5. Enhanced economic opportunity of quality of life** | **56,017** | **92,156** | **88,924** |
| **Total** | **$156,223** | **$322,381** | **$360,852** |

**Jon F. Ort** **2-21-03**

**Director** **Date**

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

## *E. 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 forages** | **6453** |
| **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 Medicinal Herbs** | **6595** |
| **Small fruit production systems** | **06681** |
| **Influence of orchard management on tree growth;** | **6196** |

| | |
|---|---|
| **Rootstock and interstem effects on Pome and Stone Fruit trees** | |
| **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** |

**Production strategies for improved vegetable production and alternative crops for diversification**
**Project 6596**
Tobacco remains North Carolina's top income-producing crop, but demand has fallen rapidly in recent years. Growers interested in preserving their family farms must find profitable alternatives. A screening program identifies melons with unique or superior qualities that can be grown successfully in North Carolina and profitably marketed. Several specialty melons have shown good potential, including the Sprite melon. In 2001, gross sales of the Sprite melon amounted to nearly $1 million for North Carolina producers. A seed-production failure limited acreage in 2002, but sales are expected to top $2 million in 2003. Meanwhile, screening of other unusual and potentially profitable melons continues.

**Rotational and compost systems in vegetable nutrient cycling**
**Project 6380**
Studies continued on ways to use various types of compost to enhance soil-microbe development. Reactor-treated, composted swine waste and controlled microbiotic compost were found to improve crop growth and yield in the first year. The evaluation will continue with further reduction of fertilizer additions; the aim is to eliminate inorganic fertilizer sources in five years.

**Weed management for small fruits and vegetables**
**Project 6327**
Weeds continue to be one of the worst pests in vegetable crops.
Palmer Amaranth, A Pigweed which is common in fields of sweet potatoes and many other crops, is difficult to control. Sweet potato growers usually mow the weed when it emerges over the crop canopy. Studies on a research station and a grower's field determined that mowing

pigweed (or Palmer amaranth) above the crop canopy should take place between 20 and 40 days to prevent reduction of yield and quality of sweet potato roots. More than half of growers are expected to adopt this practice.

**Weed management in turfgrass and forages**
**Project 6453**
Annual bluegrass continues to be the most troublesome pest for highly maintained turfgrasses. This is especially true on golf courses and particularly on putting greens. Ongoing research trails investigate innovative ways to manage this pest, and 60 percent of North Carolina golf-course superintendents have adopted new management techniques described in meetings and written material. Research on the effects of plant growth regulators (PGRs) on bentgrass lateral recovery from simulated injury has shown up to a 35 percent delay in recovery with certain PGR treatments, whereas others have slightly increased recovery. Additional research on roadside turf has led to new recommendations for the 331,000 acres of roadside turf in North Carolina.

**Mycotoxins and their effects on dairy cattle**
**Project 6348**
To maximize profits, dairymen must optimize feeding efficiency by increasing milk production per cow through better nutrition and by managing feed mycotoxin problems. The state-sponsored feed testing program is available to North Carolina dairymen and informs them about nutrient content and mycotoxin levels in feed. Cooperative Extension has provided information on feeding strategies and the effects of mycotoxins on animal health, production, reproduction, and profits. Mycotoxins are shown to effect more than a quarter of all dairymen each year. Using extension recommendations, dairy farmers have realized improvements of 2 to 8 pounds of milk per cow per day, and improvements in health and reproduction. These programs may increase the profits of North Carolina dairy producers by $10 million annually.

**Genetic improvement in pork production systems and understanding genotype by environmental interaction**
**Project 6496**
Issue: Genetic selection is a primary driver in advancing the swine industry by improving productivity, reducing costs of production and meeting consumer demand. A genetic advisory committee comprised of individuals from seven universities was formed to develop a comprehensive genetic evaluation system for the Yorkshire, Duroc, Hampshire and Landrace breeds of swine. The average genetic improvements for all four breeds resulted in a reduction of 2.7 days to market and 4.5 millimeters of backfat depth. Other genetic improvements are increases of 1.36 kg of lean per pig and .25 pigs born alive per litter. Twenty-one-day litter weights are up by 1.3 kg. These genetic improvements have resulted in economic increases of more than $9 per pig.

**Improving reproduction and management of dairy cattle**
**Project 6600**
Issue: Improving reproductive management of dairy cattle is economically important for producers. This effort has included farm consultations, meetings and workshops with extension agents, veterinarians and producers. During the past three years, field trials focused on

alternative strategies for synchronizing and breeding dairy cows. On-farm research and demonstration involving agents and veterinarians provided a good method for transferring new information. Numerous questions on cattle reproduction were addressed through international electronic discussion groups, with long-term implications for delivery of research-based information. Research shows very significant declines in reproductive measures in both Holstein and Jersey herds in ten Southeastern states over the past 25 years, particularly in the past 15 years. These data imply that both genetic and environmental factors are involved. Because of this and other efforts, reproductive traits will be measured and considered in future U.S. Department of Agriculture genetic evaluations of dairy bulls. Also, a new regional project was established to examine methods of improving reproduction in dairy cattle, including both selection strategies and cross-breeding.

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

Issue: New soybean breeding lines and varieties developed through traditional breeding and genetic engineering have dramatically altered soybean oil and protein composition. Soybean fatty acids are an important energy source for germinating seeds, and proteins provide amino acids to the growing embryonic axes. Consequently, altering fatty acids, total oil or protein composition could affect germination rate, seedling development and seed storability. Phytotron studies are designed to evaluate the influence of temperature during seed development on subsequent seed quality of nutritionally enhanced soybeans. Seed analysis is underway, and results are being statistically analyzed. Recommendations will result in increased seed quality, allow seed growers to meet company standards and allow soybean producers to reduce seed-input costs.

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

Inadequate information may lead producers to apply too many pesticides to peanut and turfgrass crops. The peanut program produced management strategies, including a refinement of the Southern corn rootworm risk index for peanuts, which helps growers avoid preventive insecticide applications and effectively manage a challenging insect-vectored disease (tomato spotted wilt virus). A speedier technique was developed for greenhouse screening of seedlings for evaluating rootworm resistance. The turfgrass research program produced immediate answers to pressing turfgrass insect problems (Oriental beetle, green June beetle, fire ants and mole crickets) and successfully transferred the technology to practitioners. Recently completed studies documented temperature and soil moisture effects on mole cricket ecology and allowed refinement of management strategies. Studies in Western North Carolina on a new turfgrass pest, the Oriental beetle, resulted in development of an initial forecast model.

**Ecology and management of European corn borer**

**Project 0205**

North Carolina's corn farmers can plant a maximum of 50 percent of their corn crop to transgenic field corn expressing Bt protein because EPA requires a 50 percent insect resistance management refuge of non-Bt corn. The refuge is designed to slow the development of resistance to the Bt toxin in corn earworm, as known as bollworm. The refuge's effectiveness depends upon the ratio of corn earworm moths emerging from the Bt crop and refuge. Refuge size can be theoretically reduced by reducing Bt corn moth production. A life-table study on a new transgenic dual-toxin Bt corn showed reduced moth numbers of 99.9 percent in 2001 and 100 percent in 2002 versus a non-Bt type. This compared to 87.9 percent for 2001 and 96.4 percent in 2002 for the currently grown Bt corn type (Yieldgard®). Decreased moth production suggests that non-selected moths from non-Bt hosts will overwhelm the few resistant moths produced from the dual-gene type and significantly slow resistance evolution. These data may justify a change in the EPA restriction and allow a greater use of Bt technology.

**Plant nutrition programs for mountain crops**

**Project 6558**

Excessive height growth is a tomato seedling problem in the “tobacco-float” system, an adapted seeding method that lowers production cost, eliminates irrigation systems and management and increases fertilizer efficiency. Efficient tomato transplant production using such technology could lower costs and fill empty tobacco seedling greenhouses. While drastic height-control measures may damage post-transplant fruit yield and quality, experiments from 1998 to 2000 and field tests in 2001 and 2002 indicated that several tested height-control measures can be used without damage to yield, fruit earliness or quality.

**Weed management and growth regulators for agronomic crops**

**Project 6417**

Issue: North Carolina growers are rapidly switching to herbicide-resistant cultivars. About 75 percent of the state’s cotton and soybeans and 10 percent of corn are planted in resistant cultivars. A greater percentage of corn acreage should be in herbicide-resistant cultivars in 2003. Research and educational programs have focused on how best to manage weeds in these herbicide-resistant crops. This has included determining the need for residual herbicides, best timing of herbicide applications and value of mixtures and solutions for problem weeds not adequately controlled in the new systems. Extensive efforts have focused on comparing net returns of the new systems with conventional systems. Crop yields increased, input costs remained the same or dropped and quality problems such as foreign matter contamination were reduced. Estimated overall value to North Carolina cotton and soybean producers is $48 million.

**Risk aversion, risk shifting and alternative payment mechanisms in settlement of broiler contracts**

**Project 6527**

Previous research indicates broiler market prices add significantly to broiler production risk. In contract production, this risk transfers to the integrator because broiler market prices typically don't influence growers' contract payments. In newer contracts, however, integrators include a market price clause to calculate grower compensation. An N.C. State University team conducted a welfare comparison of old and new contracts and found that including the market price clause not only increases grower income variability, it also raises growers' expected return. However, some growers with lower risk aversion (for example, wealthier or more educated growers) may prefer one contract type; more risk-averse growers may prefer other payment mechanisms. Overall, assuming fixed flock size and constant percentage mortality (which enables payment per-pound comparison), new contracts are welfare-superior to the old contracts. However, analysis shows that the new contracts' welfare superiority depends on the grower's attitude toward risk. Low-risk-taking growers prefer the old contracts to the new; higher risk-takers prefer the new contracts. This result shows the potential danger of uniform contract regulation. The best outcome occurs when there is competition for growers and when integrators offer different contracts so growers can self-select the best contracts.

**Fish food ingredients produced by solubilization/representation**
**Project 6616**

Ensuring global competitiveness for the $27 billion dollar U.S. seafood industry and its 250,000 workers has become increasing difficult. This project focuses on development and demonstration of innovative processing technologies that enhance the value of traditional and nontraditional seafood products for domestic and export markets, thereby improving profitability. Applied research and industry demonstrations are focused on handling and processing of scombroid (histamine) fish, farm-raised hybrid striped bass, value-added seafood products and secondary product development. Industry collaborators work cooperatively in every project. Impacts are greater compliance with food safety (HACCP) regulations, improved sensory qualities and shelf life of fresh fish, diversification of existing product lines by adding value and developing new product lines using secondary products.

**Cultural management of strawberries and grapes**
**Project 6324**

This program developed many components of the strawberry plasticulture system utilized in Eastern United States, including the introduction of strawberry plugs. Plugs continue to rapidly replace fresh bare-root and frigo plants on a worldwide basis. Plug transplants are produced in no more than five weeks and, in warmer growing climates, the process of propagating a strawberry plug can take less than three and a half weeks. Additional benefits include reduced worker exposure to pesticides and lower pesticide residues in strawberry transplants. Several trials were conducted to identify a chemical alternative to methyl bromide fumigation for the strawberry plasticulture industry. Research will further address the development on best management practices for areas that have shorter fall growing seasons and more severe freezes in winter and spring. There is also a focus on the utilization of the latest row-cover technology and a first-time investigation of interaction between-row covers and different plastic mulch films.

**Economic evaluation of technical change in cotton and peanut production**
**Project 5735**
To make a profit in the increasingly competitive markets for cotton and peanuts, agricultural producers need to be keen managers with access to economic information about a range of topics, including the costs and benefits of new technology. One new technology that has been rapidly adopted in North Carolina and other Southeastern states is ultra-narrow row, or UNR, cotton production. But until recently, farmers had little whole-farm-level economic data comparing UNR to traditional cotton production. Data derived from a recently completed study evaluating the impact of
various production factors on yields is being shared with researchers, extension educators and producers. Additional economics research and extension work focuses on the costs of reducing non-point pollution on cotton farms and on the economic impact of cotton policy changes and of new cotton production technologies.

**Economic decision support for sustainable agricultural production**
**Project 6528**
To develop sustainable strategies for agricultural production, North Carolina's farmers need solid information about financial and environmental impacts of new technologies, new crops and new regulations. Work continues on assessing the economic potentials and limitations that farmers face in transitioning to organic cropping systems and alternative swine waste management systems. An additional study is under way to evaluate tradable pollution permits as an environmental policy tool for agriculture. Other work, recently completed, demonstrated that the effectiveness of best management practices mandated for nitrogen control in the Neuse River Basin varies significantly by physiographic conditions and that these differences should be taken into account by state and federal authorities when determining cost-share programs. Such information helps policy makers understand the economic viability of various regulatory options while helping farmers make sound decisions on the economic and environmental impacts of changes in farm management practices.

**Use of alternative supplements in forage systems for beef cattle**
**Project 6480**
The extension ruminant nutrition program increases farm profits by encouraging adoption of byproduct feeds. As a result, in 2001, beef, goat and sheep producers used large amounts of byproduct feeds -- more than 6,600 tons of soybean hulls, 3,600 tons of corn gluten feed, 2,500 tons of whole cottonseed, 800 tons of wheat middlings, plus other byproducts -- and, thus, saved $1 million in feed costs. Meanwhile, research and extension efforts continue on feed content of important trace minerals such as copper and selenium; the commercial feed industry has dramatically improved formulas to include recommended levels of trace minerals, and beef producers are adopting good mineral supplement programs by taking part in county cattlemen's association efforts to achieve cost savings by buying recommended mineral supplements in large quantities. In 2002, savings of $50,000 on mineral and pharmaceutical costs were documented, and that figure is expected to rise as more groups decide to buy supplements cooperatively.

**Nutritional strategies to improve the growth, productivity and profitability of dairy cattle**
**Project 6605**

The average age at first calving among North Carolina dairy herds is about 27 to 28 months, but research shows that dairy producers lose up to $3 for every day past 24 months of age that calving is delayed. Research has shown that feeding heifers mixed rations with cottonseed hulls can improve growth through consistent nutrition, while improving profits through a reduction of labor costs and reduced age at first calving. The feeding of a high protein milk replacer and calf starter combination is also being evaluated as a means for accelerating growth and, thus, reducing the age at first calving. Reducing the average age at first calving from 27 months to 24 months could save North Carolina dairy farmers $7 million annually.

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

Pork quality is one of the U.S. pork industry's main issues of concern. The total cost per pig from color and Pale Soft and Exudative meat (PSE) problems was $1.05. Of this amount, 79 cents per pig was estimated to be directly controllable by pig producers. In an industry that produces 98 million swine annually, this amounts to a total of $77.4 million in losses due to pork quality problems. Work at North Carolina State University has demonstrated that supplementing magnesium (Mg) to pigs via the drinking prior to slaughter can improve meat quality. It is possible that Mg supplementation will be particularly beneficial in pigs with a genetic predisposition for poor quality meat.

**Using remote sensing to manage nitrogen in a corn-wheat-soybean rotation**
**Project 6425**

Low corn prices and in-place environmental regulations mean producers need cost-effective growing systems with low chances of related nitrogen (N) contaminating surface and groundwater. Statewide two-year N management tests successfully used a remote corn color-sensor that measures canopy green reflectance to take an infrared photo of cornfields to determine what N application rates were best at each corn development stage. Results were incorporated into a new N application management system based on multiple applications of small amounts. Growers using this system, which advocates applying at least half of a plant’s needed N at planting, can decrease N requirements by 5 to 10 percent while increasing yield, particularly in drought years. Extension meetings and field day demonstrations introduced the system to corn growers, with 60 percent applying at least half of the N required at planting, which increased yield by 20 to 25 bushels per acre despite drought. If only 10 percent of the state’s corn acres realized such an increase, it could mean 120,000 more bushels grown in North Carolina annually. At $2 per bushel, that is a financial gain of $480,000. It appears certain that aerial imaging in crop production management will increase in 2003.

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

Decreased North Carolina and U.S. peanut production profits creates a need to examine all production and pest management strategies to develop cost-effective, sustainable regional peanut production systems and define their associated risks. Peanuts produced in reduced tillage systems on coarse-textured soils respond equally as well as those produced in conventional tillage systems. But positive response to reduced tillage systems on fine-textured soils may be less consistent. While research suggests that less disease and fewer fungicide sprays are needed

for effective disease control in subsurface drip irrigation, expense of installation under the current peanut price structure limits feasibility.

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

In 1998, North Carolina's fledgling medicinal herb industry was valued at an estimated $27 million. In 2002, after a national three-year slump, the market slowly bounced back. In response to growers' interest in growing medicinals, Cooperative Extension and the Agricultural Research Service initiated studies in 2001 and 2002 on sun-requiring herbs in the Upper Piedmont and on woodland botanicals in the mountains. Extension took several other steps: a) Participated in the N.C. Summit on Natural Medicinal Products to promote the growth of the industry, bringing together representatives from agriculture, medicine and the natural products industry; b) Initiated a market evaluation for N.C. herbs and developed a more secure marketing plan for N.C. growers; c) Helped initiate the North Carolina Natural Products Association in 2002 to provide support and networking opportunities; and d) With the Smoky Mountain Native Plant Association, helped 13 Graham County growers start commercial medicinal herb plantings, with more than 300 acres now in production.

**Influence of orchard management on tree growth; Rootstock and interstem effects on Pome and Stone Fruit trees**
**Projects 6196 and 1840**

Row-crop farmers looking to diversify and stabilize their farm income and labor force are considering the potential of high-value tree fruit crops. To respond to such grower requests with timely and research-based crop production recommendations, county extension agents need the highest level of training. Educational programs for growers and potential growers were developed to provide the latest available production information on horticultural management such as cultivar and rootstock selection, optimal cultural management, economics and post-harvest handling. County agents were involved in developing the training and received in-service training and one-on-one training sessions. As a result, traditional fruit growers adopted and planted newer rootstocks in higher-density systems with higher-value cultivars that have a greater potential for consistent cropping and economic returns. Growers planting to higher-density systems are optimizing cultural management with newer pruning and training systems, installing irrigation systems and minimizing weed competition. Many small operations of peach, apple and pecan orchards have been established by full-time farmers looking to diversify, as well as part-time farmers or non-farmers seeking additional income.

**Farming system impacts on strawberry and tomato diseases and soil microbial ecology: short and long-term**
**6641**

Methyl bromide-dependent plasticulture crop production, an integral part of small farm operations in the Southeastern United States (SEUS), is a "tool-box" to obtain high strawberry and vegetable production. But methyl bromide (MB), linked to stratospheric ozone depletion, is

set for a January 2005 discontinuance in the United States. MB's loss threatens total estimated direct losses for SEUS strawberry and vegetable growers of $14 million per year. The program enabled plasticulture growers to adopt alternative fumigants or farm management systems. Collection of yield, weed incidence and population structure/diversity of root associated pathogens over time will help researchers implement chemical or biologically based alternatives to MB

**Maximization of laying hen performance, economic return and egg quality**
**6184**
The North Carolina Layer Performance and Management Test started in 1958, in cooperation with the N.C. Department of Agriculture and Consumer Services and the Primary Breeders of Commercial Egg Strains. In recent years, the test and the support it provides has given the industry an avenue to examine common problems with the environment, management and animal welfare of different strains of Leghorns. With the addition and enhancement of the research to include industry problems and environments, the importance of this test has increased to the industry. Breeders and egg companies use the test to compare and evaluate the strains and the different environments that are imposed upon them. Breeders have increased their support to cover the costs of research, publications and postage.

**Mountain aquaculture research**
**6153**
North Carolina has more trout farms than any other state and is the nation's second-leading state in trout production, generating farm-gate income of about $7.5 million in 2002. But producers have historically lost up to 20 percent of cultured trout to enteric redmouth (ERM) disease, and nearly 80 percent of the trout reported lost each year resulted from diseases including ERM. Research and demonstration at N.C. State University led farmers to a more effective way of protecting the fish with a vaccine injection costing just 2 cents per fish, 1/50 of the cost incurred by the loss of a single fish. With this economically viable alternative, producers have seen trout losses due to ERM decline significantly, and they've been able to cut their use of antibiotics by 84 percent since 1996. The relative importance of disease as a source of trout loss in North Carolina has also dropped dramatically from 79 percent in 1996 to less than 30 percent in 2002.

**Small fruit production systems**
**Project 5830**
To control a wide array of diseases, insects and weeds and for a productive crop, most Southeastern U.S. strawberry growers use a strawberry plasticulture system, which is dependent on methyl bromide (MB) for pre-plant soil fumigation. But MB, linked to stratospheric ozone depletion, won't be available in the United States as of 2005, so strawberry growers urgently need alternatives. Southeastern U.S. strawberry growers could lose an estimated $3-4 million dollars annually if suitable MB replacements are not identified and adopted. The team evaluated chemical and biological alternatives to MB in strawberry production for pest control and plant productivity. N.C. Research Station trials demonstrated strawberry yields and quality equivalent to MB with several alternatives. Metam sodium (both shank and drip), Telone II, Compost,

Chloropicrin, and Telone-C35 all produced equivalent yields and quality to MB. Only InLine and non-fumigated plots showing significant mean yield reductions compared to those using MB. The team also isolated and evaluated pathogens colonizing strawberry roots from different soil pre-plant treatments. These studies showed a transplant colonization level that could lead to disease problems and yield reductions. The team is developing plug-plant production methods to produce "cleaner" set-out plants.

**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 studies.** | **0836 5661** |
| **The poultry food system: A farm-to-table model** | **0292** |

**Transport phenomena in agricultural and biological processes**
**Projects 5885, 6482**

A major problem in food processing plants is the lack of adequate training programs for personnel in food sanitation. The team developed a three-credit, on-line distance education food sanitation course (FS 495K) for U.S. food industry personnel and those in other countries, including China and Canada. Tyson Foods selected this food-industry-targeted course, one of a six-course food safety manager's certificate program developed in the Department of Food Science, as an elective in their manager training program, which provides hundreds of students. In 2002, 17 industry persons received course credit and training in developing and conducting a food sanitation program.

**Improvement of thermal processes for foods; aseptic processing and packaging studies**
**Projects 0836 05, 5661**

N.C. State University's Center for Advanced Processing and Packaging Studies teamed up with a start-up company, Industrial Microwave Systems Inc., to examine microwave energy use in the food processing industry. Because of the rapid, uniform thermal treatment delivered with IMS technology, food processing applications are almost unlimited. Food science researchers can integrate quality and safety considerations into this new thermal process to provide consumers with a higher-quality, safer product, while reducing costs for processors. This technology's adoption will spur North Carolina's economic development and increase food products' quality for all consumers.

**The poultry food system: A farm-to-table model**

**Project 0292**

The use of time-temperature integrators (TTIs) to continuously monitor food product temperature may facilitate the strict temperature control required to effectively optimize the product's shelf life. Findings demonstrated that enzyme-based TTIs could be used in chicken drumsticks to predict the population of spoilage microorganisms, end of shelf life and remaining drumstick shelf life under both constant and variable refrigerated storage conditions reflecting ideal and abusive temperature situations. Studies also demonstrated that color changes in the TTI biosensor can be accurately and objectively monitored using simple analytical tools. This technology will provide valuable storage temperature abuse information for the processor and retailer and will provide a basis for an effective stock rotation plan that saves money for the retailer and consumer. Moreover, the application of TTIs to food products may improve the safety of food products by identifying temperature abuse situations that result in the growth of foodborne pathogens on fresh, perishable food products. Studies involving retail supermarket chains are ongoing to verify and validate the effectiveness and costs of these TTI biosensors for tracking product temperature from the processing plant through storage and retail distribution.

## 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** |
| **Animal waste management processes to enhance treatment & use to reduce environmental impacts** | **6423** |
| **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** |

| | |
|---|---|
| **Interior environment and energy use in poultry and livestock facilities** | **0291** |
| **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** |

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

Nursery and floriculture crops have been the fastest growing agricultural sector in North Carolina over the last decade, with annual sales increasing by approximately $24 million per year. The wholesale value of these crops is about $1 billion annually. To establish successful businesses, new growers need a thorough understanding of how to grow and market perennial crops. Workshops, short courses, comprehensive manuals and Web sites for growers and extension agents convey a range of information, including nursery statistics, regulations, licensing and certification, labor laws, vendors, site and crop selection and the latest research results.

**Animal waste management processes to enhance treatment & use to reduce environmental impacts**
**Project 6423**
Continuing professional development opportunities provide professionals working with engineering issues in livestock waste management to be more competent in the services they are able to offer. In-service training workshops help agricultural agency representatives, agri-business vendors, consultants, and regulatory personnel to better serve operators of animal waste

systems, land application equipment, irrigation systems, production unit support systems, and waste treatment units. The leader of this project left the employment of NC State University, thereby terminating this project at mid year.

### Evaluation and modeling of riparian buffer performance in the Neuse River Basin
### Project 6427

Unprecedented environmental regulation calls for a 30 percent reduction in nitrogen loading in Eastern North Carolina's Neuse River. Much of the excess nutrients come from nonpoint sources, including agricultural drainage. A 3-year riparian buffer study along five channelized streams at an agricultural research site found that buffer width, proximity to the stream and soil redox potential (an indicator of whether conditions are favorable for reducing nitrate to nitrogen gas) affected nitrate-nitrogen concentrations. On the other hand, the type of vegetation in the buffer -- fescue, switch grass, pine and mixed hardwoods, native vegetation or row crops or pastures -- was not found to affect nitrate-nitrogen concentrations. The study has implications for agricultural best management practices aimed at reducing nitrogen in groundwater and surface waters.

#### Economics of adoption of agricultural technologies in waste treatment of swine
### Projects 6610, 9676

Intensive hog production in Eastern North Carolina raised concern about waste management. Anaerobic hog lagoons are a potential source of nitrogen and other nutrients that could impact surface and shallow groundwater. Economic evaluation of hog waste management technologies
compared benefits, in terms of pollutants removed per dollar of cost, for three potential add-on technologies or various combinations designed to make lagoon-and- sprayfield technology more environmentally and economically efficient. Of the media-filter, overland-flow and constructed-wetland (as an add-on to the lagoon/sprayfield system) techniques, the constructed wetland alone was the preferred technology. A decision software program and user's manual were developed to help farmers understand the farm-level economic impact of the technologies.

### Precision agriculture for agronomic crops and nitrogen management for corn in Eastern North Carolina
### Project 6652

Optimizing fertilizer management improves farm profitability and reduces likelihood of nitrogen (N), phosphorus and sediment runoffs from fields to the Albemarle-Pamlico estuarine system's waters. In the Tidewater region, fertilizer N is applied to about 29 percent of the state's corn, 26 percent of wheat, 13 percent of cotton and 95 percent of Irish potato acreage. Scientists and producers developed fertilizer rate and timing recommendations and strategies for precision management, water control and reduced tillage to optimize returns and reduce runoff. Estimated impacts: If 50 percent of this area adopted best management practices resulting in a 50 percent reduction in N runoff on the treated fields, then total N runoff would be reduced by about 25 percent. A 10 percent fertilizer N use reduction would save farmers about 6.6 million pounds of N or $1.3 million per year, a substantial N reduction in the region nearest to the Albemarle-Pamlico estuarine system.

### Interior environment and energy use in poultry and livestock facilities
### Project 0291

Poultry and livestock producers near neighbors can cause odor perceptions when dust and gas plumes from production buildings enter the neighbor’s breathing space. A poultry producer was named in a lawsuit by a neighbor, whose home was less than 500 feet from poultry buildings. Windbreak walls, short ducts and taller stacks were evaluated for dispersing livestock building

exhaust fan airflows. Air pollutant dispersion theory analysis showed that the ducts, or similar devices, could dilute air smelled by the neighbor by a factor of two or more. The producer installed short ducts with fiberglass elbows to divert horizontally blowing fan airflow vertically upward. Colored smoke emitters used to compare airflow from the ducts, horizontally blowing fans and wind passing over the four poultry buildings showed that the ducts enhanced the fan airflow's vertical throw by 20 feet or more during moderate winds. Shortly after the ducts were installed, the neighbor dropped his lawsuit. Unfortunately, due to the sudden death of the lead researcher on this project during 2002, it will no longer continue as a viable project for the foreseeable future.

**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.

**Nutrient and by-product utilization and health of turkeys and broilers**
**Project 6343**

Environmental nutrient emissions and enteric health are two issues that challenge the integrated poultry industry in North Carolina. First, economically feasible methods to improve dietary nutrient utilization and recycle animal by-products must be developed and studied. Second, enteric health problems not only reduce nutrient utilization efficiency, leading to increased environmental emissions, but they also account for about 3 to 5 percent of poultry mortality and may also pose risks to food safety. A novel method has been developed using acid preservation and flash dehydration to convert poultry and swine protein by-products into a protein meal that is about 15 percent more digestible than protein meals produced by conventional rendering methods. Depending on any new environmental regulations and animal by-product feeding laws, this technology will save North Carolina's poultry and swine industries more than $5 million in mortality handling and disposal costs. More than 60 percent of poultry feed now includes supplemental enzymes to improve nutrient utilization, resulting in a 5-to-10 percent reduction in phosphorus emissions and improved enteric health**.**

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

The poultry industry is faced with increasing local, state and federal legislation limiting the amount of nutrients applied to the land in the form of poultry manure, waste, or litter. Recently, phosphorus (P) has received a great deal of attention as the rate-limiting nutrient. This research examined the effect of dietary P and phytase levels on the reproductive performance of turkey breeder hens. Decreasing dietary P resulted in no major reproductive problems for turkey hens. The immediate effects of lowering dietary P would be to decrease the breeder feed costs and poult costs, especially if the dietary P could be reduced without dietary phytase. Also, reducing fecal P would offer both immediate and long-term relief from manure and litter use restrictions. The poultry industry could improve its public image through environmental awareness.

**Communitywide impacts and management of septic systems**
**Project 6372**

In North Carolina, state regulatory agencies want to determine how nitrogen (N) from on-site systems may affect water quality across all the state's watersheds, particularly within the Neuse River Basin. This project has analyzed, in detail, the flow dynamics and N removed (on a mass basis) from on-site systems serving selected homes in a small watershed within the Neuse River Basin. The total potential N contributions due to septic systems across the state exceeds 30 million pounds per year without accounting for losses due to plant uptake, denitrification or in-stream removal. In various watersheds across the state, septic system use ranged from less than 40 percent to more than 80 percent of the population of various watersheds across the state. Density of septic system usage exceeded 40 systems per square mile (a level proposed by Environmental Protection Agency as high) in the Catawba, White Oak and Pasquotank River basins. The total potential N contributions within the Neuse River Basin exceeded 4 million per year, a significant level compared to total potential N 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 N due to septic system usage.

**Biology and control of nuisance vector arthropods in North Carolina**
**6479**

La Crosse encephalitis (LACE), caused by a mosquito-transmitted virus, is a leading cause of pediatric encephalitis in the U.S., with North Carolina reporting more LACE than adjacent states. In North Carolina, the disease is restricted to the mountains, especially the Cherokee Indian Reservation, where large populations of the mosquito vector, *Ochlerotatus triseriatus*, occur. This study, the most comprehensive analysis of the socioeconomic impacts of LACE in the United States, revealed that the burden resulting from the disease is substantial. Direct and indirect medical costs of a single case were $32,974. For those suffering from lifetime recurrent seizures as a result of LACE, direct medical costs ranged from $48,775 to $3.2 million. In addition, LACE victims will lose an estimated 12 percent of productive life years. The primary stress factor for LACE patients and their families was lack of information, both during (76 percent) and after (56 percent) the acute phase of the disease. The study highlights the need for active surveillance and prevention programs in this part of the state.

**Improved efficiency of water reuse aquaculture systems**
**Project 3975**

Since 1989, North Carolina State University researchers have been working to develop

technology for intensive fish production indoors in areas of the state with limited water supplies. The North Carolina Fish Barn program combines worldwide water treatment technologies in the production of freshwater and marine fin-fish with very little water usage. Once unique within the United States, it is now emulated at other land-grant universities. This College of Agriculture and Life Sciences program provides design and development services to the agribusiness community. The Fish Barn program assisted Southern Farm Tilapia in developing two operations with a production capacity of 750,000 pounds per year. The Fish Barn program also assisted Deca J Farms in developing a yellow perch facility that will have the capacity to produce more than 1 million fish per year when completed in 2004. The Fish Barn program also provides technical assistance to seven other tilapia production fish barns in North Carolina that will have the capacity to produce nearly 1.5 million pounds of fresh fish annually.

**GOAL 5**
**ENHANCED ECONOMIC OPPORTUNITY AND QUALITY OF LIFE FOR AMERICANS**

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|---|---|
| **Commodities, consumers, and communities** | **0185** |
| **Estimating impacts of community development options** | **6237** |

**Commodities, consumers and communities: Local food systems in a globalizing environment Project 0185**

Agriculture and food systems in North Carolina changed dramatically over the past 50 years. To help communities, commodity groups and others to respond effectively to these changes, N.C. State University conducted focus groups in three counties and surveyed 1,600 farm operators. A 2002 report of these findings was used to help develop a broader understanding of acceptance and adoption of certain technologies, to target educational programs to specific needs and to provide an example of program assessment. Already, social and economic data have been provided to a wide variety of public and private organizations so that they can gain a better understanding of how to collaborate with other agencies in regenerating their communities. Education, health and social services agencies have recognized that only by working together can they provide services that are integrated and effective rather than fragmented and sporadic.

**Estimating impacts of community development options**
**Project 6237**

A model was needed to help in the growth planning process by estimating the costs of development activities. Researchers, working from a Minnesota model that estimates economic impacts, developed the North Carolina Impact Projection (NCIP). NCIP provides estimates of the fiscal impact of economic activities on governmental sectors. NCIP is a series of econometric equations specified and estimated with North Carolina county-level population, labor market and

governmental service expenditure data. Researchers are fine-tuning the economic and fiscal impact models to estimate growth and development impacts on county and city governments.

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**Summary:**

**Total Extension-Research Integrated Projects: 46**

**Smith Lever B & C funding Planned: $1,575,259**

**Total Smith Lever B & C funding allocated to the 46 projects for FY 2002: $1,720,164**

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**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** |
| Goal 1. A highly competitive Agricultural System | 337,491 | 456,627 | 1,131,749 |
| Goal 2. A safe and secure food | 30,893 | 98,804 | 100,795 |

| | | | |
|---|---|---|---|
| **and fiber system** | | | |
| **Goal 3. A healthy, well-nourished population** | **0** | **0** | **0** |
| **Goal 4. An Agricultural system protecting natural resources and the environment** | **382,620** | **328.702** | **432,398** |
| **Goal 5. Enhanced economic opportunity of quality of life** | **81,456** | **79,605** | **55,222** |
| **Total** | **$832,460** | **$964,738** | **$1,720,164** |

**Jon F. Ort** **2-21-03**
**Director** **Date**

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