

NORTH CAROLINA COOPERATIVE EXTENSION

AREERA POW REPORT

Agricultural Research, Extension and Education Reform Act of 1998

**2001
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**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: 2001 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 subsequently revised in 2000 and 2001.

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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:

- sustaining agriculture and forestry
- protecting the environment
- maintaining viable communities
- developing responsible youth
- developing strong, healthy, and safe families

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 targets limited resource audiences. A major portion of the 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, the research arm of the College of Agriculture and Life Sciences. In fact, about 100 of the 350 extension faculty within the college have joint appointments with the research service.

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 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.

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 2001 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 faced a major threat during the period covered by this report because of the outbreak of Foot and Mouth Disease in the United Kingdom, which is a major trading partner and both a source of visitors to the US and popular destination for many US travelers. Tobacco farmers faced major changes in marketing as the major buyer opted for marketing contracts instead of the traditional auction system. A corollary to contracting was the requirement that growers retrofit their curing barns with indirect heating systems, which involved new technology and a very tight timeline. 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, 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. On the positive side, growing and harvesting conditions were particularly good in 2000 and 2001.

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. The Foot and Mouth Disease outbreak in Europe 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. This effort was further broadened to include bio-terrorism in the aftermath of the events of September 11, 2001. Extension programming and resources were redirected to inform producers about FMD and bio-security measures. Other, more traditional programs targeting hog, poultry, beef, dairy, goat, horse, and aquaculture producers continued but at reduced levels because of this redirection coupled with reductions in staffing levels.

Tobacco companies announced that they would buy most of their tobacco through

marketing contracts with growers, bypassing the traditional auction. In addition, these companies required that flue cured tobacco be cured in barns with indirect heating systems, which meant that all existing barns had to be retrofitted on a short time line. Extension responded promptly with programs to address issues related to the changeover, including heater design, evaluating alternative systems, the proper calibration and use of the new heating systems, and help in obtaining financial assistance with the new investment. Both transitions were accomplished without major disruptions.

Low commodity prices for traditional row crops, cuts in tobacco quota and uncertainty about the provisions of the upcoming Farm Bill 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.

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. Volunteers provide additional resources and contribute significantly to the productivity of extension programming. 4,392 volunteers contributed a total of 36,759 hours of their time to programming related to this goal.

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: 4,993 program participants increased their awareness and knowledge of the impacts of global market trends and trade policies. 2,062 participants adopted practices associated with new products. 2,486 participants adopted practices that impacted marketing successes.

Estimated financial impacts included \$3,810,688 in increased profitability through adoption of local and global marketing strategies and \$414,550 increased profits through adoption and marketing of new products.

290 volunteers were involved and contributed 6,296 hours valued at \$ 62,960.

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 20,781 individuals. This total included 1,251 dairy producers, 8,323 beef cattle producers, 1,538 hog producers, 5,503 horse producers, 1,863 sheep and goat producers, 1,805 poultry producers, and 498 producers of aquatic species.

8,773 producers adopted best management practices that optimized income, including 446 dairy producers, 3,447 beef cattle producers, 709 hog producers, 1,987 horse producers, 774 sheep and goat producers, 1,230 poultry producers, and 180 producers of aquatic species.

2,831 producers applied improved farm financial planning practices and procedures. This included 190 dairy producers, 1,039 beef cattle producers, 216 hog producers, 434 horse producers, 330 sheep and goat producers, 567 poultry producers, and 55 producers of aquatic species.

A total of 2073 volunteers assisted with extension programming. These individuals contributed 11,091 hours of their time, valued at \$110,910. Estimated financial impacts on producer income were \$7,082,561. This included income that resulted from improvements in animal nutrition, breeding practices, marketing, buildings and facilities, and health and general management practices.

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 5,607 and 268,826 acres were impacted. The financial impact of adopting these practices was estimated to be

\$21,264,835. The 134 volunteers involved contributed 941 hours, worth \$9,410.

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: 10,209 producers adopted best management practices in such area as pest control, tillage, fertilization, labor management, etc, that increased their yields. 21,959 producers increased their awareness and knowledge of production systems. 5,252 producers adopted practices that lowered production costs or kept production costs below income from the farm. 968,164 acres were affected. All of this contributed to stabilizing or increasing the number of farms and the crop acreage on 2,763 farms and 99,959 acres.

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 \$6,328,818 and reduced costs through improved pest management of \$4,930,690.

A total of 990 volunteers were involved in programming, contributing a total of 10,376 hours valued at \$103,760.

Key Theme: Animal Health

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, the benefits of the program cannot be predicted in advance and the resources committed to planning this effort were not tracked separately. Future reports will describe activities of the CART teams if they are activated in response to emergencies.

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 5499 producers who adopted new market options and 3,879 producers who gained an increased awareness and knowledge of alternative production systems. A total of 94,699 acres were affected. The increase in profitability through the adoption of new marketing options was estimated to be \$14,908,309. 230 volunteers contributed 1600 hours.

Key Theme: Diversified/Alternative Agriculture

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

b. Program Accomplishments: 2,030 producers gained knowledge about alternative production and market practices. 2,053 producers indicated an interest in developing alternative enterprises and producers tried alternative enterprises, methods, and practices. \$2,752,889 was invested in the production and marketing of alternative enterprises and \$4,236,266 in gross income resulted from this new investment.

The number of volunteers involved was 254 and they contributed 2,007 hours. This time was worth \$20,070.

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: 712 limited resource producers increased their awareness and knowledge of best management production practices. 346 producers adopted best management practices that optimized income. 161 producers adopted improved farm financial planning practices and procedures. Estimated financial impacts on producer income were \$176,573. This included income that resulted from improvements in animal nutrition, breeding practices, marketing, buildings and facilities, and health and general management practices.

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: 6,339 producers adopted best management practices such as nutrient management, etc. on 19,238 acres. 1,945 producers increased their awareness and knowledge of marketing options and 605 started to use multiple markets. 862 producers increased their awareness and knowledge of irrigation and management systems and 412 producers adopted new crops on 2,324 acres.

214 volunteers contributed 3,015 hours of time, which was valued at \$30,150.

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: 1,323 producers were interested in this approach, 1,497 gained knowledge about alternative production and market practices, and 478 tried alternative enterprises, methods, and practices. Outside funding support was obtained in the amount \$28,300. 2007 volunteers were involved and they contributed 1,433 hours of their time valued at \$14,330.

FTEs & Program Cost for Goal 1

State FTEs - 50.44	County - 68.57	Program cost- \$6,541,094
NCCESFTEs -State 49	County - 67	Program cost- \$6,411,152
NC A & T FTEs - State 1.44	County - 1.57	Program cost- \$129,942

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

National Goal 2 addresses the subject area of safe and secure food and fiber systems. North Carolina Cooperative Extension's 1999-2004 Plan of Work for Goal 2

covers nine (very) diverse Performance Goals including:

- Goal 1 - Agriculture and the Environment;
- Goal 2 - Animal Production and Marketing System;
- Goal 3 - Crop Production and Marketing Systems;
- Goal 4 - Food Production Manufacturing;
- Goal 5 - Forest Production Manufacturing;
- Goal 6 - Food and Forest Products Manufacturing;
- Goal 7 - Food Safety and Quality;
- Goal 8 - Biotechnology; and
- Goal 9 - Residential and Community Water and Waste.

Each of these performance goals addresses various aspects of the food and fiber continuums that impact the safety and security of the food and fiber supply in North Carolina. Extension efforts at NC State University cover the spectrum from farm to table. Some successful efforts are highlighted. A comprehensive summary of each performance goal follows this summary.

Agriculture and Crop Production. The primary food safety efforts targeting agriculture and crop production is educational programs designed to certify and license pesticide applicators so as to reduce the volume of pesticides used on existing acreage. The number of persons certified or recertified increased since 2000 to 19,188. As a result the number of pounds of pesticides was only 56,727. Pesticide reduction programs also target to consumer audiences.

Animal Production. The NC Cooperative Extension Service rapidly responded to potential health concerns associated with animal production. Informational meetings were organized to alert over 500 citizens, poultry leaders, and poultry and livestock farmers about how foreign animal diseases, such as Foot and Mouth Disease and BSE (mad cow disease), new regulations, and how poultry production updates would impact their businesses, livelihood, communities, and personal lives.

Food Manufacturing. Specialists within the Department of Food Science have conducting training for the meat, dairy, and seafood industries to train personnel working in these industries about how to plan and implement HACCP. These industries are required by law to have validated HACCP plans in place.

Forest Products Manufacturing. NC State University faculty conducted 145 workshops that reached an estimated 3,333 persons. The primary outcomes of these workshops were that 63 firms adopted new manufacturing techniques; \$9.6 million was saved through improved utilization or productivity; \$1.4 million resulted in increased production of value-added products; and \$3.1 million was saved through improved yield, efficiency, and marketing.

Retail Foodservice. North Carolina has responded to the increased need for food safety training targeting the retail foodservice industry. Forty-six (46) counties regularly offer food safety training and the number of persons who have been certified have increased from 2000 to over 3,500 persons.

Consumers. Extension educators actively develop and provide educational information and programs to consumer audiences in order to help them to recognize their

role in keeping their food safe. Over 1,200 programs were conducted with over 16,000 improving knowledge and 11,000 adopting safe food handling practices.

PERFORMANCE GOAL 1: AGRICULTURE AND THE ENVIRONMENT

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

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 BMPs to protect worker health, crop safety, beneficial insect populations, and other environmental protection issues.

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 2001, 19,188 persons were certified or recertified. As a result, the number of pounds of pesticides used per acre of crop was 56,727. The number of applicator citations for improper pesticide application or handling practices was 66 and there were only nine cases of pesticide worker illness.

Consumer. Educational programs on pest management helped more than 45,734 people increase their knowledge of IPM practices. Over 121,500 people reported reducing risk of their own and their pets exposure to insecticides. More than 118,600 adopted IPM practices in their pest management strategies. Over 221,800 gardeners increased their knowledge of plant fertilization needs and methods of application. 251,721 participants increased their knowledge of the prevention and management of pest problems (weeds, insects, diseases, wildlife) through non-chemical methods and/or correct methods for pesticide application. Over 143,885 gardeners adopted cultural practices that reduced/recycled yard waste.

Impact – 121,509 participants reduced their risk of being exposed to insecticides by reducing and/or targeting insecticide usage; 169,933 participants adopting two or more recommended practices that reduced pesticide or fertilizer misuse and water contamination; and program participants saved \$1,685,001 through utilizing appropriate cultural and pest management practices.

PERFORMANCE GOAL 2: ANIMAL PRODUCTION AND MARKETING SYSTEMS

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

Poultry: One of the primary advantages of a vertically integrated poultry industry is that it enables North Carolina poultry producers to rapidly respond to evolving scientific and technological advancements generated by fundamental and applied research, field

demonstrations, and team involvement. For example, in response to the recent threat of foreign animal diseases such as Foot and Mouth Disease (FMD) and BSE (mad cow disease) and proposed CAFO regulations (Confined Animal Feeding Operations Regulations), numerous informational meetings were organized by our area specialized poultry field agents for the general public, state agencies, organizations, news media, poultry industry leaders, and poultry Service persons meetings. Over 500 citizens, poultry leaders, and poultry and livestock farmers gained valuable information on how foreign animal diseases, the new CAFO regulations, and poultry production updates would impact their businesses, livelihood, communities, and personal lives. The meetings were also instrumental in influencing decisions made by the North Carolina Department of Agriculture and United States Department of Agriculture regarding how poultry would be “handled” in the event of a foreign animal disease outbreak. For example, instead of destroying all poultry within a 2-6 mile radius of a livestock outbreak of foot and mouth disease, as initially recommended by the NCDCA, no poultry would be euthanized within the quarantined area unless located on the same farm as the outbreak. Moreover, eight official comments were drafted and submitted to state and national environmental agencies in response to the proposed CAFO regulations.

Other notable activities involving area specialized poultry field agents 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 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. In response to a request for assistance by a poultry judging team at Eastern Randolph High School, an area specialized poultry agent secured resources including donated product for use in practice sessions and aided the Agriculture teacher in training the team. Through these efforts the team moved up 8 places from the previous year while competing at the state FFA contest. Through a continuing effort to improve citizen understanding and acceptance of poultry and livestock production, a news reporter was invited to tour a typical poultry farm. From what could have been a negative attack against the industry turned into a feature article that covered a range of positive topics in support of animal agriculture. As a post script to this story, the reporter returned to the farm with her children the following week to introduce them to farming and modern animal production practices.

A number of notable impacts were achieved through the efforts of the campus Poultry Science Extension specialists. Some examples include the use of egg-layer chickens as a model for studying human ovarian cancer. Ovarian cancer is a deadly disease that kills more women than all other gynecological cancers combined. Each year in the United States, 27,000 to 28,000 women are diagnosed with the disease, and 16,000 to 17,000 women will ultimately succumb to the disease. The disease is not easily detected and is often discovered in an advanced stage. Researchers in Poultry Science and Duke University are using the egg-laying hen to evaluate the efficacy of chemopreventive agents

to reduce the incidence of ovarian cancer. Chickens have been shown to be a viable model because of their high rate of naturally occurring ovarian cancer and similar genetic markers as humans. Two chemopreventive agents aimed at reducing the incidence of ovarian cancer are being evaluated, levonorgesterol, like those found in birth control pills, and a new drug 4-HPR, developed at the National Cancer Institute. This research is expected to provide new preventive therapies for a deadly human cancer and thus save lives.

KEY THEME – Food Accessibility and Affordability

In celebration of Governor Easley's annual proclamation of April Poultry month and the \$277 million income generated by the poultry industry in Iredell, Wilkes, and Alexander counties, a team involving the Iredell area specialized poultry agent and family and consumer education agent were instrumental in establishing the first "April Poultry Month" tabloid. This 12-page newspaper insert was sponsored by 21 local poultry companies and industry supporting agri-businesses and circulated to 15,000 citizens in Iredell and the surrounding counties. The insert featured articles on the economic impact of the poultry industry, nutritional value, safe handling practices, and feature articles submitted by local growers.

KEY THEME – Agricultural Profitability (also addressed under Goal 1)

Health issues are ranked as the primary concern among turkey producers, especially as related to enteric problems, immune function disorders, and leg abnormalities. Many of these health issues, especially for young turkeys, are either directly or indirectly related to nutrition. These health problems are the primary reasons average growth performance in turkeys is about 15% below their genetic potential. This loss in growth potential costs the North Carolina turkey industry at least \$25 million annually. Appropriate nutritional applications are among the most cost effective means to alleviate turkey health problems. To address these problems a Poultry Specialist has been leading the efforts to improve turkey nutrition and management. Several studies were conducted to demonstrate the beneficial effects of several nutritional factors on disease resistance and maintenance of gut health. For example, elevated concentrations of vitamin E, vitamin C, and organic trace minerals were found to improve immune function and disease resistance. Moreover, enteric disorders and poor nutrient utilization were alleviated by including betaine and enzymes in the diets and by modifying feed formulations. This information was presented to the turkey industry via industry meetings, the Carolina Poultry Nutrition Conference, popular press, and journal publications. The turkey industry has adopted several of these nutrition and management strategies thereby minimizing their losses from immunodeficiency, enteric problems, and leg abnormalities. Enteric problems, such as Poult Enteritis and Mortality Syndrome (PEMS), are now under control following the adoption of several of these management and nutritional recommendations. The annual economic impact of this program is estimated to be approximately \$4 million.

PERFORMANCE GOAL 3: CROP PRODUCTION AND MARKETING SYSTEMS –

KEY THEME – Biotechnology is addressed under Performance Goal 8.

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

PERFORMANCE GOAL 4: FOOD PRODUCTS MANUFACTURING

KEY THEME – HACCP

Specialists from the Department of Food Science at North Carolina State University have been at the forefront of the effort to institute the HACCP food safety system in all products that have a regulatory requirement. This effort has previously been reported on, but there are significant updates.

Specialists have worked with the Meat and Poultry Inspection Division of the North Carolina Department of Agriculture to plan and implement a training program for very small meat and poultry plants in North Carolina. In an effort to meet the needs of the industry in the face of in-depth verification, a validation and verification workshop has been instituted in cooperation with the NCDA and FSIS. Impact: The first workshop was taught in November and was attended by state and federal regulatory agencies as well as 30 representatives of every major processor in North Carolina. Participants reported that they would be better able to validate the technical information in their HACCP plans.

The dairy foods processing specialist has participated as a member of the NCIMS dairy HACCP pilot program with service on the committee, on the evaluation team, and as a co-coordinator for the national training efforts. Impact: Training has included all regional milk specialists, members of the FDA Milk Safety Branch, pilot program first phase members for six states, second phase members for ten states and two milk specialists from each state.

Specialists have been involved in the design and maintenance of the seafood HACCP course, in collaboration with AFDO and other organizations. They continue to conduct training regularly. Impact: Currently they have conducted 14 workshops and trained 457 individuals to produce their company's HACCP plan.

FDA Juice HACCP regulations are being implemented in January 2002. NCSU extension specialists have been working with the Juice HACCP Alliance to revise the Seafood HACCP manual to reflect the needs of the juice industry. Impact: The manually is ready for use. The first Alliance course using these materials is scheduled for February 2002.

KEY THEME – Food Safety

In an effort to reduce the threat of foodborne 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 were engaged in the development of an on-farm pre-harvest food safety education program for 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 contaminant-free poultry to processing plants. Following the successful completion of Phase I training where

90% of the North Carolina poultry industry were introduced to the principles of HACCP (Hazard Analysis Critical Control Point program) via 4 one-day workshops, Phase II training was initiated. In Phase II, an on-line pre-harvest food safety course composed of separate modules is currently under development. This training program will provide the foundation for an on-going dialog involving the University, integrators, processors, and growers. This distance education course is in the final stages of development and will be beta tested in the near future. Moreover, each module will be field tested with our commercial integrator partners and then offered to the industry for individualized instruction.

Poultry Science specialists were also actively involved in planning and delivering numerous conferences, workshops, symposia, and schools. These annual outreach activities reach out to approximately 1500-2000 members of the poultry industry from NC as well as from across the country. Specific topics for each meeting are generally selected from input and recommendations of industry program advisory committees and one or more faculty. A total of 10 different annual activities were offered including the National Egg Quality School, the Mid-Atlantic Layer Management Workshop, Poultry Supervisors and Turkey Industry Days Workshop, Southeastern Game Breeders & Hunting Preserve Association Conference, North American Gamebird Association Conference, NCSU Turkey Nutritionists Workshop, Carolina Poultry Nutrition Conference and Soybean Meal Symposium, Feed Analytical Laboratory CONFAB Workshop, Feed Technology School, and the Broiler Breeder and Hatchery Management Conference.

PERFORMANCE GOAL 5: FOREST PRODUCTS MANUFACTURING

KEY THEME – Forest Crops is addressed under Performance Goal 6

PERFORMANCE GOAL 6: FOOD AND FOREST PRODUCTS MANUFACTURING

The focus of programming at NCSU 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 meet this goal, faculty conducted, organized, or participating in 145 workshops, conferences, seminars, short courses, and classes for forest industry and consumer audiences. These efforts reached an estimated 3,333 individuals. These activities results in 63 firms adopting new manufacturing techniques, 142 consumers adopting practices related to the selection, use, and maintenance of wood products, 2,043 individuals increasing their knowledge of the economic importance of the wood products industry, and 10697 consumers increasing their understanding of forest products and their proper use. In economic terms these activities resulting in the following impacts: \$9.6 million saved through improved utilization or productivity; \$1.4 million in increased production of value-added products; and \$3.1 million saved through improved yield, efficiency, and marketing.

Impacts – Individual impacts are described below.

One furniture manufacturing company implemented improvements in their rough mill operation which improved yield by 5% and resulted in an annual savings of \$125,000.

One sawmill decided against investing in a large capital project due to the negative cash flow for the first five years. This decision resulted in an annual savings to the mill of \$1,000,000.

Equipment selection by one sawmill, based on an Extension study conducted a year ago, increased manufacturing efficiency and an additional annual profit of \$500,000.

One sawmill implemented extension-recommended drying procedures that resulted in an annual savings of \$216,000.

An out-of-state manufacturing firm decided to use a different wood species in their operation as a result of Extension programs. The result is a commitment to purchase \$1,400,000 worth of lumber manufactured in North Carolina over the next year.

As a result of extension assistance, one sawmill implemented strategies to reduce downtime, resulting in increased productivity valued at \$310,000 per year.

Sixty-three forest products manufacturing or processing firms have adopted new manufacturing techniques as a result of Extension programs.

PERFORMANCE GOAL 7: FOOD SAFETY AND QUALITY

KEY THEME – Food Safety

Retail Food Safety. NCCES programming addressed two of the six priority areas in the 1997 National Food Safety Initiative – (1) coordination of food safety activities between the private sector, academia, and regulatory agencies, and (2) education of food handlers. The foodservice industry is the second largest retailer in NC employing over 250,000 people. According to the Centers for Disease Control and Prevention, nearly 50% of all reported foodborne illness outbreaks are attributed to unsafe food handling practices occurring in foodservice operations. To address this problem, 46 counties have partnered with the local health department to offer the ServSafe: Serving Safe Food program to retail food managers and their employees. ServSafe is a nationally recognized certification program developed by the Educational Foundation of the National Restaurant Association. Programs are delivered both through trained extension agents and food safety and quality specialists. A driving force behind this program is to provide to appropriate audiences a broad scientific perspective of food safety from farm to table.

Impact – 537 programs were offered to managers and 791 to other food handlers. Of these, 163 were certification programs for managers and 84 for food handlers. Over 3,500 foodservice workers were reported to have increased knowledge about safe food handling, 1,606 foodservice managers successfully completed their certification exam.

Consumer Food Safety. 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 food safety practices and knowledge 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.

Impact – 1,246 programs were conducted for consumers. Of these, four were

Master Food Preserver programs involved 89 individuals. Of all consumer programs, 16,322 increased knowledge and 11,153 adopted safe food handling practices.

PERFORMANCE GOAL 8: BIOTECHNOLOGY

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

Agriculture. Twenty-two (22) North Carolina counties conducted educational programs that target farmers and citizens about biotechnology and the use, benefits, and risks associated with the production of genetically engineering crop plants. The resulting impacts are as follows.

Impact – Profits due to the use of practices associated with production of genetically engineered plants was over \$4 million. It was estimated that \$1,049,101 were saved to the decreased pesticide usage. Over 12,000 persons were reported to have increased their awareness and knowledge of biotechnology and its applications to crop production and 34,426 increased their understanding as a result of educational efforts sponsored by the Cooperative Extension Service. In 2001, 3,071 person utilized genetically engineering varieties of crops on a total of 383,861 acres.

Consumer. Education efforts targeting consumers with information about the safety and acceptability of the use of biotechnology in the food supply was conducted in one county.

Impact – The program reached 3,064 consumers. Of those participating 1,049 improved their attitudes about the safety and acceptability of the use of biotechnology.

PERFORMANCE GOAL 9: RESIDENTIAL AND COMMUNITY WATER AND WASTE MANAGEMENT

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.

Impact – In 2001, 154 improved their existing wells. An additional 244 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, 232 persons had their water tested and/or treated properly. One individual had their unused well properly closed and 55 had their old or hand-dug wells replaced with modern well or hookup to a municipal water supply. Of those participating in educational programs, 84 reported that they believed that these best management practices were beneficial.

FTEs & Program Cost for Goal 2

State FTEs - 30	County - 42	Program cost- \$3,753,222
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Goal 3. A HEALTHY, WELL-NOURISHED POPULATION

Issue

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 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 Disease

Dietary factors are associated with five of the ten leading causes of death in N.C. (and in the U.S.), including coronary heart disease, some types of cancer, stroke, noninsulin-dependent diabetes mellitus, and atherosclerosis. Another three (cirrhosis of the liver, unintentional injuries, and suicides) are associated with excessive alcohol intake. Currently, health professionals are more concerned with excess and imbalance of certain components in the diet than the dietary deficiencies seen in former days. North Carolina has higher age-adjusted mortality rates in comparison to national averages; much of which may be related to what citizens eat. Diets in North Carolina are improving but 1993 and 1994 statewide surveys show that people still consume too much fat, salt and sugar and too little high fiber fruits, vegetables and whole grain foods. Many people have heard and accepted the message that they should reduce the fat, salt and sugar in their diets however, all too often, they don't recognize where these components are in foods or how to lower their intake. As research continues in these areas and as consumers continue to seek the answers to their questions, programs will continue to be needed that address the risk factors associated with various health problems and appropriate lifestyle changes.

Lifecycle Concerns

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

continued programming in the maternal and child area.

No time is more important than childhood to promote healthy eating and health practices. Children in North Carolina do not consume enough fruits or vegetables and have diets that are low in fiber and higher in fat than recommend. Children in North Carolina need quality nutrition education to help positively influence their food choices. Childhood overweight has reached epidemic status in the nation and in North Carolina. Practical approaches for preventing overweight in children are needed. 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 population. 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.

NCCE 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, health, 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, Healthy Heart, Our Destiny Is Our Decision, Color Me Healthy, NoonLiting, Out For Lunch, SyberShop, Expanded Food and Nutrition Education program and the In-Home Breast-feeding 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 included using the Internet, mailed materials, media, one-on-one contacts, and public meetings. 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 CEMP members brought in more than 11 million dollars in funds. As a result of programming, over 84,000 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 30,000 changed diet and lifestyle habits, and improved their quality of life and the quality of life of others. Over 14,000 participants decreased dietary fat consumption, over 11,000 decreased dietary sodium consumption, over 11,000 increased fruit and vegetable consumption and over 12,000 increased dietary calcium consumption. As a result of the changed diet and lifestyles over 1,500 decreased high blood cholesterol levels, over 1,800 decreased high blood glucose levels, over 1,200 decreased high blood pressure levels, over 2,000 decreased excess body weight and over 3,000 adopted behaviors to improve

their chances of delivering a normal weight baby.

Performance Goal #1

Participants will adopt behaviors to promote a healthier diet.

Key Theme: Human Nutrition

Output Indicators

Numbers of participants increasing knowledge that will promote a healthier diet: 67,654

Numbers of participants increasing awareness of need to have good nutrition habits: 84,473

Numbers of participants changing attitudes and aspirations that will promote a healthier diet: 50,448

Outcome Indicators

Number of participant's who adopt diets consistent with dietary guidelines for good health: 31,507

Key Program Components

The key teaching components include Worksite Wellness programs, health fairs, workshops and demonstrations, after-school programs, parent-teacher programs, and face-to-face encounters. Media is used to effectively disseminate a clear message about healthy eating patterns. Programs such as SyberShop, Partners in Wellness, Give Your Heart a Healthy Beat, Noonliting, and Out For Lunch help participants gain the needed knowledge and skills to adopt healthy dietary behaviors.

Performance Goal #2

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

Key Theme: Human Health

Output Indicators

Numbers of participants who increase knowledge in how to reduce risk for chronic disease: 20,546

Numbers of participants who increase skills that will promote reducing risk of chronic disease: 17,302

Numbers of participants who change attitudes and or aspirations that will promote reducing risk of chronic disease: 17,161

Outcome Indicators

Number of individuals reducing risk factors for chronic diseases (heart diseases, strokes, cancers, adult-onset diabetes, arthritis, arteriosclerosis, and osteoporosis) including:

- Numbers who decrease high blood cholesterol level: 1,720
- Numbers who decrease high blood pressure: 1,277
- Numbers who decrease high blood sugar: 1,862
- Numbers who decrease excess weight : 2,011

- Numbers who decrease fat in diet to below 30% of calories: 14,496
- Numbers who decrease sodium in diet: 11,016
- Numbers who increase fruits and vegetable consumption: 11,387
- Numbers who increase calcium in diet: 12,435

Key Program Components

The key teaching methods 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 is used to effectively disseminate messages about the relationship between chronic disease and eating patterns. Programs such as Give Your Heart A Healthy Beat, Partners In Wellness, Out for Lunch, Color Me Healthy and NoonLiting help participants adopt eating patterns that will decrease their risk of chronic disease.

Performance 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.

Key Theme: Human Nutrition

Output Indicators

- Parents increase awareness and knowledge of importance of good nutrition for children: 5,613
- Parents increase knowledge about good eating habits for children: 5,446
- Parents and children participating in food and nutrition activities together: 3,084
- Child care providers increase knowledge about the importance of good nutrition for children and the importance of teaching children about nutrition: 4,500

Outcome Indicators

- Parents adopt food behaviors consistent with the Dietary Guidelines and the Food Guide Pyramid.: 4,692
- Children adopt food behaviors consistent with the Dietary Guidelines and Food Guide Pyramid: 4,832
- Child care providers teach children about the importance of a healthy diet based on the Dietary Guidelines and the Food Guide Pyramid: 3,252

Key Program Components

The key teaching points are training in nutrition for child-care providers, in-home study for parents and children, health fairs for parents and care-givers, one-on-one discussion with parents, and work in the classroom and child-care setting with children. Mass media is used to effectively disseminate nutrition messages to parents and child-care providers about the importance of helping children to form healthy eating habits early in life. Programs such as HomePlate, Color Me Healthy, Out For Lunch and SyberShop (a multimedia CD-ROM for adolescents) help young people adopt healthy eating patterns for a lifetime of good health.

Performance Goal #4

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

Key Theme: Human Nutrition

Output Indicators

Numbers and percent who increase in knowledge of nutrition and diet: 40,896
 Numbers of participants in programs such as Food Stamps, WIC free/reduced school meals who increased awareness which lead to improved health: 11,005; NC A&T Food Stamo Program - 2365 participants increased knowledge and demonstrated skills in using the Food Pyramid Guide and the 2000 Dietary Guidelines for Americans.

Outcome Indicators

Numbers and percent who made dietary improvement: 28,579
 Numbers of pregnant women seeking prenatal care: 2,922
 Numbers adopting behaviors that reduce low-weight births: 3,826

Key Program Components

The key teaching components 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, Eat Right-Add to Life Program, Color Me Healthy, Out For Lunch, and Partners In Wellness help limited resource audiences adopt behaviors that improve the nutrition adequacy of their diet.

Target 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:

Federal and State Agencies,
Day-care Centers and Family Day Care Homes,
Local and regional hospitals, Physicians
Boys and Girls Clubs,
Parent and Teacher Organizations

After School Programs

Public Schools
Family Resource Centers
4-H Youth Development
Corporate Partners
Media
Faith Community
Head Start

FTEs & Program Cost for Goal 3

State FTEs - 7.35	County FTEs- 23.09	Program cost- \$1,425,277
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NCCES state FTEs - 7	County FTEs- 23	Program cost- \$1,404,557
NC A & T state FTEs -.35	County FTEs -.09	Program cost- \$20,720

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. An example of the efforts under this goal comes from Davidson county: "Cattle producers are concerned about water quality and how future environmental regulations could affect them. NRCS/DSWCD have cost share programs available, but few cattle producers are aware of them. The Davidson County Cooperative Extension Service and NRCS/DSWCD conducted a twilight meeting for beef producers to explain cost share programs available for installing watering systems that can help to eliminate stream bank erosion and pond dam destruction with the resulting cleaning drinking water for cattle. This meeting was deemed a success because 8 producers out of 35 requested further

information and site evaluations for their farms.”

During 2001, more than 2,400 land application operators were trained and certified. In excess of 160,000 acres of best management practices (BMPs) were adopted on units associated with animal production. Those efforts have reduced soil loss by 131,000 tons per year. The estimated economic value of livestock organic byproducts utilized (nutrients, organic matter, etc.) was more than \$10.2 million. 84% of producers (8,244 of 9,709) are now utilizing approved waste management plans. Over 275 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, “Landscape and turf maintenance is a fast growing business in Davie County. The increase is a result of population and housing increases, and an aging and more affluent population. New and existing landscapers need education and training on pest management, fertility, turf establishment and maintenance, pesticides, research updates and pesticide recertification. Therefore, the ‘Landscape and Turf Professionals Training’ was established. The half day training features presenters of current research and information from NCSU, NCDA, and private industry targeting needs based participant surveys. 36 landscape professionals attended the 2001 training receiving 1.5 hours of pesticide recertification credit. In addition, 66% indicated the training was quite or very useful to them and their business. 77% indicated that they now always or normally use or recommend slow release fertilizer. The adoption of slow release fertilizer results in increased fertilizer efficiency, reduced potential for off site movement and is an environmentally friendly practice.”

119 industry meetings and trade shows which promoted environmentally sound agriculture were held in 2001. Agribusinesses sponsored at least 112 environmentally focused programs. During 2001, more than 28,700 pesticide application professionals were certified or recertified. Over 1.65 million tons of soil were saved through reduced soil loss from row crop, horticultural crop, or forested land. Over 4,200 acres of wildlife habitat was established. BMP adoption was very successful, with over 640,000 acres in no-till, 546,000 acres in residue management, 659,000 acres using integrated pest management, and 205,000 acres utilizing improved forestry practices. Over 3,400 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 Beaufort County: “Beaufort County Extension Agents teamed with local NRCS to train farmers for participation in the nutrient management program. During each of the three meetings, farmers were exposed to the latest data on nutrient management, nutrient leaching and availability of nutrients to plants. As a result, 38 farmers received training that enabled them to write their own nutrient management plans and participate in the program. The training also reduced the amount of fertilizers used on those farms by 10% to 25%.”

In 2001, more than 5,500 individuals attended environmental policy seminars and workshops. Multi agency groups delivered more than 165 programs on regulations and environmental constraints. There were at least 115 organized contacts between the agricultural community and special interest groups. As a result of these meetings, over 8,450 individuals indicated that their knowledge of the policy making process had increased. Over 750 people indicated that their participation in policy making increased. More than 31,700 people stated that they were now more aware of the links between agriculture and the environment.

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. Hyde County reported: "An environmental scan in 1995 revealed a water quality issue in the community of Engelhard. A shoreline survey conducted by DEHNR in Hyde County found 55 direct and indirect discharges of septic systems into Far Creek, a very important primary nursery area of Pamlico Sound. It was determined by meetings with community leaders, NCCE Specialists and personnel from DEHNR that an innovative waste management system would be needed. Specialists from Biological and Agricultural Engineering and Extension Forestry helped design a waste management system with a research component for the community. After a series of public meetings to make the community aware of the issue, community leaders sought and were granted 5 million dollars funding from the General Assembly to build the system. The system will be operational in early 2002, thus saving tons of nutrients from degrading the water quality of Far Creek."

Results reported in 2001 indicate significant and demonstrable improvements in performance, knowledge, and attitude regarding agriculture and the environment – both in agricultural and non-agricultural communities.

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.
- a. "The Wake County Center of the North Carolina Extension Service held an Agricultural Water Quality Workshop. The workshop featured practices recently installed on farms including: nutrient management, wheat fertilization, water management, and buffers. Compliance with the Neuse River Rules was also discussed. The event was covered by 3 media outlets, ...reaching hundreds of thousands of NC residents."
- b. Smith-Lever Act funds and State matching funds.
- c. 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. "Training to assist animal waste system operators continues to be an important issue for this area. In 2001, seven new operators were provided with the necessary 10 hour training to allow them to take the certification test. Also, 19 area operators were provided with 2 hours of continuing education training."

"The timely land application of poultry litter is a major concern. After recognizing the timing factors for land application facing poultry producers in Bladen County, a collaborative approach to increase the number of poultry litter storage facilities was focused upon by the representatives of Cooperative Extension, Natural Resources Conservation Service (NRCS) and the Soil and Water Conservation District (SWCD). Each agency participated in marketing the effort through newspaper articles, newsletters, personal producer contacts and contacts with integrator service people. To date, seven (7) poultry litter storage buildings have been completed and eleven (11) are in some phase of the process. The completed buildings have improved the timing of land application of 108,000 pounds of nitrogen and assisted the poultry producers in complying with state regulations. Interest by poultry producers remains very high in this effort."

- 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, gulying, disruption of normal tillage operations) and off-site impacts (loss of aquatic habitat, pesticide and nutrient pollution, sedimentation in sensitive areas). Extension is working with other state and federal agencies to educate farm and non-farm communities about erosion control and stream bank stabilization. These efforts not only help keep the soil in place, but also improve water quality and recreational opportunities downstream.
- b. "Farmers have adopted no-till at greater ac. each year in Pamlico County. This year, there has been a 25% increase of no-till in soybeans, cotton, wheat and corn. One grower stated that by using no-till he could plant 200 more ac. using 3 less people. He figures that he reduces his cost per ac.\$20 for soybeans, \$15 for wheat, \$32 for corn and \$43 for cotton. Over his 2200 ac no-till, this farmer had an increase of income of over \$50,000 from changing to no-till. He further states that as result of his using no-till he is able to plant and harvest more timely fashion."

"One Caswell county livestock producer wanted to look at alternative watering sources for his cattle, so he came up with an idea with help from Cooperative Extension and financial assistance from NRCS. He developed a spring site that will water all his cattle and allow them not to rely on getting water from the creek, therefore improving water quality in the stream and reducing erosion on the stream banks. This producer was extremely pleased with his new arrangement."

- c. Smith-Lever Act funds and State matching funds.
- d. 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.
- b. "Vegetation on coastal dunes in Brunswick County is often fertilized to increase growth and coverage by the plants. Municipalities and private property owners apply fertilizer to dunes as part of their coastal erosion management plans. Highly soluble forms of nitrogen, such as ammonium nitrate, are frequently used to supply nitrogen to the plants. In 2001, the NCCES Brunswick County Center worked with a local fertilizer supplier to formulate a 30-10-0 fertilizer using a controlled-release nitrogen product. This formulation is research-based to supply the correct ratio of nutrients to the dune plants. The nitrogen is less likely to leach into the groundwater than other forms previously used."

"During 2001, Cleveland County's Multi-Agency Conservation (MAC) Team comprised by NC Cooperative Extension, Cleveland Soil & Water Conservation District and Natural Resources Conservation Service, worked closely in several key areas. The team shared the workload in helping 25 poultry producers develop and successfully implement approved litter management plans. They also collaborated in collecting soil samples, background information and field data in support of the statewide Phosphorus Loss Assessment Study. The MAC Team supported Cleveland County Farm Bureau and the local farming community in the development and adoption of a Voluntary Farmland Preservation Program. They also formed a soil quality team to evaluate the biological, chemical, and physical benefits of long-term no-till and to share that information with relevant agencies and farmers."

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

FTEs & Program Cost for Goal 4

State FTEs - 33.25	County FTEs - 64.25	program cost \$4,845,819
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NCCESFTEs -State 32.8	County - 63.9	Program cost- \$4,823,819
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NC A & T FTEs - State .45	County - .35	Program cost- \$22,000
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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 8.0 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.

North Carolina Cooperative Extension’s state and county unit based professionals made major impacts in the year 2000 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

Seventy county Extension units submitted 92 reports of efforts to insure the child care professionals in North Carolina will provide safe, nurturing, appropriate programs for children. Thirty-four county Extension units submitted 43 reports of effort to increase the amount of quality child care as a result of improved collaboration among county agencies, increased resource development and the education of business leaders, court officials, school and private.

Impacts:

Thirty-two thousand, five hundred and forty-three children in quality child care demonstrated improvement in social-emotional, cognitive, and physical development as reported by parents, providers, and school personnel. Twenty-four thousand, six hundred and seventy-nine hours of training were provided to 2,932 school-age care providers. One thousand, eight hundred and nineteen of those reported an increase in knowledge, attitude, and skill. Thirty-three thousand, seven hundred and six hours of training were provided for 9,547 center care professionals. Three thousand, eight hundred and eight reported increases. Twenty-six thousand, eight hundred and ninety-four hours of training were provided to 4,551 family child care providers. One thousand, nine hundred and forty-two reported increases. Eleven thousand, seven hundred and forty-eight hours of training were provided to 1,056 youth with 813 reporting increases. Two thousand, six hundred and sixty-three volunteers worked 32,561 hours at a value of \$325,610. The value of the program to society is \$3,981,373.

Two thousand, nine hundred and nineteen new child care slots were created, and 62 new centers/homes were brought on-line as a result of Extension efforts. Four thousand, six hundred and fifty-five providers increased knowledge.

Key Theme - Youth Development 4-H

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, the 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.

Impacts:

During 2001, approximately 187,008 young people, including limited resource youth, between the ages of 5 and 19 participated in 4-H programs with 118,740 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:

Thirty-one thousand eight hundred seventy-nine youth increased their communication skills. Thirty thousand seven hundred and ten youth have increased their decision-making skills. Thirty-nine thousand four hundred and sixty-eight youth increased their awareness of community service. Sixty-three thousand four hundred sixty-six youth increased their knowledge in various curriculum areas. And, 33,373 increased their self confidence.

In addition, counties reported that as a result of the 4-H community service projects, their communities saved \$486,116.

Youth (including limited resource youth) demonstrated increased life skill capacity in the following numbers:

self-confident – 33,373; making decisions – 27,375; communication – 29,836; managing relationships – 19,772.

Seventeen thousand, two hundred fourteen families were actively involved in 4-H through 1,466 4-H clubs. Two hundred forty-one thousand, one hundred fifty-six youth participated in all forms of 4-H.

Key Theme – Resilient Youth, Families, and Communities

High risk youth were the target audience of 49 county reporting units. Their objective was “youth in high risk environments will participate in community based programs resulting in youth acquiring coping skills, making informed decisions, and developing a sense of purpose and future.”

Progress was reported for 13,345 youth increasing basic life skills, 5,507 increased literacy, 7,808 increased community involvement, and 10,243 increased knowledge and awareness (and alternatives to use) of drugs and alcohol.

Impacts:

During 2001, 12,705 high risk youth increased life skills, 6,696 improved academic performance, 6,966 expanded citizenship involvement, 2,770 reduced used of drugs and alcohol, 1,223 reduced judicial involvement, and 1,081 reduced incidence of violence.

Families participate in educational experiences through programs managed by North Carolina A&T State University that allow them to identify problems, determine solutions, and develop skills to cope with family adverse situations. Family coping and communication skills have remained as the primary focus of this objective. Through parenting classes and workshops, families are learning new ways of developing and maintaining stable relationships among themselves. A second focus is in the area of violence prevention, particularly relating to teaching children about safety.

Impacts:

Over two hundred youth, ages 8 to 12, and 22 volunteers participated in a Mini Society program, facilitated by NC A&T S U. One hundred seventy-two youth participants increased their knowledge and demonstrated skills in designing and developing their own society as well as learned the framework of life and work which included economics, law, ethics and a variety of other subjects. One hundred thirty-one youth illustrated the knowledge and effective use of conducting a market survey, determining a location, establishing costs, acquiring start-up money and advertising to successfully start a business.

Learning skills needed to help protect families from substance use and abuse was the focus of 24 families. Money was allocated from the Department of Juvenile Justice for substance abuse prevention, and a special council and program was designed to work with families with substance abuse behaviors that result in court appearances.

Impacts:

One thousand four hundred and five reported a reduction in conflict through improved family and interpersonal communication, and 1,708 adopted family coping and nurturing practices. Family members increased knowledge and awareness of family coping and nurturing practices through a variety of activities and educational programs. In one county, participation in an intensive family preservation program saved six children from being separated from their families. In another county, through parenting education sessions, participants reported an improvement in the frequency and level of positive family interactions, understanding of normal adolescent behavior, and the ability to handle conflict better.

Eight persons completed a Divorce Care 12-week series. At the end of the session, face-to-face self-evaluations indicated that each person had gained knowledge in how to cope with their individual situations and how to help their children cope with separation and divorce. Each individual had children ages 7-18. Each person requested to have the opportunity to repeat the class. This will give them an opportunity to see how they have

grown and learned how to use their coping skills.

Extension Outreach has helped to resolve family conflict and promote family harmony through effective parenting, management, decision-making classes; and juvenile courts have helped to discipline youth.

of 120 money management plans. Six hundred and sixty-two persons increased their knowledge and awareness of effective communication skills, while 1,827 reported having increased their knowledge and awareness of family coping and nurturing practices.

Impact:

A reported \$3,847 in savings and reallocated monies was reported through effective money management.

Key Theme - Aging / Estate Planning / Retirement Planning

Thirty county Extension units 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.

Impacts:

Two thousand, three hundred and fifty-two participants improved financial status through adoption of consumer and financial management practices. A total of \$24,012 in increased savings and/or retirement contributions was reported. Eight hundred estate plans were developed and implemented; and one thousand, one hundred and seventy-three plans for possible future incompetency and dependency were developed.

Key Theme - Community Development

Twenty-eight 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. 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.

Impacts:

Nineteen hundred thirty persons attended conferences where they received information concerning economic conditions and economic trends for their local communities. Twenty-four counties reported that due to efforts to increase awareness of opportunities and improved skills of special audiences: 540 persons participated in local public hearings, 39 participated in the voting process, 598 joined the local labor force, 825 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. Ten of the counties reported that a total of 66 new businesses were attracted to their counties as a result of this educational effort. Nine counties reported over 437 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 12 new business start-ups with an estimated payroll of \$69,500, and it was reported that 13 small and home base businesses developed business plans. The value to the local communities that was reported by these 28 counties was \$1.33 million.

Key Theme - Community Development

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. Citizens from varying socio-economic levels gained knowledge and skills that facilitated their participation in community problem-solving and in local decision-making. One thousand five hundred local citizens improved their problem-solving skills with 475 taking action and participating in the community / public policy process as a result of the training they received. One hundred fifty-five community issues were addressed. Of those resolved successfully, local communities saved an estimated \$173,000 in cost.

There were 8,600 limited resource and other non-traditional participants involved in leadership training. One thousand five hundred forty-eight of these participants in 27 counties identified community problems and took steps to solve them.

Their actions resulted in 1,120 problems being resolved or projects completed to address the problems. To continue finding solutions to problems, these individuals formed 100 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 30,725. A number of these volunteers became part of volunteer management systems (713) 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.

Key Theme – Family Resource Management

Eighteen 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. Thirty-five 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. Twelve 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.

Impacts:

While the number of persons who actually increased their knowledge of the value of financial planning numbered 1,446, the number who actually demonstrated success in the planning process was 469. An additional 969 persons reported ongoing success in implementing goal setting, family budgeting, and record keeping. There were an additional 311 persons who actually developed and implemented a "life cycle plan." Eighteen counties reported that as a result of conducting best management financial planning educational programs, 330 persons reported improving their financial status. The 35 counties reporting impacts for limited resource audiences, found that 1,273 persons had collectively reduced debt by an estimated \$163,860. In addition, 1,190 persons attained

their financial goals, and 3,103 improved their family financial self-sufficiency with resources available to them.

FTEs & Program Cost for Goal 5

State FTEs - 21.81	County - 142.27	Program cost \$6,717,450
NCCES FTEs -State 20	County - 140	Program cost- \$6,559,980
NC A & T FTEs - State 1.81	County - 2.27	Program cost- \$157,470

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. 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 well 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 input 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.

Environmental scans were conducted, in 2000, in the one hundred counties and the Indian reservation by approximately 5,000 individuals representing extension staffs, advisory leadership council members, specialized extension committee members, clientele, volunteers, commodity group members, environmental group members, local decision makers, and other members of local governmental agencies. For the 2000 environmental scan, data were collected from over 20,000 individuals.

In 2001, the continuous assessment of needs and issues was effected by several techniques. At the local level, county advisory council, specialized committee members, and extension personnel reviewed current programming with respect to whether ongoing needs and issues were being assessed. State and district extension administrators held meetings in each of the state's seven districts. The district meetings involved a wide and diverse participation of both extension and non-extension clientele including decision makers and other local government personnel. A third assessment of critical needs and issues occurred in preparation for visits by congressional members and their staffs. For each of these congressional visits, needs and emerging issues were assessed, prioritized and presented to the legislative groups.

Utilizing data and inputs from these major information generating meetings was the basis for adding, deleting, and modifying current extension programs.

C. Program Review Process

The Long Range Plan Steering Committee, with members representing NCSU and NC A&TSU, is 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 2001, NCCES had documented multistate activities using Smith-Lever B & C funds amounting to \$322,381. This funding level exceeded the originally planned expenditure of \$191,700 by \$130,681. Altogether, the 2000 plan indicated 12 activities. Additional activities have been added for a total of 17. However, one of the originally planned activities has been removed, thereby making a total of 16 reportable multistate activities for 2001.

NCCES conducts a vast number of multistate collaborative programs. However, the numbers of activities that could be identified as the multistate requirements that were identified in 2000 showed that these were the only activities that met all the AREERA requirements at the time. During the 2000 fiscal year, two of those originally planned activities failed to meet the AREERA requirements. However, 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 are on target, with financial goals also on target to meet the plan. Unfortunately, the difficulties associated with the Orchard Floor Management Program as indicated in the Multistate report will preclude that program from continuing as a part of the NCCES multistate plan. Loss of the personnel associated with this activity coupled with severe budget shortfalls has resulted in hiring freezes and subsequent reallocation of resources in filling this position using other than Smith-Lever funds has resulted in this activity being removed from the plan, even though it is now a viable program.

Efforts continue to expand current programs and identify additional multistate activities for meeting or exceeding the AREERA requirements. Such activities will be subsequently added to the plan and reported upon as appropriate. The key point is that NCCES has significant multistate activities underway on a continuous basis which 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, 34 had Smith-Lever B & C funding allocated for all or part of the Extension funding in 2001. For fiscal year 2001, these B & C funds amounted to \$964,738. This funding level exceeded the originally planned expenditure of \$934,731 by \$30,007. This 2001 expenditure exceeds the prior year by \$132,278. Plans are to significantly increase the numbers of projects with increasing levels of Smith-Lever funding

for the 2002 fiscal year. Two of the 34 funded project reports were combined into other companion project reports, giving a total of 32 projects reported on for 2001. However, some originally planned projects have been or are being discontinued due to retirements or resignations of project leaders, and some have been discontinued because of changing research and extension priorities.

While the integrated projects have a greater focus on Goals 1 and 4, some projects are reported under Goals 2 and 5 as well. 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 2001 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: 2,086

Report: This SERA is scheduled to run through 9/03. The major activity of the this SERA in 2001 was planning and conducting the Southern dairy conference. The 2001 conference was held in Atlanta in February, 2001. The SERA committee members held two half-day meetings in 2001, one in February immediately after the dairy conference and one in July in conjunction with a planning meeting for the 2002 Southern Dairy Conference. The agenda for both meetings included an information exchange and discussion of regional collaboration. Budget problems and downsizing of dairy interest faculty were seen as major challenges.

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. Future funding for this multi-state project is under review based on personnel and funding availability. With the uncertain circumstances facing this program, we are revising our plan and will drop this program from our multistate plan for the future.

Program 3.

Southern Region Small Fruit Consortium

Specialized assistance provided to small fruit growers in North Carolina, South Carolina, Georgia, Virginia, and Arkansas.

Amount funded: 28,670

Report: This program provides grower workshops and agent training programs throughout the Southern Region on one of the fastest growing horticultural commodities in the Southeast - strawberry plasticulture. In 2001, the SR-SFC provided Strawberry Plasticulture Workshops and In-service trainings in Georgia (1), South Carolina (1), Arkansas (2), and Virginia (2). There were 350 producers and agents directly impacted by those meetings in these other states in 2001. In Arkansas alone, the strawberry plasticulture industry has gone from 5 acres in 1998 to over 250 acres in 2001 as a direct result of this regional outreach effort (each acre of new strawberry plasticulture generates approximately \$30,000 for the local economy (purchase of supplies as well as farmgate receipts). A new web site has been developed called BERRYagent, 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.

Program 4.

Pork Industry Handbook

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

Amount funded: \$15,300

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. 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.

Regional Vegetable Guide

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

Amount Funded: \$22,400

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 TN and FL to share recommendations.

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: \$19,170

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.

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, \$30,000

Report: The Breeding and Gestation Herd Management Internet Course was Beta tested

at NCSU based on the national Breeding and Gestation Herd Management Curriculum. The course consists of interactive HTML lessons, images, and self-grading quizzes, and allows for student - teacher interactions via E-mail. The Internet course was pilot tested in cooperation with NPPC during the spring of 2001. A total of 117 participants enrolled, 77 participants completed the course and 72 evaluations were returned. Eighty-one percent of producers responded that they strongly agreed or agreed that the course provided them with an opportunity to improve job skills. However, specific gains in knowledge differed by the participant's years of experience, job description and farm size and type with participants with less experience and from more general swine farms gaining more knowledge. Fifty-four percent of the producers indicated plans to make changes in production practices based on knowledge gained from the course. This demonstrates that this type of educational program not only makes information readily available at a time convenient to the clientele but that it is also effective in delivery and can result in improved knowledge and job skills.

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 the 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 involved.

Amount funded: \$48,950

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, very small nanoparticles having the capacity to bind the foodborne pathogen *Campylobacter jejuni* are being developed as a novel on-farm strategy to prevent intestinal colonization of campylobacters and promote flushing of these pathogens from the intestinal tract of poultry. Development of these pro-active strategies to eliminate pathogens from poultry carcasses represents a logical approach for improving the safety of poultry products. In a second collaboration between NCCES and Clemson, an in-package pasteurization process combined with packaging materials containing novel bacterial inhibitors are under development as a means for eliminating bacterial pathogens from the surfaces of ready-to-eat poultry products. A final successful collaboration between NCCES and several of the cooperating states involves the development of a simple, cost effective biosensor (i.e., time temperature integrator - TTI) for tracking product temperature abuse and predicting end of product shelf life at any stage of storage, distribution, or marketing. The use of TTIs to monitor product temperature throughout the distribution chain is anticipated to aid the poultry industry in producing a safer and higher quality product.

Goal 3. A HEALTHY, WELL-NOURISHED POPULATION

Program 1.

Partners in Wellness

Nutrition education for the elderly, a program involving North Carolina and Georgia in a collaborative arrangement for program development and implementation.

Amount funded: \$31,000

Report: NCCES collaborated with the University of Georgia at Athens in implementation and evaluation of impact, appropriateness for the audience and process evaluation. Georgia initiated three modules of PIW in 24 sites and submitted a report back to NCSU. Georgia is developing and disseminating new material this year. We also collaborated with Michigan, Colorado and Pennsylvania in program development, implementation, and evaluation of impact, appropriateness for the audience and evaluation of impact. Michigan used the program and reported back their successes. Pennsylvania is using the program and Colorado is critiquing the program. Kansas State U. has adapted it into newsletters which have been and are being distributed throughout their state.

Selected outcomes include:

There was a significant increase in PIW participants at congregate nutrition sites, which had seen a decline in numbers in the past years. Also there has been an increase in healthy behaviors by the participants. The partnerships which were fostered across state lines as other state universities requested to collaborate with PIW and to deliver the program or a component of the program in their states included Georgia at the University of Georgia, Michigan at Michigan State University, Kansas at Kansas State University and Pennsylvania at Penn State University. The PIW curriculum was shared with each of these partners.

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 participate on a regular basis.

Amount funded: \$12,994

Report: NCCES faculty chair the Elderly Nutrition Education (ENE) Coordinating core group composed of members from Florida International U., St. Louis U., K-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 groups efforts are 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 others. We also have presented older adult nutrition education at several national meetings including the Southern Gerontological Society annual conference, the First Joint Conference of the American Society on Aging and the National Council on Aging, the annual meeting of the Society for Nutrition Education, and the annual meeting of the American Dietetic Association. This past year we continued our work on co-authoring 9 research papers concerning nutrition education and older adults, we are guest editors for special issues of two prestigious journals, the Journal for Nutrition Education for the Elderly

and the Journal of Nutrition Education and Behavior.

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: \$12,481

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: \$7,174

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

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

Program 1.

Southern Rural Development Center

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

Amount funded: \$18,500

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.

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 Management Team is building an infrastructure to support states who decide to work on this initiative. As a follow up to the 2000 Roll-Out Conference, the National Extension Cares (ECI) Initiative Management Team members (consisting of representatives from about 30 states) are providing training and technical assistance support to states that developed plans of works during the conference. This is being accomplished primarily through the work of the three program committees: Early Childhood, School-Age Care, and Working with Teens In Out Of School Time. The Evaluation committee is pilot testing the web-based data collection system and plans to go nation wide once the pilot is completed. The goal is to involve all states in this evaluation effort. The ECI leadership team (REEUSDA and North Carolina) is working closely with CYFAR to ensure sustainability of Initiative work when the Initiative ends in February, 2004.

The School-Age Care committee, working with National 4-H Council, secured a \$400,000 grant from JC Penney to develop a national 4-H School-Age Care program. JC Penney has pledged financial support for three years to develop and implement this project, initially in communities with JC Penney stores, but eventually in all states in the nation.

ECI members from three states, including NC, are working with the University of Georgia on a grant-funded project to access child care availability in communities and provider training needs.

A North Carolina 4-H faculty member is providing leadership to the Southeast Region (consisting of six states) 21st Century Community Learning Centers Advisory Committee. The faculty member developed a training needs assessment that was sent to 99 community site directors. Impacts on all of these projects will be documented once the projects are completed. All states and territories are involved except AS, GU (Univ. of Guam), MC (College of Micronesia), MT, ND, PR (Univ. of Puerto Rico), RI, and VI.

Program 3.

4-H Volunteer Leadership Development Forum

A multistate program designed to train more effective leaders for youth programs.

Amount funded: \$23,800

Report: The Southern Region 4-H Leader Forum is an annual event which boasts attendance by more than 700 volunteers and 4-H staff members from 13 southern states and territories (Virginia, North Carolina, South Carolina, Georgia, Florida, Alabama, Mississippi, Louisiana, Texas, Oklahoma, Arkansas, Kansas, 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. It is expected that participants will increase their

understanding of the 4-H mission, gain new ideas and perspectives related to youth development education, expand their horizons and increase their effectiveness and competence, share their learning experiences with others throughout the region, develop a stronger commitment to the 4-H program, and enjoy the experience of interacting and exchanging ideas with those from states, territories and provinces.

In 2001, North Carolina served as the Vice Chair of the Regional Planning committee with specific responsibilities for coordinating the educational workshops and seminars at the Southern Region Forum. This work involved a state level committee which met at least monthly throughout the year as they booked and confirmed more than 120 workshops offered by approximately 100 instructors at the four-day event. This year, North Carolina will take on responsibility for hosting the event and serving as Chair of the committee. There are currently 11 state level committees conducting activities and planning for the actual event in October. This responsibility includes hosting the debriefing and planning meeting in November, booking keynote speakers, and other tasks related to organizing a quality conference. More than 100 North Carolina volunteers are expected to be involved in planning and conducting the work.

Program 4.

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

Amount funded: \$12,681

Report: Through one annual meeting and monthly teleconference calls with the editorial board, have accomplished the following: solicited for, reviewed and catalogued 31,326 resources in 73 categories on the CYFERnet Parent/Family web site, presented at the national CYFERnet conference and will present at the 2002 conference, conducted two Interactive Telephone Trainings - one on Couples Education: Relationships in Good Times and Bad Tuesday and one entitled Redefining Parent Involvement: Parents Making a Difference in Their Children's Lives. Both telephone trainings were "sold out" with waiting lists of registrants. Evaluation feedback from both trainings was very positive. Due to the number of people on the waiting list for the parent involvement training, the members of the CYFERnet Parent/Family Editorial Board are planning to repeat the training during the spring of 2002. All new materials generated in conjunction with these training experiences have been archived through the CYFERnet Parent/Family web site as online resources. Entities involved include U. of Maine, U. of Arkansas, NC State Univ., U. of FL, Cornell, U. of Idaho, U of Illinois, U of VT and CSREES-USDA.

Program 5.

National Extension Parenting Educators' Framework -

Amount Funded: \$10,750

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

Summary:

Total Extension Multistate Programs: 17

Total Smith Lever B & C funding planned: \$191,700

Total Smith Lever B & C funding allocated to 16 programs for FY 2001: \$322,381

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)
 Integrated Activities (Smith-Lever Act Funds)

	<u>Actual Expenditures</u>		
<u>Title of Planned Program/Activity</u>	<u>FY 2000</u>	<u>FY2001</u>	<u>FY2002</u>
<u>Goal 1. A highly competitive Agricultural System</u>	<u>42,695</u>	<u>117,626</u>	
<u>Goal 2. A safe and secure food and fiber system</u>	<u>0</u>	<u>48,950</u>	
<u>Goal 3. A healthy, well-nourished population</u>	<u>40,040</u>	<u>43,994</u>	
<u>Goal 4. An Agricultural system protecting natural resources and the environment</u>	<u>17,471</u>	<u>19,655</u>	
<u>Goal 5. Enhanced economic opportunity of quality of life</u>	<u>56,017</u>	<u>92,156</u>	
<u>Total</u>	<u>156,223</u>	<u>322,381</u>	
<u>Certified by Jon F. Ort</u> Director	<u>2/28/2002</u> Date		

Form CSREES-REPT (2/00)

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
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<i>Integrated Project</i>	<i>Project#</i>
Improved efficiency of water reuse aquaculture systems	3975
Weed management for small fruits and vegetables	6327
Plant establishment for vegetable production	6187
Nutrient cycling in vegetable cropping systems	6380
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
Innovative seafood techniques for improved profitability	6392
Cultural Management of Strawberries and Grapes	6324
Disease Management	5060

Improved efficiency of water reuse aquaculture systems

Project 3975

Issue: With an annual farm-gate value of more than \$25 million, aquaculture has become an economically promising alternative for some North Carolina farmers. In the past, the industry has been limited to areas of the state with abundant water supplies. However, scientists have developed and demonstrated new economically viable technologies that allow producers in areas with limited water supplies to enter the industry. At the Fish Barn in Raleigh, the university demonstrates these recirculating systems, which clean fish waste from water, allowing it to be used over and over again within the same tank. Using the recirculating system demonstrated at the Fish Barn, one swine production company has invested \$1.25 million in tilapia aquaculture facilities, including hatchery, grow-out and processing and cold-storage facilities. Seven other commercial operations are in operation or under construction, giving North Carolina farmers the capacity to grow 2.5 million pounds of tilapia in 2002.

Weed management for small fruits and vegetables

Project 6327

Issue: Weeds continue to be one of the worst pests in vegetable crops. Pigweed, a common weed in fields of sweetpotatoes and many other crops, is difficult to control, and 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 for pigweed (or Palmer amaranth) should take place between 20 and 40 days to prevent reduction of yield and quality of sweetpotato roots. More than half of growers are expected to adopt this practice.

Plant establishment for vegetable production

Project 6187

Issue: During the early and mid-1990s, inferior planting stock of Beauregard sweetpotatoes led to inferior yields and quality. Starting in 1994, superior Beauregard alone and hill selections have been made, and virus and other diseases have been eliminated from the superior selections using tissue culture techniques of N.C. State University's Micropropagation Unit. For several years, field tests in several locations have led to the selection of virus-tested Beauregard clones with the best yields and quality. As a result, North Carolina's commercial sweetpotato growers have access to the best planting stock in the nation. A newly established industry, sweetpotato certified growers, sells a

significant amount of the improved planting stock to growers in Mississippi, Louisiana, Alabama and other states. Meanwhile, more than half of North Carolina's sweetpotato acreage derives from these improved, virus-tested, micropropagated clones.

Rotational and compost systems in vegetable nutrient cycling

Project 6380

Issue: 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 in turfgrass and forages

Project 6453

Issue: 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. Research on the effects of plant growth regulators (PGRs) on bentgrass lateral recovery from simulated injury have shown up to a 35 percent delay in recovery with certain PGR treatments whereas others has slightly increased recovery. While this research is just beginning, new recommendations already have been developed for the 331,000 acres of management roadside turf in North Carolina.

Mycotoxins and their effects on dairy cattle

Project 6348

Issue: In order to maximize profits, dairymen must optimize feeding efficiency by increasing milk production per cow through better nutrition and by managing feed mycotoxin problems. The feed testing program is available to North Carolina dairymen tells them the nutrient content and mycotoxin levels in feed. Cooperative Extension has provided information on feeding strategies and their effects on animal health, production, reproduction, profits and mycotoxin management. Mycotoxins are shown to effect more than a quarter of all dairymen each year. Using Extension recommendation, 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's dairy producers by \$15 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 have

focused on alternative strategies for synchronizing and breeding dairy cows. On-farm research and demonstration has involving agents and veterinarians has provided a good method for transferring new information. Numerous questions on cattle reproduction were addressed through international electronic discussion groups, perhaps with long-term implications for delivery of research-based information.

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. Soy bean 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 initiated last year 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

Issue: Inadequate information leads 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-vector 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

Issue: North Carolina's corn farmers can't plant more than 50 percent of their crop to transgenic field corn expressing Bt protein because EPA restricts acreage planted due to concern for rapid resistance development to the Bt toxin in corn earworm. An intense study of new transgenic dual-gene Bt corn types documenting corn earworm larvae mortality indicated that the dual-gene type reduced moth numbers by 99.9 percent, versus a non-Bt type. This compares to 87.9 percent for the currently grown Bt corn type. Decreased moth production indicates 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

Issue: Tobacco float beds used for producing other crops mean lowered production costs, elimination of irrigation systems and management and increased fertilizer efficiency. This project has identified species that can be produced in the float system, and has begun to

solve height control problems. Float production of these species could lower production costs, and could utilize empty tobacco seedling greenhouses. Experiments have been conducted to solve the height control problems with tomato, which, of all the species screened, has the greatest potential to produce tall, "leggy" seedlings. Several successful height control measures have been developed. Field testing of transplants is being conducted to ensure the greenhouse treatments are not damaging yield or fruit earliness.

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 the coming year. 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, 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 have increased, input costs have remained the same or dropped and quality problems such as foreign matter contamination have been reduced. The overall value to North Carolina cotton and soybean producers is estimated at \$48 million.

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

Project 6527

Issue: Broiler production is mostly organized via contracts between integrators and independent growers, with settlements based on a "two-part piece-rate tournament" consisting of a fixed-base payment per pound of output and a variable bonus payment based on a broiler grower's relative performance. Many growers oppose the system because it bases their payments on how their neighbors perform. However, flock rotations on any farm lead to a rapid group dissipation over time, so the welfare importance of league composition risk seems small. This suggests that the observed broiler tournament contracts offer higher welfare to growers than would fixed performance standards. In a sufficiently long sequence of tournaments, mixing growers of unequal abilities creates a significant group composition effect, which make fixed-performance standard schemes more attractive when leagues are fixed. The study results highlight the essential need to mix players in a tournament setting.

Innovative seafood techniques for improved profitability

Project 6392

Issue: The seafood industry's need to improve product quality, process efficiency and distribution methods to remain competitive in today's global economy has never been greater. Innovative technology demonstrations, including cold-binding technology, have been used to enhance the value of traditional and non-traditional seafood products for domestic and export markets. The Wanchese Fish Company, Inc. revolutionized the scallop industry with scallop medallions, which create larger scallops from smaller ones by using cold binding. The company is now adding other value-added products at new processing facility in Virginia. Other product development projects have enabled North Carolina seafood processors to add value to their current products. Several processors will launch new products in 2002, allowing them to become more competitive in consumer markets.

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 plug. Plugs continue to rapidly replace fresh bare-root and frigo plants on a worldwide basis. Plug transplants are produced in no more than 5 weeks, and in warmer growing the process of propagating a strawberry plug can take less than 3 ½ weeks. Additional benefits of producing plug strawberries over 4 weeks instead of 4 months are: 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 advective freezes in winter and spring. There is also a focus on the utilization of the latest row cover technology as well as investigate for the first time anywhere the interaction between row covers and different plastic mulch films.

Disease management for vegetables

Project 5960

Issue: Disease Management: Several plant diseases have the potential to cause serious defoliation and fruit rots on North Carolina's 21 million dollar fresh-market tomato crop. Researchers developed and tested tomato fungicide usage strategies which alternate the use of strobilurin compounds, eg., Quadris, with traditional fungicides applied at extended spray intervals. Tomato growers report that use of the spray program developed by this research provides better disease control and that their harvest period is now longer because of improved disease control. Any federal funding for this project ended in 2001.

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

Issue: North Carolina poultry processors have increased water use by 25 to 50 percent since the implementation of Hazard Analysis and Critical Control Points (HACCP). Research is underway on quantifying the effectiveness of washer systems in removal of visible and microbiological contamination on raw poultry. Preliminary results suggest limited effectiveness of washer systems in removing pathogenic bacteria. In addition, chemical agents (trisodium phosphate, sodium citrate) which are sometimes added to washer systems for improved microbial reduction are also being evaluated. Preliminary

results suggest that adding a chemical agent to washer systems can reduce surface microbial levels by a factor of two compared to chlorine alone. The results from the completed study will be used to design improved washer systems for poultry processing plants. In addition, this information can be used to justify the removal of unnecessary washer systems and save water.

Improvement of thermal processes for foods; aseptic processing and packaging studies.

Projects 0836 05, 5661

Issue: 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 the use of microwave energy 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 produce, while reducing costs for processors. Adoption of this technology, will spur economic development for North Carolina and will increase the quality of food products for all consumers.

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

Project 0292

Issue: 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. Not only will this technology provide valuable storage temperature abuse information for the processor and retailer but it will also 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.

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	6427

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

Environmentally compatible nursery crop production practices

Project 6224

Issue: 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. New growers entering the industry need information on perennial crop production and marketing, and extension agents need advanced training. Workshops, short courses, comprehensive manuals and Web sites 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

Issue: 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.

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

Project 6427

Issue: Intensive hog production in Eastern North Carolina has raised concern about the issue of waste management. To evaluate the fate and transport of hog lagoon wastewater nutrients in soil, researchers conducted a seepage study, evaluating the hydrology and shallow groundwater quality associated with leakage from an old, unlined lagoon in North Carolina's Middle Coastal Plain. Nutrient concentrations in the stream indicated that the seepage plume was reaching the stream. A water control structure was installed downstream of the lagoon to reduce the hydraulic gradient towards the stream and a series of pumping wells in the seepage plume to remove and route contaminated groundwater to a small constructed wetland for treatment. The wetland's inflow and outflow has been continuously monitored to determine nutrient loading and reduction rates and evaluated the site's hydrology. Nutrient concentrations in wells 15 meters down gradient of the lagoon decreased substantially and travel time of the seepage plume to the stream increased from 380 days in a free drainage scenario to 640 days in the controlled drainage case.

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

Issue: 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.

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

Issue: 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. Fertilizer nitrogen in the Tidewater region 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 in closest proximity to the Albemarle-Pamlico estuarine system.

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

Issue: 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. Such devices can't solve all poultry or livestock building odor problems, but can lessen odor intensities at short distances downwind from the sources.

Integrated vegetation management in non-cropland environments

Project 6305

Issue: 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

Issue: 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. This 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 one North Carolina company more than \$3 million in mortality handling costs and eliminate their dependence on conventional rendering service.

Effect of management on turkey production, turkey reproduction and turkey waste handling

Project 6390

Issue: 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 phosphorus 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 cost of breeder feed as well as poult costs, especially if the dietary phosphorus could be reduced without dietary phytase. Also, reducing fecal phosphorus would offer both immediate and long-term relief from manure and litter use restrictions. In addition, the poultry industry could improve its public image by being proactive and progressive with respect to environmental awareness and concerns.

GOAL 5 ENHANCED ECONOMIC OPPORTUNITY AND QUALITY OF LIFE FOR AMERICANS

Commodities, consumers, and communities	0185
Youth and careers	6841
Estimating impacts of community development options	6237

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

Project 0185

Issue: Agriculture and food systems in North Carolina have changed dramatically over the past 50 years. To help communities, commodity groups and others to respond effectively to these changes, N.C. State University has conducted focus groups in three counties and a survey of 1,600 farm operators. A report of these findings will be completed in 2002 and 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.

Youth and careers

Project 6841

Issue: Career decision making. The program offers advanced instruction in youth career development coupled with hands-on research experience studying factors that affect youth careers including family, education and labor force issues. Youth and Careers research focuses on critical career development issues. For example the project is studying rural high school students in North Carolina to determine how parents influence their sons' and daughters' career plans. We present continuing education workshops for career counselors in high schools throughout the U S and abroad. To date, we have trained more than 4,000 counselors to use the program. We have written books and articles on youth and careers that are used widely in university classrooms. This project was concluded during the 2001 fiscal year.

Estimating impacts of community development options

Project 6237

Issue: A model was needed to help in the growth planning process by estimating the costs of development activities. Researchers, working from a Minnesota model used for estimating 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. Work is underway to test both models using actual data for a case study. Researchers are fine-tuning the economic and fiscal impact models to estimate growth and development impacts on county and city governments.

Summary:

Total current Extension-Research Integrated Projects: 32

Smith Lever B & C funding Planned: \$934,731

Total Smith Lever B & C funding allocated to the 32 projects for FY 2001: \$964,738

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)
 Integrated Activities (Smith-Lever Act Funds)

Actual Expenditures

Title of Planned Program/Activity	FY 2000	FY 2001
<u>Goal 1. A highly competitive</u>	<u>337,491</u>	<u>456,627</u> <u>Agricultural</u>
		<u>System</u>
<u>Goal 2. A safe and secure food</u> <u>and fiber system</u>	<u>30,893</u>	<u>98,804</u>
<u>Goal 3. A healthy, well-nourished</u> <u>population</u>	<u>0</u>	<u>0</u>
<u>Goal 4. An Agricultural system</u> <u>protecting natural resources and</u> <u>the environment</u>	<u>382,620</u>	<u>328,702</u>
<u>Goal 5. Enhanced economic</u> <u>opportunity of quality of life</u>	<u>81,456</u>	<u>79,605</u>
<u>Total</u>	<u>\$832,460</u>	<u>\$964,738</u>

Certified by Jon F. Ort

2/28/2002

Director

Date