

2009 Clemson University and South Carolina State University Combined Research and Extension Annual Report of Accomplishments and Results

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I. Report Overview

1. Executive Summary

Twenty experiment station research projects concluded in the reporting period and the results of the research are presented in the planned programs. During the reporting period, 1890 Research had two research projects to complete their funding cycle. The findings will be documented in research bulletins as well as outlined in the Plan of Work Report, once the projects are completed.

At the request of Dr. Beachy, South Carolina included the NIFA high priority issues in the report. Global food security and hunger, climate change, sustainable energy and childhood obesity were added. South Carolina has had ongoing efforts in food safety and nutrition since the inception of the plan of work process. Activities and accomplishments were reported for each of the high priority issues as they are becoming priority issues in South Carolina.

The Clemson University Cooperative Extension Service in South Carolina is reporting to ten (10) programs that were originally in the federal plan of work. In addition, we are reporting some work in three new federal priority areas this year, Childhood Obesity, Sustainable Energy, and Global Food Security and Hunger. Some of the work that we do already fits nicely into the priority areas. We are in a planning phase to better capture work done in all five of the new priority areas for the next reporting year. South Carolina State University's 1890 Research and Extension Program has worked on Childhood Obesity, Global Food Security and Hunger and Climate Change. The 1890 Program Administrators have directed researchers and agents to focus attention on Sustainable Energy.

Specialists have applied for research funds to study climate change on water quality. There have been formal discussions to establish the first state-wide automated agricultural meteorology station network and irrigation information web site for South Carolina (SCAgMet). The State Climate Office Director will provide data quality control services. He provided meteorology sensors to increase the number of new towers in SC. The experiment station has been examining a number of different models which would allow the organization to be responsive to a competitive funding environment.

Total Actual Amount of professional FTEs/SYs for this State

Year: 2009	Extension		Research	
	1862	1890	1862	1890
Plan	140.0	44.0	55.0	15.0
Actual	187.0	42.0	56.3	13.0

II. Merit Review Process

1. The Merit Review Process that was Employed for this year

- Internal University Panel
- External Non-University Panel
- Expert Peer Review

2. Brief Explanation

The South Carolina Merit Review Committee, which also serves as the Research and Development Committee of the State Extension Advisory Council, met two times and were briefed on Extension and Research activities at both institutions.

Peer review of all research proposals for Hatch, Hatch Multi-State, Evans-Allen and McIntire Stennis continued at both institutions. Clemson, typically, participates in peer review activities with South Carolina State.

The members of the committee were notified of the request from Dr. Beachy to reflect the new national priorities in the annual report and in subsequent plan updates.

III. Stakeholder Input

1. Actions taken to seek stakeholder input that encouraged their participation

- Use of media to announce public meetings and listening sessions
- Targeted invitation to traditional stakeholder groups
- Targeted invitation to non-traditional stakeholder groups
- Targeted invitation to traditional stakeholder individuals
- Targeted invitation to non-traditional stakeholder individuals
- Targeted invitation to selected individuals from general public
- Survey specifically with non-traditional groups

Brief explanation.

Invitations are sent to local advisory councils across the state. Meetings are conducted to get stakeholder input about major issues of concern, possible solutions, and how Research and Extension can help address problems.

2(A). A brief statement of the process that was used by the recipient institution to identify individuals and groups stakeholders and to collect input from them

1. Method to identify individuals and groups

- Use Advisory Committees
- Use Internal Focus Groups
- Use External Focus Groups
- Open Listening Sessions
- Needs Assessments
- Use Surveys

Brief explanation.

People who are already involved in Research and Extension programs or receive services and people who may not be involved, but may have similar interests or are addressing similar concerns are identified and contacted.

2(B). A brief statement of the process that was used by the recipient institution to identify individuals and groups who are stakeholders and to collect input from them

1. Methods for collecting Stakeholder Input

- Meeting with traditional Stakeholder groups
- Survey of traditional Stakeholder groups
- Meeting with traditional Stakeholder individuals
- Survey of traditional Stakeholder individuals
- Meeting with the general public (open meeting advertised to all)
- Meeting specifically with non-traditional groups
- Survey specifically with non-traditional groups
- Meeting with invited selected individuals from the general public

Brief explanation.

Participants are asked to evaluate the effectiveness of the Extension programs, express major concerns in the county and recommend topics they feel Extension can adequately address. They also give program ideas. Based

on the feedback, research projects may be developed from the results.

3. A statement of how the input will be considered

- To Identify Emerging Issues
- Redirect Extension Programs
- Redirect Research Programs
- In the Staff Hiring Process
- In the Action Plans
- To Set Priorities

Brief explanation.

Program issues are identified and programs are developed, expanded, or eliminated based on their quality and/or effectiveness.

Brief Explanation of what you learned from your Stakeholders

Comments from South Carolina stakeholders included the fact that methodology in the area of agriculture resiliency and climate change needs to be strengthened and that all agronomic crops programming should fit in the Global Food Security and Hunger priority area. They felt also that more clarity is needed in terms of the kinds of water activities that would fit under the category of Sustainable Energy. Stakeholders agreed that next year additional areas would need to be included in the priority areas of Global Food Security and Hunger and Sustainable Energy.

IV. Expenditure Summary

1. Total Actual Formula dollars Allocated (prepopulated from C-REEMS)			
Extension		Research	
Smith-Lever 3b & 3c	1890 Extension	Hatch	Evans-Allen
5493359	1711754	3710719	2012573

2. Totaled Actual dollars from Planned Programs Inputs				
	Extension		Research	
	Smith-Lever 3b & 3c	1890 Extension	Hatch	Evans-Allen
Actual Formula	5493359	1711754	3304002	2012573
Actual Matching	5493359	1023886	8831657	1126639
Actual All Other	1545508	0	0	0
Total Actual Expended	12532226	2735640	12135659	3139212

3. Amount of Above Actual Formula Dollars Expended which comes from Carryover funds from				
Carryover	2940201	0	406717	0

V. Planned Program Table of Content

S. No.	PROGRAM NAME
1	Sustainable Animal Production Systems
2	Sustainable Agriculture Production for Horticultural Crops
3	Sustainable Agronomic Crop Systems
4	Water Quality and Water Quantity
5	Biotechnology
6	Food Safety and Nutrition
7	Community, Leadership, and Economic Development
8	Integrated Pest Management
9	4-H Youth Development and Families
10	Environmental Conservation for Wildlife
11	Sustainable Forest Management
12	Childhood Obesity
13	Climate Change
14	Sustainable Energy
15	Global Food Security and Hunger

V(A). Planned Program (Summary)**Program # 1****1. Name of the Planned Program**

Sustainable Animal Production Systems

V(B). Program Knowledge Area(s)**1. Program Knowledge Areas and Percentage**

KA Code	Knowledge Area	%1862 Extension	%1890 Extension	%1862 Research	%1890 Research
301	Reproductive Performance of Animals	20%	20%	20%	20%
302	Nutrient Utilization in Animals	20%	20%	20%	10%
303	Genetic Improvement of Animals	15%	10%	15%	25%
307	Animal Management Systems	20%	25%	20%	20%
308	Improved Animal Products (Before Harvest)	15%	10%	15%	10%
315	Animal Welfare/Well-Being and Protection	10%	15%	10%	15%
Total		100%	100%	100%	100%

V(C). Planned Program (Inputs)**1. Actual amount of professional FTE/SYs expended this Program**

Year: 2009	Extension		Research	
	1862	1890	1862	1890
Plan	9.0	5.5	4.5	0.0
Actual	16.8	7.0	6.0	0.0

2. Actual dollars expended in this Program (includes Carryover Funds from previous years)

Extension		Research	
Smith-Lever 3b & 3c	1890 Extension	Hatch	Evans-Allen
659136	325234	444271	0
1862 Matching	1890 Matching	1862 Matching	1890 Matching
659136	188666	1198170	0
1862 All Other	1890 All Other	1862 All Other	1890 All Other
0	0	0	0

V(D). Planned Program (Activity)**1. Brief description of the Activity**

The Clemson University Cooperative Extension Service conducted educational programs that focused on animal production systems. Agents were able to age-verify calves that were sold. Cattlemen were able to maximize their profitability.

Researchers have focused on cells in the mammary gland that are likely critical in controlling mammary development. The results can maximize lifetime milk production and minimize the need to produce offspring, reducing the risk of birth-related

diseases. The work will help the S.C. \$52 million dairy industry and \$105 million cattle industry. Mammary development is critical to profitability in dairy, beef, swine, and lamb operations because milk production controls growth of offspring and profitability in dairy operations. The work could impact human breast cancer research as well.

Agricultural engineers have worked with poultry producers to help lower their energy costs and improve operations. Savings can be 40 percent or more on heating, cooling and lighting costs. Ag-engineers also studied using chicken and turkey house litter to fertilize pine trees that produce pine needles for landscaping. The outcome was a win-win, with poultry growers finding a way to dispose of manure and pine-needle producers finding a low-cost, natural fertilizer. The poultry industry provides about \$1.5 billion a year to the state's economy.

The 1890 Small Farm Assistance & Outreach Program conducted activities that increased farm management skills in the areas of production, marketing and sustainability. The Program assisted socially disadvantaged producers in retaining their land, increasing management skills and maintaining and/or increasing profitability on their enterprises. 1890 Extension assembled 12 cattle producers from 5 counties to establish a cooperative. The Co-Op farmers developed strategies that assisted them in remaining profitable and competitive. With assistance from the Center of Cooperative Development, members purchased a no-till drill, portable livestock scale system and fertilizer/lime spreader. The 1890 Program provided leadership and farm management training to producers.

2. Brief description of the target audience

The audience included producers, limited-resource farmers, Extension personnel, and agency personnel

V(E). Planned Program (Outputs)

1. Standard output measures

2009	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Plan	14000	4700	0	0
Actual	19477	134182	281	80

2. Number of Patent Applications Submitted (Standard Research Output)

Patent Applications Submitted

Year: 2009
Plan: 0
Actual: 2

Patents listed

Ex-Vivo Test System for Breast Tissue
Bio active recombinant follicle stimulating hormones

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

2009	Extension	Research	Total
Plan	1	8	
Actual	0	36	0

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

- Disclosures

Year	Target	Actual
2009	1	1

Output #2

Output Measure

- Licenses

Year	Target	Actual
2009	0	0

Output #3

Output Measure

- New products, processes, procedures and policies
Not reporting on this Output for this Annual Report

Output #4

Output Measure

- National Media Placements

Year	Target	Actual
2009	4	5

Output #5

Output Measure

- Percent increase of outside funds through grants, contracts and gifts
Not reporting on this Output for this Annual Report

Output #6

Output Measure

- Number of people completing educational workshops

Year	Target	Actual
2009	7600	16268

Output #7

Output Measure

- Number of Attendees Completing Educational Workshops

Year	Target	Actual
2009	{No Data Entered}	268

V(G). State Defined Outcomes**V. State Defined Outcomes Table of Content**

O. No.	OUTCOME NAME
1	Number of publications authored or co-authored (fact sheets, papers presented at Extension meetings, etc.)
2	Increased percentage of forage fed beef production in the state and the region.
3	Number of people reporting increased knowledge
4	Number of farmers' co-op increased membership.
5	A number of meat goat producers increased their herd management skills.

Outcome #1

1. Outcome Measures

Number of publications authored or co-authored (fact sheets, papers presented at Extension meetings, etc.)

2. Associated Institution Types

- 1862 Research
- 1890 Research

3a. Outcome Type:

Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2009	4	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

{No Data Entered}

What has been done

{No Data Entered}

Results

{No Data Entered}

4. Associated Knowledge Areas

KA Code	Knowledge Area
301	Reproductive Performance of Animals
307	Animal Management Systems

Outcome #2

1. Outcome Measures

Increased percentage of forage fed beef production in the state and the region.

Not Reporting on this Outcome Measure

Outcome #3**1. Outcome Measures**

Number of people reporting increased knowledge

2. Associated Institution Types

- 1862 Extension
- 1890 Extension

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2009	3800	15207

3c. Qualitative Outcome or Impact Statement**Issue (Who cares and Why)**

Due to a host of external economic and environmental influences, the cost of cattle feeds has increased over 100% in the last year in South Carolina. Producers have seen this increased cost of production in the form of higher production costs and dwindling profit margins. In order to combat this higher cost of production, producers have to increase their production either through increased weaning weights or increased conception rates; ideally both. Unfortunately, both of these numbers (weaning weights and conception rates) are tied to nutrition.

What has been done

Extension conducted over 300 programs to educate producers. The 2nd annual Cattlemen's Day was held in conjunction with the Bull Sale.

Bull health and breeding soundness exam procedures were covered. Over 190 youth from four states exhibited over 300 cattle in the Jr. Beef Roundup. A feeder calf sale was conducted. Twenty-six producers from eight South Carolina counties marketed 1,524 calves in truckload lots. All calves were vaccinated for respiratory disease, preconditioned for a minimum of 45 days and were source and age verified through USDA Process Verified Program (PVP). During educational sessions, key producers learned procedures required for farmers to list cattle as source and age verified through USDA's Process Verified Program (PVP). In addition, recordkeeping and management practices required to meet source and age verification guidelines were discussed.

Results

Of the 1,524 calves sold during the feeder calf sale, 1,086 were sold directly off farm and 438 were sold in commingled truckloads comprised of cattle from small farmers. Cattlemen selling on the commingled loads averaged 20 head per farmer, allowing small producers the opportunity to maximize profitability by selling in truckload lots. This year, source and age verified truckload lots sold for \$0.10 per pound more than traditional weekly livestock auctions resulting in \$99,800 in additional income for area cattle farms (\$3,700 per farm).

As a result of training sessions, Clemson Extension Agents were able to source and age verified over 2,250 calves from 38 South Carolina farms in the fall of 2007. Calves of known source and age sold for \$10-\$12 more per head than calves of unknown age. By participating in the PVP, producers received \$24,750 in additional income. In addition, youth developed leadership skills and learned responsibility and livestock management skills. Agents produced articles for newspapers and newsletters to publicize their programs.

4. Associated Knowledge Areas

KA Code	Knowledge Area
307	Animal Management Systems
315	Animal Welfare/Well-Being and Protection

Outcome #4

1. Outcome Measures

Number of farmers' co-op increased membership.

2. Associated Institution Types

- 1890 Extension

3a. Outcome Type:

Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2009	{No Data Entered}	263

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Competition in the industry made it difficult for individual farmers to operate a feasible farm enterprise. They did not have the advantages that corporate-style farms used to influence profit margins, so many individual farmers did not earn reasonable profits. Thus, affecting their ability to compete for premium price on the market.

What has been done

Extension assembled 12 cattle producers from 5 counties to establish the Piedmont Farmers Market Cooperative, Inc. Through the Co-Op, farmers developed strategies that assisted them in remaining profitable and competitive. With assistance from the Center of Cooperative Development, members purchased a no-till drill, portable livestock scale system and fertilizer/lime spreader. The 1890 Extension Program also provided leadership and farm management training to producers.

Results

Since the founding of the Co-Op, membership increased to 30 producers with nearly 700 cattle and goats. Members harnessed their collective buying power to negotiate premium prices and increased their share of earnings. Farmers also reduced input costs, especially with supply and equipment expenses. The cooperative purchases feed, seed and livestock minerals at wholesale prices and rents the Co-Op's equipment for affordable fees.

4. Associated Knowledge Areas

KA Code	Knowledge Area
301	Reproductive Performance of Animals
302	Nutrient Utilization in Animals
303	Genetic Improvement of Animals
307	Animal Management Systems

- 308 Improved Animal Products (Before Harvest)
- 315 Animal Welfare/Well-Being and Protection

Outcome #5

1. Outcome Measures

A number of meat goat producers increased their herd management skills.

2. Associated Institution Types

- 1890 Extension

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2009	{No Data Entered}	272

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Socially disadvantaged meat goat producers had a desire to increase their herd management skills to produce higher quality of animals. Disadvantaged meat goat producers wanted know to gain more knowledge in the areas of herd health, marketing, forages and predator control to increase profits and produce healthier animals.

What has been done

The Greenwood Cluster 1890 Extension Program conducted workshops on herd health, marketing, forages and predator control.

Results

Socially disadvantaged meat goat producers gained knowledge in predator control, forage selection and management, marketing strategies and herd health practices. One hundred percent of the attendees reported the information was very useful and the program met their needs. One hundred percent reported they gained knowledge by attending the program.

4. Associated Knowledge Areas

KA Code	Knowledge Area
301	Reproductive Performance of Animals
303	Genetic Improvement of Animals
307	Animal Management Systems
308	Improved Animal Products (Before Harvest)
315	Animal Welfare/Well-Being and Protection

V(H). Planned Program (External Factors)

External factors which affected outcomes

- Natural Disasters (drought, weather extremes, etc.)
- Economy
- Appropriations changes
- Public Policy changes
- Government Regulations
- Competing Public priorities
- Competing Programmatic Challenges
- Populations changes (immigration, new cultural groupings, etc.)

Brief Explanation

The cost of cattle feeds has increased over 100% in the last year in South Carolina.

V(I). Planned Program (Evaluation Studies and Data Collection)

1. Evaluation Studies Planned

- After Only (post program)
- Retrospective (post program)
- Before-After (before and after program)
- During (during program)
- Case Study
- Comparison between locales where the program operates and sites without program intervention

Evaluation Results

Key Items of Evaluation

V(A). Planned Program (Summary)**Program # 2****1. Name of the Planned Program**

Sustainable Agriculture Production for Horticultural Crops

V(B). Program Knowledge Area(s)**1. Program Knowledge Areas and Percentage**

KA Code	Knowledge Area	%1862 Extension	%1890 Extension	%1862 Research	%1890 Research
201	Plant Genome, Genetics, and Genetic Mechanisms	10%	10%	10%	10%
202	Plant Genetic Resources	10%	10%	10%	10%
204	Plant Product Quality and Utility (Preharvest)	10%	10%	10%	10%
205	Plant Management Systems	15%	20%	15%	15%
211	Insects, Mites, and Other Arthropods Affecting Plants	10%	10%	10%	10%
212	Pathogens and Nematodes Affecting Plants	10%	10%	10%	10%
215	Biological Control of Pests Affecting Plants	10%	10%	10%	15%
216	Integrated Pest Management Systems	15%	10%	15%	10%
601	Economics of Agricultural Production and Farm Management	10%	10%	10%	10%
Total		100%	100%	100%	100%

V(C). Planned Program (Inputs)**1. Actual amount of professional FTE/SYs expended this Program**

Year: 2009	Extension		Research	
	1862	1890	1862	1890
Plan	26.0	5.5	4.0	2.5
Actual	24.6	7.0	0.0	2.0

2. Actual dollars expended in this Program (includes Carryover Funds from previous years)

Extension		Research	
Smith-Lever 3b & 3c	1890 Extension	Hatch	Evans-Allen
721438	325234	418026	615446
1862 Matching	1890 Matching	1862 Matching	1890 Matching
721438	188666	1473601	329012
1862 All Other	1890 All Other	1862 All Other	1890 All Other
0	0	0	0

V(D). Planned Program (Activity)

1. Brief description of the Activity

Educational programs were conducted. Field trials were conducted and demonstrated. Evaluation programs provided growers with comprehensive and updated information on performance so that they can make informed decisions, especially about the selection of profitable peach varieties for new plantings. The program promoted and encouraged activities that fostered sustainable agriculture practices and policies.

Researchers have developed a kit to determine the optimal treatment for brown rot fungus. The work has helped South Carolina to rank as second largest producer of peaches in the nation, behind California. S.C. peaches generate approximately \$40 million for the state's economy. Improvements to disease resistance, tree productivity and fruit quality are the results of research on fruit trees, particularly peach trees. Genetic data generated provides markers and genes that can be used in breeding. Besides saving the growers money and helping the environment by using fewer chemicals, the research and techniques can be used for other stone-fruit crops because the disease also affects nectarines and cherries and plum.

Peach growers now have a vital source of reliable research based information on peach cultivar performance in South Carolina through the Clemson peach website. Particular features include performance data, cultivar descriptions and digital photos. Growers use this site to make informed decisions on which varieties to plant on their farms. They can even do side-by-side comparisons on-line to compare how different cultivars perform. Proper variety selection will determine profitability and reliability of production from year to year. Research on the importance of summer pruning has been documented and demonstrated and many growers now routinely perform this practice where they had not before. Dormant pruning costs can be reduced by as much as 50 percent. Summer pruning also benefits fruit size and coloration. The work has helped South Carolina to rank as second largest producer of peaches in the nation, ranking behind California. S.C. peaches generate approximately \$40 million for the state's economy.

Researchers are finding alternatives to chemical pesticides, reducing use and creating cost savings. In South Carolina, leafy greens producers using advanced field scouting techniques and microbial agents, reduced applications of insecticides from about 15 per season down to 2 or 3 using microbial agents. This has resulted in savings to the producer and less impact on the environment. In the United States growers more than 600 different pesticides are used yearly at a cost of more than \$4 billion. Pesticides are applied to vegetable crops more than any other crop with about 240 million pounds annually.

Researchers have come up with new growing methods that allow S.C. farmers to introduce new and unique produce. Markets for major vegetable crops, such as fresh tomatoes, are rapidly diminishing with increased competition from nearby states. Without new high-value crops and efficient vegetable production systems, the South Carolina vegetable industry faces gradual extinction. Recent statistics show this situation impacts more than 1,500 S.C growers, generating about \$126 million in sales yearly. Specialty markets have begun to develop and the demand for the small size potatoes seems to be there. The demand for something different in the potato market has sparked an interest for different flesh colors. Chefs in Charleston, South Carolina have started to advertise these potatoes on the menu and the South Carolina Department of Agriculture has featured them. One of the leading supermarket chains has expressed interest in test marketing out product in 2008 and 2009. S.C. farmers are now a major player in the South. In the sweet corn market S.C. yields are among the highest in the Southeast and quality is excellent. The acreages continue to increase every year. Parsley, radishes and cilantro have opened winter markets for our growers. This has opened additional markets for other winter vegetables like broccoli. The quality is excellent and the additional income has made a big impact on the health of our growers. The new crops also have nutritional benefits, ranking among the highest nutritional values and cancer-risk reducers.

An 1890 Researcher explored genes that affected the receptivity to the mating of fruitfly females, which was identified on the basis of DNA microarray analysis. A mutant for one of the genes was obtained from the Drosophila stock center in Bloomington, IN and used for behavior assays. Females that carry the mutation were tested with two laboratory strains of males, Tai-Y and Canton-S. The researcher is preparing the results in a research bulletin for dissemination. Another 1890 researcher is focusing his attention on polymers. Today's industries strive to obtain new materials with optimal characteristics for new inventions. Polymers are the key in material sciences, especially new polymers with new characters are desired highly. Acrylic and methacrylic polymers are among the most used material by today's industries. The research project is looking to synthesize new polymers derived from acrylic acid. Work with high pressure reactor to synthesize new materials. Made diluted solution of the polymer, measured viscosity of solvent and polymer solutions, calculated viscosity numbers and limited viscosity numbers related to the intrinsic viscosity of the polymer in solution.

During the report period of the 1890 soybean candle research, two classes of candles were tested to determine whether any type had produced unwanted hazardous emissions for human health while burning. The candles were burned in a

controlled chamber and the emission products were collected and analyzed for identification. The resultant chromatograms were analyzed using a NIST library to determine all possible chemicals for the specified sample

2. Brief description of the target audience

The audience included producers, small farmers, Extension personnel, horticulture professionals, residents in counties with Master Gardener programs, Master Gardeners, and consumers.

V(E). Planned Program (Outputs)

1. Standard output measures

2009	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Plan	19000	5100	0	0
Actual	18038	4869873	393	133

2. Number of Patent Applications Submitted (Standard Research Output)

Patent Applications Submitted

Year: 2009
 Plan: 0
 Actual: 2

Patents listed

Plant -derived protectants from ultraviolet light
 Methods and systems for production of organically derived ammonia/ammonium

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

2009	Extension	Research	Total
Plan	0	6	
Actual	0	23	0

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

- Disclosures

Year	Target	Actual
2009	2	3

Output #2

Output Measure

- Licenses

Year	Target	Actual
2009	1	0

Output #3

Output Measure

- New Products, processes, procedures and policies
Not reporting on this Output for this Annual Report

Output #4

Output Measure

- National Media Placements

Year	Target	Actual
2009	4	6

Output #5

Output Measure

- Percent Increase of outside funds through grants, contracts and gifts
Not reporting on this Output for this Annual Report

Output #6

Output Measure

- Number of people completing horticultural educational workshops

Year	Target	Actual
2009	5300	16938

Output #7

Output Measure

- Number of Farmers' Cooperatives Formed.

Year	Target	Actual
2009	{No Data Entered}	2

V(G). State Defined Outcomes**V. State Defined Outcomes Table of Content**

O. No.	OUTCOME NAME
1	Number of participants reporting profitability gain
2	Number of Master Gardeners reporting activities and programs
3	Number of people receiving information from Master Gardeners
4	Percent increase in profitability in the peach and melon industries
5	Number of participants gaining knowledge
6	Number of acres affected by ICM

Outcome #1

1. Outcome Measures

Number of participants reporting profitability gain

2. Associated Institution Types

- 1862 Extension
- 1890 Extension

3a. Outcome Type:

Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2009	100	55

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

With the 1890 Program small commercial vegetable producers and home gardeners were interested in the most up to date production practices and techniques to improve the quality of their produce.

What has been done

Two production meetings, six group meetings, and two training sessions/ workshops were held. Two demo garden sites were conducted to train producers and gardeners on updated crop production practices to include sustainable practices and variety trials.

Results

Ninety seven adults and thirty six youth received training in the area of vegetable production and home gardening. The updated production practices were adopted by sixty participants, ninety seven producers gained knowledge and increased skills, while seventy-five percent increased production and thirty-five percent increased income.

4. Associated Knowledge Areas

KA Code	Knowledge Area
205	Plant Management Systems
216	Integrated Pest Management Systems

Outcome #2

1. Outcome Measures

Number of Master Gardeners reporting activities and programs

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2009	1200	2407

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

This program seeks to inform horticulture professionals, master gardeners, and consumers on environmentally sound horticultural practices that will improve communities.

What has been done

Master Gardener training was conducted and over 2400 Master Gardeners reported that they conducted activities and programs after being trained, contributing over 67,168 hours of service.

Results

Over 262,000 people received information from Master Gardeners through telephone calls, office visits, workshops, and activities. They assembled packets and fact sheets, planted for Habitat for Humanity homes, designed butterfly gardens at local elementary schools and various other community programs. Several "Ask-A-Master Gardener" sessions were conducted.

4. Associated Knowledge Areas

KA Code	Knowledge Area
205	Plant Management Systems
216	Integrated Pest Management Systems

Outcome #3

1. Outcome Measures

Number of people receiving information from Master Gardeners

Not Reporting on this Outcome Measure

Outcome #4

1. Outcome Measures

Percent increase in profitability in the peach and melon industries

Not Reporting on this Outcome Measure

Outcome #5

1. Outcome Measures

Number of participants gaining knowledge

2. Associated Institution Types

- 1862 Extension
- 1890 Extension
- 1890 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2009	5600	15523

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

The Horticultural Program at Clemson University seeks to inform horticulture professionals, master gardeners, and consumers on environmentally sound horticultural practices that will improve communities.

What has been done

Some 739 horticultural programs were conducted reaching 16,900 persons. Activities this year included site visits to commercial nurseries to address plant and pest problems, presentations on employment opportunities for prison inmates in the green industry, meetings with horticultural professionals to diagnose turf problems, conducting plant identification classes, sustainable landscapes, and trainings for Master Gardeners and community organizations. Turfgrass management programs were conducted. Agents and volunteers distributed \$32,500 worth of fresh vegetable nutrition vouchers to 1300 residents in on county. A total of 24,756 consumers received information through PAWS hotline and Home and Garden Information Center. Agents conducted media programs such as appearances on Making it Grow radio and TV shows, wrote newspaper articles and published websites. There were 4.8 million visits to university horticulture websites.

Results

Of the 16,900 persons participating in horticultural programs, 92% reported a gain in knowledge.

4. Associated Knowledge Areas

KA Code	Knowledge Area
205	Plant Management Systems
211	Insects, Mites, and Other Arthropods Affecting Plants
216	Integrated Pest Management Systems

Outcome #6

1. Outcome Measures

Number of acres affected by ICM

Not Reporting on this Outcome Measure

V(H). Planned Program (External Factors)

External factors which affected outcomes

- Natural Disasters (drought, weather extremes, etc.)
- Economy
- Government Regulations
- Competing Public priorities
- Competing Programmatic Challenges
- Populations changes (immigration, new cultural groupings, etc.)

Brief Explanation

V(I). Planned Program (Evaluation Studies and Data Collection)

1. Evaluation Studies Planned

- After Only (post program)
- Retrospective (post program)
- Before-After (before and after program)
- During (during program)

Evaluation Results

Key Items of Evaluation

V(A). Planned Program (Summary)

Program # 3

1. Name of the Planned Program

Sustainable Agronomic Crop Systems

V(B). Program Knowledge Area(s)

1. Program Knowledge Areas and Percentage

KA Code	Knowledge Area	%1862 Extension	%1890 Extension	%1862 Research	%1890 Research
204	Plant Product Quality and Utility (Preharvest)	10%	0%	10%	0%
205	Plant Management Systems	10%	0%	10%	0%
211	Insects, Mites, and Other Arthropods Affecting Plants	10%	0%	10%	0%
212	Pathogens and Nematodes Affecting Plants	15%	0%	15%	0%
213	Weeds Affecting Plants	10%	0%	10%	0%
215	Biological Control of Pests Affecting Plants	10%	0%	10%	0%
216	Integrated Pest Management Systems	15%	0%	15%	0%
601	Economics of Agricultural Production and Farm Management	10%	0%	10%	0%
604	Marketing and Distribution Practices	10%	0%	10%	0%
Total		100%	0%	100%	0%

V(C). Planned Program (Inputs)

1. Actual amount of professional FTE/SYs expended this Program

Year: 2009	Extension		Research	
	1862	1890	1862	1890
Plan	9.0	0.0	8.5	0.0
Actual	23.7	0.0	7.5	0.0

2. Actual dollars expended in this Program (includes Carryover Funds from previous years)

Extension		Research	
Smith-Lever 3b & 3c	1890 Extension	Hatch	Evans-Allen
951036	0	369877	0
1862 Matching	1890 Matching	1862 Matching	1890 Matching
951036	0	1320282	0
1862 All Other	1890 All Other	1862 All Other	1890 All Other
0	0	0	0

V(D). Planned Program (Activity)

1. Brief description of the Activity

The Clemson University Cooperative Extension Service Agronomic Program focused educational programs on integrated crop management, integrated pest management, organic production systems, risk management, and marketing.

Research activities centered on ways to increase disease and insect resistance levels, assess transgenic varieties, and improve management systems.

2. Brief description of the target audience

The target audience included producers, Extension and other agency personnel.

V(E). Planned Program (Outputs)

1. Standard output measures

2009	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Plan	11000	2000	0	0
Actual	13265	288936	0	0

2. Number of Patent Applications Submitted (Standard Research Output)

Patent Applications Submitted

Year: 2009
 Plan: 2
 Actual: 0

Patents listed

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

2009	Extension	Research	Total
Plan	0	5	
Actual	0	20	0

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

- Disclosures

Year	Target	Actual
2009	2	2

Output #2

Output Measure

- Licenses

Year	Target	Actual
2009	0	0

Output #3

Output Measure

- New products, processes, procedures and policies
Not reporting on this Output for this Annual Report

Output #4

Output Measure

- National media placements

Year	Target	Actual
2009	3	3

Output #5

Output Measure

- Percent Increase of outside funds through grants, contracts and gifts
Not reporting on this Output for this Annual Report

Output #6

Output Measure

- Number of people completing educational workshops

Year	Target	Actual
2009	8000	11657

V(G). State Defined Outcomes**V. State Defined Outcomes Table of Content**

O. No.	OUTCOME NAME
1	Number of acres affected by ICM programs
2	Number of people reporting increased knowledge
3	Number of new wheat varieties with increased disease and pest resistance.
4	Number of new high yielding soybean cultivars with resistance to nematodes which will improve profitability for growers

Outcome #1

1. Outcome Measures

Number of acres affected by ICM programs

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2009	40000	288405

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

It is important that South Carolina landowners adopt agronomic production practices to improve profitability and reduce the negative environmental impacts of agronomic cropping systems.

What has been done

Corn, soybean, cotton and tobacco production meetings were conducted to teach insect, weed and disease management of these crops.

Results

Approximately 288,405 acres in South Carolina were affected by integrated crop management practices.

4. Associated Knowledge Areas

KA Code	Knowledge Area
204	Plant Product Quality and Utility (Preharvest)
205	Plant Management Systems
211	Insects, Mites, and Other Arthropods Affecting Plants
212	Pathogens and Nematodes Affecting Plants
213	Weeds Affecting Plants
215	Biological Control of Pests Affecting Plants
216	Integrated Pest Management Systems
601	Economics of Agricultural Production and Farm Management
604	Marketing and Distribution Practices

Outcome #2**1. Outcome Measures**

Number of people reporting increased knowledge

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2009	4000	11003

3c. Qualitative Outcome or Impact Statement**Issue (Who cares and Why)**

It is important that South Carolina landowners adopt agronomic production practices to improve profitability and reduce the negative environmental impacts of agronomic cropping systems. In addition, irrigation management guidelines are needed.

What has been done

Some 439 programs were conducted reaching 11,657 people. On-farm water delivery systems and irrigation scheduling were examined. In one county, the conversion of diesel to electric motor and use of soil moisture sensors for scheduling was suggested. Forty-five participants in a Corn Field Day gained knowledge of available corn hybrids. Participants in a Wheat Production Meeting gained knowledge of wheat varieties, insect management, and disease management. Participants in peanut maturity clinics gained knowledge of determination of digging date for peanuts. Participants gained knowledge of tobacco production and pest management. Farmers increased their knowledge of pasture and hayfield weed management and grain bin safety. Participants in the precision agriculture training learned about zone management. Sessions on Scouting for Rust and Soybean Foliar Diseases were presented. In addition, participants in sustainable/organic programs gained knowledge about organic food and where to purchase it locally. Students at one county's career center learned how to use GPS guided equipment. The 5th Annual Open Forum on Sustainable Agriculture was conducted. Extension Specialists at Clemson are part of the eOrganic Community of Practice developing pest management content for eXtension. Seventy one Pesticide Recertification training sessions were conducted reaching over 921 persons.

Agents developed articles for newspapers and newsletters to publicize programs. They are also posting information to inform the public on their county websites.

Results

Of the 11,657 people participating in programs, 94% reported a gain in knowledge. For one farmer, it was determined that his application of 20 inches of water to corn was too high and he may be able to reduce application to 15 inches with a cost saving of \$10/inch/acre or about \$50/acre for the season. Participants attending the Vegetable Grower meetings who had pesticide applicator licenses received one to two hours of educational credit with the Department of Pesticide Regulations.

4. Associated Knowledge Areas

KA Code Knowledge Area

205	Plant Management Systems
216	Integrated Pest Management Systems

Outcome #3

1. Outcome Measures

Number of new wheat varieties with increased disease and pest resistance.

Not Reporting on this Outcome Measure

Outcome #4

1. Outcome Measures

Number of new high yielding soybean cultivars with resistance to nematodes which will improve profitability for growers

Not Reporting on this Outcome Measure

V(H). Planned Program (External Factors)

External factors which affected outcomes

- Natural Disasters (drought, weather extremes, etc.)
- Economy
- Public Policy changes
- Government Regulations
- Competing Programmatic Challenges
- Populations changes (immigration, new cultural groupings, etc.)

Brief Explanation

V(I). Planned Program (Evaluation Studies and Data Collection)

1. Evaluation Studies Planned

- After Only (post program)
- Retrospective (post program)
- Before-After (before and after program)
- During (during program)
- Time series (multiple points before and after program)
- Comparisons between program participants (individuals, group, organizations) and non-participants
- Comparisons between different groups of individuals or program participants experiencing different levels of program intensity.
- Comparison between locales where the program operates and sites without program intervention

Evaluation Results

Designed and implemented a state-wide survey of crop-specific irrigated acreages and system types, and pump stations. Identified and contacted key extension specialists and agents in each of the 46 counties in SC, who gave names of people who might participate in this comprehensive irrigation survey.

About 35% of the agents completed the survey, with non-responses mostly from counties with limited acreage of irrigated row crops and vegetables. The data is highly valuable as there is currently no known state or federal agency who collects irrigation data in South Carolina (Note: in Feb 2009, NASS implemented a nation-wide irrigation survey). Data from this survey will be integrated with the NASS data and will be published as an extension publication for public information and use.

Key Items of Evaluation

V(A). Planned Program (Summary)**Program # 4****1. Name of the Planned Program**

Water Quality and Water Quantity

V(B). Program Knowledge Area(s)**1. Program Knowledge Areas and Percentage**

KA Code	Knowledge Area	%1862 Extension	%1890 Extension	%1862 Research	%1890 Research
111	Conservation and Efficient Use of Water	30%	0%	30%	0%
112	Watershed Protection and Management	20%	0%	20%	0%
131	Alternative Uses of Land	20%	0%	20%	0%
133	Pollution Prevention and Mitigation	20%	0%	20%	0%
134	Outdoor Recreation	10%	0%	10%	0%
	Total	100%	0%	100%	0%

V(C). Planned Program (Inputs)**1. Actual amount of professional FTE/SYs expended this Program**

Year: 2009	Extension		Research	
	1862	1890	1862	1890
Plan	4.0	0.0	3.5	0.0
Actual	11.5	0.0	4.3	0.0

2. Actual dollars expended in this Program (includes Carryover Funds from previous years)

Extension		Research	
Smith-Lever 3b & 3c	1890 Extension	Hatch	Evans-Allen
413650	0	249885	0
1862 Matching	1890 Matching	1862 Matching	1890 Matching
413650	0	451132	0
1862 All Other	1890 All Other	1862 All Other	1890 All Other
0	0	0	0

V(D). Planned Program (Activity)**1. Brief description of the Activity**

Environmental researchers have developed new methods to minimize water pollution that are science-based and meet water quality improvements, which are obtained with minimum impact on the American agricultural community and taxpayers. Researchers have science-based answers for questions posed by stakeholders, policy and decision-makers, developers and planners concerning land use alternatives. Success is seen by improved utilization of sound management measures and improved installation and maintenance of these measures.

Workshops to educate municipal officials, designers, developers, building contractors and the public in storm water management and environmentally sound development practices have been attended by approximately 6000 persons.

Many landowners in South Carolina watersheds are unaware of the uniqueness of their property so the Clemson University Cooperative Extension Service staff developed educational programs to inform them about their property and ways to conserve it.

2. Brief description of the target audience

The target audience includes farm and forest landowners, Extension agents, and administrators, natural resource professionals, Land Management agency personnel, and user groups, nature-based tourism operators, South Carolina citizens, tourists, nature base, tourism industry, children in school, after-school, summer and 4-H programs, agents and volunteers, urban, suburban and rural residents, farmers, ranchers, poultry and swine producers, foresters urban agents, agency personnel, urban planners and land owners/managers, municipal officials, and local community groups statewide, managers, government officials, and recreation and tourism operators.

V(E). Planned Program (Outputs)

1. Standard output measures

2009	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Plan	7000	2500	0	0
Actual	12351	393517	200	0

2. Number of Patent Applications Submitted (Standard Research Output)

Patent Applications Submitted

Year: 2009
 Plan: 1
 Actual: 0

Patents listed

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

2009	Extension	Research	Total
Plan	0	9	
Actual	0	18	0

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

- Disclosures

Year	Target	Actual
2009	1	2

Output #2

Output Measure

- Licenses

Year	Target	Actual
2009	0	0

Output #3

Output Measure

- New Products, processes, procedures and policies
Not reporting on this Output for this Annual Report

Output #4

Output Measure

- National Media Placements

Year	Target	Actual
2009	8	12

Output #5

Output Measure

- Percentage increase in outside funds from grants, contracts and gifts
Not reporting on this Output for this Annual Report

Output #6

Output Measure

- Number of people completing educational workshops

Year	Target	Actual
2009	4300	7973

V(G). State Defined Outcomes

V. State Defined Outcomes Table of Content

O. No.	OUTCOME NAME
1	Number of people gaining knowledge
2	Number of people using practices learned
3	Policies for economically viable land use preserving water quality
4	Strategies for TMDL development and implementation at the watershed level

Outcome #1**1. Outcome Measures**

Number of people gaining knowledge

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2009	3300	7536

3c. Qualitative Outcome or Impact Statement**Issue (Who cares and Why)**

South Carolina has many watersheds that are considered impaired. Watersheds are evaluated based on the EPA standards that are a part of the Clean Water Act of 1972. In the clean water act EPA is given the authority to set the amount of pollutant a water body can contain. The most prevalent of the pollutants in South Carolina is fecal coliform. The presence of fecal coliform is an indication that animal wastes are entering the water body. Fecal coliform is a bacterium associated with the feces of warm blooded animals. Based on EPA's standards for water quality, water bodies which contain more than 200 counts/100ml of fecal coliform are considered impaired. There is a need to improve water quality, wetland, and wetland management.

What has been done

Seventeen water quality and quantity programs were conducted reaching 7,973 people. To reduce the amount of fecal coliform in watersheds, a Section 319 TMDL project was implemented. As a part of this project, homeowners are encouraged to repair failing septic systems which could be contributing fecal coliform to the local streams and creeks. Three (3) Certified Erosion Prevention and Sediment Control Inspector courses were conducted in August by Extension Specialists who are serving as program coordinators for the DHEC Certified Erosion Prevention and Sediment Control Inspector Program. The program seeks to educate field personnel on the proper installation, maintenance, and inspection of erosion prevention and sediment control measures at construction sites. Over 4,500 people have participated in the classes and over 3,900 completed the certification examination. The series of one-day workshops teaches attendees the latest techniques for erosion prevention and sediment control. It also introduces a variety of erosion control practices including the most environmentally effective techniques for different terrain. Instructors demonstrated how to review grading and drainage plans, as well as BMP details. Each participant is provided an opportunity to meet others involved in land disturbing activities and taught how to conduct a field inspection of erosion prevention and sediment control practices. The first South Carolina Water Resources Conference (SCWRC) was held in North Charleston and covered topics such as water policies, research projects, and water management. A natural resources enterprise workshop was conducted and focused on alternative income opportunities from natural resources on private lands.

Agents developed articles for newspapers and newsletters to publicize programs. They are also posting information to inform the public on their county websites.

Results

Of those participating in the water quality and quantity programs, almost 95% reported a gain in knowledge. Additional information can be found at the SCWRC site:
http://www.clemson.edu/restoration/events/past_events/sc_water_resources/

4. Associated Knowledge Areas

KA Code	Knowledge Area
111	Conservation and Efficient Use of Water
112	Watershed Protection and Management
131	Alternative Uses of Land
133	Pollution Prevention and Mitigation
134	Outdoor Recreation

Outcome #2

1. Outcome Measures

Number of people using practices learned

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2009	2300	3677

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

The Clemson Extension Carolina Clear program is currently partnering with Myrtle Beach, North Myrtle Beach, Conway, Georgetown County and Horry County (and small communities in each county) on improved stormwater education and management. These communities and the additional members of the Coastal Waccamaw Stormwater Education Consortium have expressed a need for more technical workshops and training.

In addition, storm water runoff from roofs and driveways threatens water quality and exacerbates flood problems. In addition, impermeable surfaces decrease the amount of rainwater available to recharge groundwater resources. It is important to educate citizens of these water issues.

What has been done

To meet the expressed need of the Stormwater Education Consortium, two bioretention cells were constructed at the new Clemson Baruch Institute. Innovative stormwater management practices have been incorporated into the site design of the new Baruch Institute building as part of its green infrastructure. Bioretention cells, otherwise known as rain gardens, are attractive landscape features that mimic natural hydrologic processes by allowing stormwater to be infiltrated into the ground. This is accomplished by collecting rainfall runoff from the building rooftop into the shallow basins of the bioretention areas, a process which not only delivers water to the landscape plants but also provides water quantity management and water quality improvement. These cells were constructed using local soil materials, including sand from the Hobcaw Barony property, yard waste compost from the Georgetown County landfill, and mulch from a local sod farm. The areas were planted with native tree, shrub, and

perennial plant species, including bald cypress, summer sweet, false indigo, coreopsis, lizards tail, blue flag iris, swamp sunflower, joe pye weed, blazing star, and columbine.

The basins were also instrumented and a weather station is housed on site to conduct research and be used in education. Each basin has also been instrumented with the following: 1) one multilevel piezometer; 2) one vented well for water table position, and 3) four soil moisture sensors. Planned research will focus on monitoring weather measurements (rainfall, temperature, potential evapotranspiration, among others), water quantity (water table position, surface water level, infiltration rates, soil moisture content) and various water quality parameters to assess the effectiveness of the bioretention cells. The bioretention areas will serve as a demonstration site for local stormwater practitioners. All plants used were native and some were particularly chosen to test their viability within bioretention cells and their growth rate due to alternative production methods used.

Some 282 educational programs were conducted in the areas of rain water harvesting, stormwater prevention, pond weed identification and treatment. Participants gained knowledge on the purpose and construction of rain gardens. Extension specialists were part of an academic convened to discuss issues of minimum instream flows in South Carolina's rivers and streams. A white paper was developed and sent to South Carolina legislators. A stormwater pond newsletter series was developed for distribution to local newspapers and community newsletters.

4H20 day camps were conducted on the lake for 4th and 5th grade students. Agents taught sessions for the Girls in Science program at the SC state Museum, Myrtle Beach municipal staff on stormwater and the municipal employees and residents of RV parks on stormwater pond management.

Results

The first workshop for the Stormwater Education Consortium was held in partnership with the North Inlet Winyah Bay National Estuarine Research Reserve Coastal Training Program and the Coastal Waccamaw Stormwater Education Consortium, entitled, Low Impact Case Studies at Hobcaw Barony: Bioretention, Site Design and Pervious Paving. Flyers were distributed via education listservs and within just more than a week of release, the workshop was filled with forty participants, with a wait list of more than 15 people. The workshop was targeted to stormwater professionals, planning board and zoning board members, engineers, landscape architects and plan reviewers. Evaluations were very positive as to the success of this workshop. Based on what was learned at this workshop, some attendees responded that they would be looking into implementing more low impact development within their community and pressuring other staff to become educated on topics presented. The instrumentation and data collection will continue for these basins, which will allow for additional educational opportunities through on site visits, video training and distance education. With all instruments installed and functioning, this demonstration project may also soon become part of the Bannockburn Plantation component of the Intelligent River TM project, which will allow for more widespread distribution of data collected at this site. In addition to the counties listed for this program, Carolina Clear is currently partnering with Lexington, Pickens, Sumter and Richland counties on improved stormwater education and management. This is an indication that the program is well received and is growing.

Other results of the Water Quality Program include the construction of rain gardens at local middle and high schools and a state park. Residents reported that they constructed rain barrels.

Youth learned about soil texture, water infiltration, and soil water repellency. A river sweep event was conducted and volunteers removed 50 tires, 920 pounds of debris and 250 pounds of metal from the river.

4. Associated Knowledge Areas

KA Code	Knowledge Area
112	Watershed Protection and Management
131	Alternative Uses of Land
133	Pollution Prevention and Mitigation
134	Outdoor Recreation

Outcome #3

1. Outcome Measures

Policies for economically viable land use preserving water quality

Not Reporting on this Outcome Measure

Outcome #4

1. Outcome Measures

Strategies for TMDL development and implementation at the watershed level

Not Reporting on this Outcome Measure

V(H). Planned Program (External Factors)

External factors which affected outcomes

- Natural Disasters (drought, weather extremes, etc.)
- Economy
- Public Policy changes
- Government Regulations
- Competing Public priorities
- Competing Programmatic Challenges

Brief Explanation

V(I). Planned Program (Evaluation Studies and Data Collection)

1. Evaluation Studies Planned

- After Only (post program)
- Retrospective (post program)
- Before-After (before and after program)
- During (during program)
- Time series (multiple points before and after program)
- Comparisons between program participants (individuals, group, organizations) and non-participants
- Comparisons between different groups of individuals or program participants experiencing different levels of program intensity.
- Comparison between locales where the program operates and sites without program intervention

Evaluation Results

CU Extension Specialists installed a water level logger at a site that is slated for restoration, to provide City of Conway Storm water Department hydrologic relevant information of that site. Hydrologic analyses was carried out using data gathered at this site to calibrate a hydrologic model. Model results were conveyed to the appropriate person in the City of Conway storm water department.

An evaluation of the program on "Low Impact Case Studies at Hobcaw Barony: Bioretention, Site Design and Pervious Paving" was conducted. Based on what was learned at this workshop, some attendees responded that they would be looking into implementing more low impact development within their community and pressuring other staff to become educated on topics presented. The instrumentation and data collection will continue for these basins, which will allow for additional educational opportunities through onsite visits, video training and distance education. With all instruments installed and functioning, this demonstration project may also soon become part of the Bannockburn Plantation component of the Intelligent River&trade project, which will allow for more widespread distribution of data collected at this site.

Key Items of Evaluation

V(A). Planned Program (Summary)**Program # 5****1. Name of the Planned Program**

Biotechnology

V(B). Program Knowledge Area(s)**1. Program Knowledge Areas and Percentage**

KA Code	Knowledge Area	%1862 Extension	%1890 Extension	%1862 Research	%1890 Research
201	Plant Genome, Genetics, and Genetic Mechanisms	0%	0%	25%	0%
202	Plant Genetic Resources	0%	0%	25%	0%
303	Genetic Improvement of Animals	0%	0%	20%	0%
304	Animal Genome	0%	0%	20%	0%
712	Protect Food from Contamination by Pathogenic Microorganisms, Parasites, and Naturally Occurring Toxins	0%	0%	10%	0%
Total		0%	0%	100%	0%

V(C). Planned Program (Inputs)**1. Actual amount of professional FTE/SYs expended this Program**

Year: 2009	Extension		Research	
	1862	1890	1862	1890
Plan	0.0	0.0	8.0	0.0
Actual	0.0	0.0	8.3	0.0

2. Actual dollars expended in this Program (includes Carryover Funds from previous years)

Extension		Research	
Smith-Lever 3b & 3c	1890 Extension	Hatch	Evans-Allen
0	0	373059	0
1862 Matching	1890 Matching	1862 Matching	1890 Matching
0	0	608104	0
1862 All Other	1890 All Other	1862 All Other	1890 All Other
0	0	0	0

V(D). Planned Program (Activity)**1. Brief description of the Activity**

A Clemson scientist has had success in manipulating oyster blood cells to deposit nacre, the material used to form shell and pearl, onto aluminum, titanium and stainless-steel alloy surfaces. This research holds promise to create super-tough coatings that will resist corrosion and reduce drag. Airplane and shipbuilding industries and the military are interested in the research.

2. Brief description of the target audience

Agricultural biotechnology research has a grower and industry focus. New approaches to improving crop and animal lines are one result of biotechnology research. The ability to better deal with a variety of pests which negatively impact productivity is another.

V(E). Planned Program (Outputs)

1. Standard output measures

2009	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Plan	0	0	0	0
Actual	0	0	0	0

2. Number of Patent Applications Submitted (Standard Research Output)

Patent Applications Submitted

Year: 2009

Plan: 1

Actual: 1

Patents listed

Deposition of nanocrystalline calcite on metal alloys by a cellular biomineralization mean sand process for preparing same

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

2009	Extension	Research	Total
Plan	0	12	
Actual	0	14	0

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

- Disclosures

Year	Target	Actual
2009	3	2

Output #2

Output Measure

- Licenses

Year	Target	Actual
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2009 0 0

Output #3

Output Measure

- New products, processes procedures and policies
Not reporting on this Output for this Annual Report

Output #4

Output Measure

- National media placements

Year	Target	Actual
2009	9	7

Output #5

Output Measure

- Percentage increase of funds through grants, contracts and gifts
Not reporting on this Output for this Annual Report

V(G). State Defined Outcomes**V. State Defined Outcomes Table of Content**

O. No.	OUTCOME NAME
1	Development of expanded applications of legumes in nitrogen poor environments
2	Improved profitability for beef and dairy producers

Outcome #1

1. Outcome Measures

Development of expanded applications of legumes in nitrogen poor environments

Not Reporting on this Outcome Measure

Outcome #2

1. Outcome Measures

Improved profitability for beef and dairy producers

Not Reporting on this Outcome Measure

V(H). Planned Program (External Factors)

External factors which affected outcomes

- Natural Disasters (drought, weather extremes, etc.)
- Economy
- Public Policy changes
- Government Regulations

Brief Explanation

V(I). Planned Program (Evaluation Studies and Data Collection)

1. Evaluation Studies Planned

- After Only (post program)
- Retrospective (post program)
- Before-After (before and after program)
- During (during program)
- Time series (multiple points before and after program)
- Comparisons between program participants (individuals, group, organizations) and non-participants
- Comparisons between different groups of individuals or program participants experiencing different levels of program intensity.
- Comparison between locales where the program operates and sites without program intervention

Evaluation Results

Key Items of Evaluation

V(A). Planned Program (Summary)**Program # 6****1. Name of the Planned Program**

Food Safety and Nutrition

V(B). Program Knowledge Area(s)

1. Program Knowledge Areas and Percentage

KA Code	Knowledge Area	%1862 Extension	%1890 Extension	%1862 Research	%1890 Research
503	Quality Maintenance in Storing and Marketing Food Products	5%	5%	5%	5%
703	Nutrition Education and Behavior	30%	40%	30%	35%
712	Protect Food from Contamination by Pathogenic Microorganisms, Parasites, and Naturally Occurring Toxins	20%	10%	30%	20%
723	Hazards to Human Health and Safety	30%	30%	30%	20%
724	Healthy Lifestyle	15%	15%	5%	20%
	Total	100%	100%	100%	100%

V(C). Planned Program (Inputs)

1. Actual amount of professional FTE/SYs expended this Program

Year: 2009	Extension		Research	
	1862	1890	1862	1890
Plan	10.0	14.0	2.0	4.0
Actual	21.0	3.0	2.8	2.0

2. Actual dollars expended in this Program (includes Carryover Funds from previous years)

Extension		Research	
Smith-Lever 3b & 3c	1890 Extension	Hatch	Evans-Allen
71252	62764	312409	110691
1862 Matching	1890 Matching	1862 Matching	1890 Matching
71252	38238	265305	62929
1862 All Other	1890 All Other	1862 All Other	1890 All Other
1032327	0	0	0

V(D). Planned Program (Activity)

1. Brief description of the Activity

Clemson Extension as well as South Carolina State 1890 Extension Food Safety and Nutrition activities focused on educational programs to increase the nutrition and food safety knowledge of citizens and businesses in South Carolina. Desired results are three-fold: (1) make their lifestyles healthier and thus reduce the incidence of obesity-related chronic disease; (2) decrease the incidence of foodborne illness and improve public health; (3) assist food businesses with preventing foodborne

illness-related, food quality-related losses that negatively impact economic viability and result in job losses.

Commercial food processors were targeted in an effort to improve commercial food processing efficiencies and effectiveness/develop new markets/improve commercial handling, processing, preservation and packaging to provide safe and high quality foods. Attention was given to providing consumers with scientifically based, reasonable nutrition and food safety information via the media.

Researchers have found that nano-particles coated with lysozyme can be effective way to reduce listeria, a major cause of food-related illness. The research presents new packaging methods to keep food safe. The CDC estimates foodborne diseases cause approximately 76 million illnesses, 325,000 hospitalizations, and 5,000 deaths in the United States each year. Lysozyme is part of the immune system that can break down the outer wall of certain bacteria, including ones that cause food-related illnesses.

Biologists using a bacterium widely used as starters in yogurt and cheese are improving its commercial usefulness. The results indicate that this bacterium could help control spoilage in cottage cheese, potentially extending its shelf life. Experiments with cottage cheese showed that as the numbers of lactobacilli increased, the numbers of spoilage organisms decreased. The research also may lead to health benefits. Unlocking the genetic code may uncover DNA fragments that can be used to make proteins that attack bacterial infections. These proteins, called bacteriocins, are potentially more effective than antibiotics. Disease-causing bacteria can become resistant to antibiotics but not to bacteriocins.

Clemson food scientists are working with colleagues at New Mexico State University and the Danyun Institute in China have developed a series of food safety training materials in Chinese. Making sure foodservice workers practice safe-food handling is an ongoing challenge for public health experts. The National Restaurant Association (NRA) estimates that a single food-borne illness outbreak could cost a restaurant an estimated \$75,000. Chinese is the third most commonly spoken language in U.S. foodservice operations, following English and Spanish. In many areas of the U.S., food safety educators only speak English and so it is difficult for them to effectively train Chinese-speaking foodservice workers. Take-out and restaurant dining has become a way of life. More food is prepared and consumed away from home. The U.S. Department of Agriculture (USDA) estimates that consumers spend 43 cents of every food dollar eating out.

An 1890 Researcher is examining, for the state of South Carolina, the evolution of attitudes towards nutrition-related issues from the nineteenth century on and should shed light on the sources of resistance and difficulties encountered in the implementation of governmental nutrition guidelines. An historical approach helps to establish a proper context for the intensifying obesity debate and helps to identify longstanding problems and barriers to the implementation of governmental nutrition guidelines in South Carolina. The researcher focused on the nature of the nutrition debate in South Carolina during the antebellum period. South Carolina newspapers were examined and the nutritional advice contained in them. The question of how nutrition information was received was examined.

Researchers examined the direct effects of selected precollege factors, institutional characteristics and college experiences on African American college students' health orientations and behaviors. The project educated participants about the importance of having a healthy orientation and participating in healthy behavior. Reviewed and synthesized relevant research literature, began collecting data, and cleaned, coded and constructed dependent and independent variables.

Research is also being conducted on the effects of diabetes on DNA/RNA of the diseased participants. The project aims at identifying a bio-marker of DNA modification in relation to diabetes. Experiments have begun using invitro conditions out and subsequent experiments with human urine, etc.

2. Brief description of the target audience

The audience includes community leaders, agencies, policy makers, general public, EFNEP - limited resource families, food service managers, supervisors, food handlers, producers, commercial food handlers, processing and packaging industry, entrepreneurs seeking to start food businesses or improve existing food business, media and other marketing contacts, and publication outlets &ndash doctors' offices and grocers.

V(E). Planned Program (Outputs)

1. Standard output measures

2009	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Plan	30000	1800	10900	0
Actual	19180	576360	3133	0

2. Number of Patent Applications Submitted (Standard Research Output)

Patent Applications Submitted

Year: 2009
 Plan: 1
 Actual: 0

Patents listed

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

2009	Extension	Research	Total
Plan	0	5	
Actual	0	1	0

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

- Licenses

Year	Target	Actual
2009	0	0

Output #2

Output Measure

- Disclosures

Year	Target	Actual
2009	1	2

Output #3

Output Measure

- Publications

Year	Target	Actual
2009	10	1

Output #4**Output Measure**

- New products, processes, procedures and policies
Not reporting on this Output for this Annual Report

Output #5**Output Measure**

- National media placements

Year	Target	Actual
2009	4	2

Output #6**Output Measure**

- Percent increase of outside funds through grants, contracts and gifts
Not reporting on this Output for this Annual Report

Output #7**Output Measure**

- Number of press kits distributed

Year	Target	Actual
2009	45	279

Output #8**Output Measure**

- Number of people completing educational workshops

Year	Target	Actual
2009	15000	18136

V(G). State Defined Outcomes**V. State Defined Outcomes Table of Content**

O. No.	OUTCOME NAME
1	Number of participants reporting increase knowledge in safe food handling and nutrition
2	Number of managers/supervisors/food handlers completing educational program and receiving a course certificate
3	Number of coalitions formed (partners, public/private, academic)
4	Number of participants reached with food safety information by volunteers who participated in an Extension training program
5	Number of new or improved food products entering the market as a result of adopting recommended practices
6	Number of people reached through media outlets that utilize Extension food safety, food biotechnology and nutrition resources

Outcome #1**1. Outcome Measures**

Number of participants reporting increase knowledge in safe food handling and nutrition

2. Associated Institution Types

- 1862 Extension
- 1890 Extension
- 1890 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2009	11000	17508

3c. Qualitative Outcome or Impact Statement**Issue (Who cares and Why)**

There is a need for South Carolinians to improve dietary practices and decrease the incidence of foodborne illnesses to enable them to live healthy lifestyles. In addition, the current economic down-turn has driven families to look for ways to stretch their shrinking food dollars. One way is to preserve homegrown or locally purchased fruits and vegetables. Yet, many families do not know how to preserve foods safely.

What has been done

Some 2,275 educational sessions were conducted, reaching over 17,894 persons. In addition, adults were reached with health and wellness fairs, Color Me Healthy, and Take Off Pounds Sensibly(TOPS)workshops at councils on aging, AARP groups, employee work sites, and local agencies. In addition, the first Food Safety Workshop in Spanish from Clemson University was conducted with Hispanic businesses and entrepreneurs from around the upstate area of South Carolina.

Food Safety & Nutrition agents helped families increase their food preservation skills through answering questions and offering 4 food canning/preservation workshops across South Carolina. In addition, Food Safety professionals answered food safety and food preservation-related questions (over 500 in 2008-09) at the Home and Garden Information Center (HGIC). They also developed Hot Topics (on food safety topics of current interest) and develops or updates food preservation fact sheets for the HGIC.

Extension specialists, agents and MUSC faculty members are conducting a pilot study to assess the effects of a nutrition and food safety intervention on older adults who participate in the South Carolina congregate nutrition program. The intervention (Cooking Healthy-Eating Smart) demonstrates cooking, food safety and healthy diets for seniors. The \$273,000 project is funded by the USDA Rural Health Initiative. It will provide a science-based program to target critical food safety and nutrition needs for South Carolina's growing senior population.

Health workshops about chronic diseases such as hypertension,high blood pressure, meal preparations, food demonstrations and physical activity were taught to youth, adults and senior citizens. The participants shared their experiences with chronic diseases and prevention. hands-on-food demonstrations were done to highlight meal preparation with reduced sugar, fat and salt.

Results

Ninety percent (90%) of the persons participating in educational workshops gained knowledge. As a result of the 1890 health workshops, medical ID cards were given and 60% of the participants stated they were more aware of their health and that of their families. They also indicated that they would use the recipes and carry their medical ID cards with them at all times.

4. Associated Knowledge Areas

KA Code	Knowledge Area
503	Quality Maintenance in Storing and Marketing Food Products
703	Nutrition Education and Behavior
712	Protect Food from Contamination by Pathogenic Microorganisms, Parasites, and Naturally Occurring Toxins
723	Hazards to Human Health and Safety
724	Healthy Lifestyle

Outcome #2

1. Outcome Measures

Number of managers/supervisors/food handlers completing educational program and receiving a course certificate

2. Associated Institution Types

- 1862 Extension
- 1890 Extension

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2009	600	275

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Food handlers, managers and supervisors potentially reach thousands of people in their communities daily. The estimated average cost of a foodborne illness outbreak to an establishment has increased to over \$75,000. Desired results for citizens are three-fold: (1) make their lifestyles healthier and thus reduce the incidence of obesity-related chronic disease; (2) decrease the incidence of foodborne illness and improve public health; (3) assist food businesses with preventing foodborne illness-related and food quality-related losses that negatively impact economic viability and result in job losses.

South Carolina law requires the Department of Education's Child Nutrition Services to have effective HACCP plans in place.

What has been done

ServSafe is a proven, practical training that increases retail employees' compliance with food safety guidelines. Food safety educational programs for retail are offered in 2 formats statewide ServSafe for Managers (15 hours), ServSafe for Employees (6-10 hours) and Serving Safe Food employee training (4 hours). Over 319 food handlers representing 230 food establishments completed educational workshops offered by the Clemson University Extension Service, and gained knowledge and skills in safe food handling techniques to reduce the incidence of

food-borne illness, which reduces the likelihood of medical costs that are incurred due to food-borne illness. The food handlers had the potential of reaching 234,232 people.

Working with Child Nutrition Services, specialists have developed operational HACCP school foodservice plans, providing the Department with support and training to implement these plans.

Results

Over 90% of the participants received a course completion certificate indicating knowledge proficiency. The approximate value of the trainings in South Carolina was \$19,275,000. Having effective HACCP plans in place increases the safety of the meals provided to all South Carolina school children.

4. Associated Knowledge Areas

KA Code	Knowledge Area
703	Nutrition Education and Behavior
712	Protect Food from Contamination by Pathogenic Microorganisms, Parasites, and Naturally Occurring Toxins
723	Hazards to Human Health and Safety

Outcome #3

1. Outcome Measures

Number of coalitions formed (partners, public/private, academic)

2. Associated Institution Types

- 1862 Extension
- 1890 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2009	5	10

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

There is a need for clientele to improve their dietary practices to enable them to live healthy lifestyles. Establishing partnerships and coalitions can effectively extend the resources of Extension and help to maximize its programmatic outreach.

What has been done

Agents met with various groups to establish networks and coalitions whereby educational sessions could be implemented and evaluated.

Results

Ten new coalitions were formed with the local school districts to set up a Cooking Up Literacy program. In addition, partnerships were established with Greenville Tech for the Upward Bound Student Program, the SC Housing Authority, Housing and Homeless Coalition, Churches, county libraries, Coker College and the SC Cancer Alliance to implement various nutrition programs.

4. Associated Knowledge Areas

KA Code	Knowledge Area
703	Nutrition Education and Behavior
723	Hazards to Human Health and Safety
724	Healthy Lifestyle

Outcome #4

1. Outcome Measures

Number of participants reached with food safety information by volunteers who participated in an Extension training program
 Not Reporting on this Outcome Measure

Outcome #5

1. Outcome Measures

Number of new or improved food products entering the market as a result of adopting recommended practices

2. Associated Institution Types

- 1862 Extension
- 1890 Research

3a. Outcome Type:

Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2009	45	106

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Consumers want to make healthy food choices and need high quality supplies of food and fiber products.

What has been done

Food analysis assistance was given to companies to comply with food laws and regulations. Specialists are continuing the development of a probiotic drink with the potential to assist autistic children and an herb extract with potential medical applications.

Results

Approximately 106 improved food products entered the market as a result of adopting recommended practices.

4. Associated Knowledge Areas

KA Code	Knowledge Area
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- 503 Quality Maintenance in Storing and Marketing Food Products
- 712 Protect Food from Contamination by Pathogenic Microorganisms, Parasites, and Naturally Occurring Toxins

Outcome #6

1. Outcome Measures

Number of people reached through media outlets that utilize Extension food safety, food biotechnology and nutrition resources

2. Associated Institution Types

- 1862 Extension
- 1890 Extension
- 1890 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2009	40000	447057

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

South Carolina citizens need to make healthy food choices, develop skills in the procurement of food for good health, and demonstrate skills in healthy food preparation.

What has been done

Agents wrote monthly local and statewide articles for newspapers and magazines and conducted programs over "Your Day" educational TV, radio and other media outlets. They delivered information through the Home & Garden Information Center. Faculty and agents had 253 and 155 minutes of programming airtime on TV and radio programs, respectively. Local, regional, state newspapers published 1,438 column inches of food safety-related articles.

Results

Over 447,057 people were reached through media this year.

4. Associated Knowledge Areas

KA Code	Knowledge Area
503	Quality Maintenance in Storing and Marketing Food Products
703	Nutrition Education and Behavior
712	Protect Food from Contamination by Pathogenic Microorganisms, Parasites, and Naturally Occurring Toxins
723	Hazards to Human Health and Safety
724	Healthy Lifestyle

V(H). Planned Program (External Factors)

External factors which affected outcomes

- Economy
- Government Regulations
- Populations changes (immigration, new cultural groupings, etc.)

Brief Explanation

V(I). Planned Program (Evaluation Studies and Data Collection)

1. Evaluation Studies Planned

- After Only (post program)
- Retrospective (post program)
- Before-After (before and after program)
- During (during program)
- Case Study
- Comparisons between program participants (individuals, group, organizations) and non-participants
- Comparisons between different groups of individuals or program participants experiencing different levels of program intensity.
- Comparison between locales where the program operates and sites without program intervention

Evaluation Results

During FY 09, when the adult participants entered the Expanded Food and Nutrition Education Program (EFNEP), only 9 percent reported diets that contained food from all five food groups. This percentage increased to almost 30 percent by the time participants graduated from the program.

A positive change in at least one food group was noted in 97 percent of participants graduating from the program. EFNEP participants also show behavior changes that translate into significant improvements in daily living skills.

Results from a survey taken at the beginning and at the end of the program show that 88 percent of participants showed improvements in one or more nutrition practices (i.e., planning meals, making healthy food choices, preparing meals without adding salt, reading nutrition labels, or having children eat breakfast).

More than 87 percent of participants showed improvements in one or more food resource management practices (i.e., planning meals, comparing prices, using grocery lists, or not running out of food).

Almost 66 percent of participants showed improvement in one or more food safety practices (i.e., thawing and storing foods properly).

When participants first enrolled in the program, only 1 percent followed the acceptable practices for all indicators. At the end of the program 31 percent had achieved the goal. More than 48 percent of participants increased their physical activity levels.

Key Items of Evaluation

V(A). Planned Program (Summary)

Program # 7

1. Name of the Planned Program

Community, Leadership, and Economic Development

V(B). Program Knowledge Area(s)

1. Program Knowledge Areas and Percentage

KA Code	Knowledge Area	%1862 Extension	%1890 Extension	%1862 Research	%1890 Research
608	Community Resource Planning and Development	15%	25%	15%	15%
609	Economic Theory and Methods	10%	10%	10%	15%
610	Domestic Policy Analysis	15%	10%	15%	25%
801	Individual and Family Resource Management	15%	20%	15%	10%
802	Human Development and Family Well-Being	15%	10%	15%	10%
803	Sociological and Technological Change Affecting Individuals, Families, and Communities	15%	15%	15%	15%
806	Youth Development	15%	10%	15%	10%
Total		100%	100%	100%	100%

V(C). Planned Program (Inputs)

1. Actual amount of professional FTE/SYs expended this Program

Year: 2009	Extension		Research	
	1862	1890	1862	1890
Plan	14.0	6.0	7.5	8.5
Actual	15.8	8.0	5.5	2.0

2. Actual dollars expended in this Program (includes Carryover Funds from previous years)

Extension		Research	
Smith-Lever 3b & 3c	1890 Extension	Hatch	Evans-Allen
582069	308114	282128	362263
1862 Matching	1890 Matching	1862 Matching	1890 Matching
582069	187709	844732	205946
1862 All Other	1890 All Other	1862 All Other	1890 All Other
0	0	0	0

V(D). Planned Program (Activity)

1. Brief description of the Activity

The Clemson University Cooperative Extension Service conducted leadership programs and workshops focusing on facilitation skills and best practices for conflict resolution to be used by youth and adults in public meetings and public forums. Nonprofit organizations received board development and team building training, which strengthened their organizational capacity. Tutoring programs were also conducted. The faculty continue to examine the concept of agricultural tourism as a diversification strategy in rural South Carolina.

The 1890 Adult Leadership and Community Development Program is to design and develop effective network of business and economic development programs for limited-resource person who reside in the State of South Carolina. The chief goal is to effectuate permanent jobs and business development and other socioeconomic changes, through the delivery of educational information leading to a shift in ways of doing business. A new program adopted by the 1890 Program was the Rural Entrepreneurship Action Learning (REAL) Facilitator Training. Consultations and workshops were held as well as business plans developed. An Entrepreneurship Expo was held. The program targets high school seniors to learn the rewards of business ownership, through workshops, competitions and rewards. High schools entered teams into the Business Plan Competition where teams prepared and present viable business plans suitable for their respective communities.

Programs fostered collaborations, capacity building and leadership for sustainable community and economic development. South Carolina citizens were engaged in community promotion projects and collaborations with community partners were established and strengthened. Materials were prepared for public distribution in print or through electronic means (video, television, radio, media) to promote understanding of public issues.

Pest control research and training are helping South Carolina deal with insects ranging from ants to termites. Pest control applicators are learning to use insect nesting and foraging behavior to determine the best times and places to apply insecticides. This means more effective treatments and reduced use of insecticides. The state's pest-control industry, which generates more than \$151 million in sales and \$61 million in payroll, works closely with pesticide regulators and researchers to protect dwellings and businesses.

The 1890 Northeastern Corridor of Orangeburg Community Development Corporation (NCO CDC) addresses the declining conditions that exist in the neighborhoods within close proximity to SC State University. The NCO CDC offered community-based programs that addressed problems in neighborhoods and promoted self-sufficiency. Families had access to emergency repair assistance, credit counseling and homeownership. The NCO CDC had one of its proudest accomplishments by providing down payments and/or closing cost assistance to 11 first-time homebuyers. All families received a forgivable loan of \$10,000 or more. The U. S. Department of Housing and Urban Development increased its maximum award from \$600,000 to \$800,000, which covers a three-year period. The NCO CDC is the recipient of the highest award since its inception.

An 1890 Researcher explored six cities over a period ranging from 1970 to the present. The study will determine the extent to which low and moderate income neighborhoods benefit from local community development policies. Databases have been lined and reports have been generated showing the relationship between a precinct's socio-economic profile and political participation. Documents on community development issues and community leaders have been transferred to an NVIVO database. An NVivo database has been created for city council meeting minutes for each targeted city. The documents are being coded.

Another study analyzes the factors that affect the educational attainment and investment in South Carolinian order to develop a model to promote educational attainment and economic development in the state. A pool of cross-sectional approaches were used to examine the determinants of educational attainment in 2001-2008 in South Carolina. Multivariate ordinary least square technique was used to evaluate the factors that affected educational attainment. Three multiple regression models were estimated using a linear and log form.

2. Brief description of the target audience

The target audience included students, child care providers, limited-resource persons, community leaders, board/council members, nonprofit organization boards and groups, adults, youth, business and workforce preparation agencies and disadvantaged citizens and communities, state, federal, and local agency personnel, association members, citizens faced with public issues, and citizens engaged in economic and tourism development.

V(E). Planned Program (Outputs)

1. Standard output measures

2009	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Plan	19500	2400	0	200
Actual	18249	400878	1748	0

2. Number of Patent Applications Submitted (Standard Research Output)

Patent Applications Submitted

Year: 2009
 Plan: 0
 Actual: 1

Patents listed

Process for reducing solid waste volume and landfill mass

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

2009	Extension	Research	Total
Plan	0	8	
Actual	0	2	0

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

- Disclosures

Year	Target	Actual
2009	0	0

Output #2

Output Measure

- Licenses

Year	Target	Actual
2009	0	0

Output #3

Output Measure

- Publications, business plans and housing grants

Year	Target	Actual
2009	18	29

Output #4

Output Measure

- New Products, processes, procedures and policies

Year	Target	Actual
2009	3	2

Output #5

Output Measure

- Percent Increase of Outside funds from grants, contracts and gifts
Not reporting on this Output for this Annual Report

Output #6

Output Measure

- National Media Placements

Year	Target	Actual
2009	4	1

Output #7

Output Measure

- Total number of people completing educational workshops

Year	Target	Actual
2009	13500	16335

Output #8

Output Measure

- Number of board members trained

Year	Target	Actual
2009	60	57

Output #9

Output Measure

- Number of Persons Applied for Loans after Training.

Year	Target	Actual
2009	{No Data Entered}	29

Output #10

Output Measure

- Number of Homes Rehabilitated.

Year	Target	Actual
2009	{No Data Entered}	12

V(G). State Defined Outcomes**V. State Defined Outcomes Table of Content**

O. No.	OUTCOME NAME
1	Total number of people reporting increased knowledge as a result of participation in CLED activities
2	Number of facilitated public meetings addressing public issues
3	Number of printed materials used to promote understanding of public issues
4	Number of National Issues Forums convened or moderated
5	Number of participants engaged in community promotion projects
6	Number of homeownerships provided.

Outcome #1**1. Outcome Measures**

Total number of people reporting increased knowledge as a result of participation in CLED activities

2. Associated Institution Types

- 1862 Extension
- 1890 Extension

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2009	7950	14656

3c. Qualitative Outcome or Impact Statement**Issue (Who cares and Why)**

In South Carolina, there is a need to assist in building local economies through the development of local leadership. In addition, South Carolina, like many other states, suffers a high school drop-out rate of almost one third of its students every year. The school districts along the I-95 Corridor have dropout rates in the mid-forty percent range (2006 Kids Count). The 1.3 million students annually who do not graduate from high school are costing the nation more than \$325 billion in lost wages, taxes, and productivity over their lifetimes reports the Alliance for Excellent Education. The statistics indicate that hundreds of thousands of South Carolinians are without the credentials to find viable employment and struggle every year to maintain quality of life and productivity. The statistics are staggering when added to the fact that 82% of America's prison inmates are high school dropouts. The statistics are also indicators for the lack of viable workforce in our rural communities hindering economic growth.

What has been done

A total of 545 programs were conducted reaching 14,925 people who participated. Fifty-seven board members were trained. Board training for public officials and non-profit organizations were offered at the community and state-wide levels in the areas of community leadership development, team building, and consensus development activities. Programs included Palmetto Leadership, University of South Carolina Teacher Cadet College Day, Builders of Tomorrow Site Supervisor Training, Entrepreneurship Expo, REAL Facilitator Training and other Leadership Advisory Board training. In addition, programs such as Operation Military Kids Family Readiness was conducted at McEntire Air and National Guard Base and Ft. Jackson Military Base.

AmeriCorp and other youth leadership programs seek to provide tutoring and leadership development for overall improvement in learning.

Results

Of those persons participating in Extension Community Leadership and Economic Development programs, over 96% (14,345) gained knowledge. AmeriCorps members in the Clemson University Builders of Tomorrow Program contributed over 14,000 hours in our schools and earned money to continue their college education. Our AmeriCorps members are spending their service hours in our schools conducting weekly youth leadership programs to 600 6th and 7th grade students and tutoring 300 6th, 7th, and 8th grade students improving academic and classroom performance in more than 78% of the youth participants.

Agents developed news releases, fact sheets, reports, articles, websites and newsletters for information distribution.

4. Associated Knowledge Areas

KA Code	Knowledge Area
608	Community Resource Planning and Development
801	Individual and Family Resource Management
803	Sociological and Technological Change Affecting Individuals, Families, and Communities
806	Youth Development

Outcome #2

1. Outcome Measures

Number of facilitated public meetings addressing public issues

2. Associated Institution Types

- 1862 Extension
- 1890 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2009	12	45

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Citizens need to be able to understand public issues and learn methods for addressing concerns in a productive manner in order to promote unified public policy.

What has been done

The community leadership program provides a facilitated and constructive forum where conflicting interests and policies can be addressed through the action plans of established and emerging leaders. These programs also help create the next generation of informed leaders.

Results

There were 12 facilitated meetings addressing public issues and 33 National Issues Forums (NIF) moderated or convened. The forums addressed topics such as health care, making ends meet, and violent kids.

4. Associated Knowledge Areas

KA Code	Knowledge Area
608	Community Resource Planning and Development
803	Sociological and Technological Change Affecting Individuals, Families, and Communities
806	Youth Development

Outcome #3

1. Outcome Measures

Number of printed materials used to promote understanding of public issues

Not Reporting on this Outcome Measure

Outcome #4

1. Outcome Measures

Number of National Issues Forums convened or moderated

Not Reporting on this Outcome Measure

Outcome #5

1. Outcome Measures

Number of participants engaged in community promotion projects

2. Associated Institution Types

- 1862 Extension
- 1890 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2009	475	857

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Improved community image can be linked to sustainable economic development and improved quality of life.

What has been done

Community leadership and economic development programs provided 127 community promotions projects in schools and communities to engage youth and adults.

Results

Twenty-three grant-writing workshops were conducted. The FACETS Drawing Institute engaged classroom teachers as studio practitioners. Agents assisted farmers market vendors with market plans. Downtown revitalization efforts for small towns are continuing. There were three pilot sites developed for Landscapes for Learning, an outdoor environmental laboratory.

4. Associated Knowledge Areas

KA Code	Knowledge Area
608	Community Resource Planning and Development
802	Human Development and Family Well-Being
803	Sociological and Technological Change Affecting Individuals, Families, and Communities
806	Youth Development

Outcome #6

1. Outcome Measures

Number of homeownerships provided.

2. Associated Institution Types

- 1890 Extension

3a. Outcome Type:

Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2009	{No Data Entered}	11

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Low to moderate income families often encounter barriers associated with homeownership. Declining housing conditions exist in neighborhoods within close proximity to SC State University.

What has been done

The "American Dream" of homeownership was provided to 11 low-to-moderate income families. Recipients attended and completed 6 Homebuyer Education classes. They received \$18,000 toward a down payment and closing costs. Home rehabilitation was, also, conducted.

Results

A forgivable loan of \$18,000 was provided to 6 families and 3 others received \$8,700. A HUD publication highlighted 2 of the NCO CDC participants in an article entitled, "Helping Single Working Mothers Achieve the American Dream". Home rehabilitation was completed for 22 residents at an average cost of \$20,000 per project totalling \$440,000.

4. Associated Knowledge Areas

KA Code	Knowledge Area
608	Community Resource Planning and Development
801	Individual and Family Resource Management
802	Human Development and Family Well-Being
803	Sociological and Technological Change Affecting Individuals, Families, and Communities

V(H). Planned Program (External Factors)

External factors which affected outcomes

- Economy
- Public Policy changes
- Competing Public priorities
- Populations changes (immigration, new cultural groupings, etc.)

Brief Explanation

It became more challenging to obtain mortgage approval for the clientele the 1890 NCO CDC served. Credit scores previously deemed high enough to obtain decent mortgages were no longer considered acceptable.

V(I). Planned Program (Evaluation Studies and Data Collection)

1. Evaluation Studies Planned

- After Only (post program)
- During (during program)
- Comparison between locales where the program operates and sites without program intervention

Evaluation Results

Key Items of Evaluation

V(A). Planned Program (Summary)

Program # 8

1. Name of the Planned Program

Integrated Pest Management

V(B). Program Knowledge Area(s)

1. Program Knowledge Areas and Percentage

KA Code	Knowledge Area	%1862 Extension	%1890 Extension	%1862 Research	%1890 Research
211	Insects, Mites, and Other Arthropods Affecting Plants	50%	0%	0%	0%
216	Integrated Pest Management Systems	50%	0%	0%	0%
	Total	100%	0%	0%	0%

V(C). Planned Program (Inputs)

1. Actual amount of professional FTE/SYs expended this Program

Year: 2009	Extension		Research	
	1862	1890	1862	1890
Plan	1.0	0.0	3.0	2.0
Actual	3.6	0.0	0.0	0.0

2. Actual dollars expended in this Program (includes Carryover Funds from previous years)

Extension		Research	
Smith-Lever 3b & 3c	1890 Extension	Hatch	Evans-Allen
135812	0	0	0
1862 Matching	1890 Matching	1862 Matching	1890 Matching
135812	0	0	0
1862 All Other	1890 All Other	1862 All Other	1890 All Other
0	0	0	0

V(D). Planned Program (Activity)

1. Brief description of the Activity

Research experiments were conducted and publications will be developed. In Extension, educational programs and trainings were conducted.

2. Brief description of the target audience

The target audience included homeowners, businesses and producers of horticultural and agronomic crops.

V(E). Planned Program (Outputs)

1. Standard output measures

2009	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Plan	400	100	0	0
Actual	8688	17402	0	0

2. Number of Patent Applications Submitted (Standard Research Output)

Patent Applications Submitted

Year: 2009
 Plan: 0
 Actual: 0

Patents listed

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

2009	Extension	Research	Total
Plan	0	6	
Actual	0	0	0

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

- Disclosures

Year	Target	Actual
2009	2	0

Output #2

Output Measure

- Licenses

Year	Target	Actual
2009	0	0

Output #3

Output Measure

- New Products, processes, procedures or policies

Year	Target	Actual
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2009	1	0
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Output #4

Output Measure

- National media placements

Year	Target	Actual
2009	2	0

Output #5

Output Measure

- Percent increase of outside funds through grants, contracts and gifts

Year	Target	Actual
2009	10	0

Output #6

Output Measure

- Number of educational workshops and trainings conducted.

Year	Target	Actual
2009	100	15

V(G). State Defined Outcomes**V. State Defined Outcomes Table of Content**

O. No.	OUTCOME NAME
1	Increased knowledge of the evolution of resistance in pest species
2	Improved strategies for managing ants and other household pests
3	Number of participants reporting increased knowledge due to participation in IPM programs.

Outcome #1

1. Outcome Measures

Increased knowledge of the evolution of resistance in pest species

2. Associated Institution Types

- 1862 Research

3a. Outcome Type:

Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2009	1	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
{No Data Entered}

What has been done
{No Data Entered}

Results
{No Data Entered}

4. Associated Knowledge Areas

KA Code	Knowledge Area
211	Insects, Mites, and Other Arthropods Affecting Plants
216	Integrated Pest Management Systems

Outcome #2

1. Outcome Measures

Improved strategies for managing ants and other household pests

Not Reporting on this Outcome Measure

Outcome #3

1. Outcome Measures

Number of participants reporting increased knowledge due to participation in IPM programs.

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2009	400	744

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

There is a need for more information about IPM strategies and systems and an increased level of adoption of environmentally sound integrated pest management practices so that commodities, homes, and communities will be protected, resulting in abundant, high quality supplies of food and fiber products and improved quality of life.

What has been done

Fifteen educational workshops were conducted reaching over 900 persons. The Cotton Disease and Cotton Nematode sections of the Ag Chem Handbook were updated. Site visits and contacts were conducted to provide identification and management recommendations for ornamental pests in private home and commercial nursery and landscape settings.

Results

Eighty-three (83%) percent of the participants reported a gain in knowledge.

4. Associated Knowledge Areas

KA Code	Knowledge Area
211	Insects, Mites, and Other Arthropods Affecting Plants
216	Integrated Pest Management Systems

V(H). Planned Program (External Factors)

External factors which affected outcomes

- Economy
- Government Regulations

Brief Explanation

V(I). Planned Program (Evaluation Studies and Data Collection)

1. Evaluation Studies Planned

- After Only (post program)
- During (during program)
- Case Study

Evaluation Results

Key Items of Evaluation

V(A). Planned Program (Summary)**Program # 9****1. Name of the Planned Program**

4-H Youth Development and Families

V(B). Program Knowledge Area(s)**1. Program Knowledge Areas and Percentage**

KA Code	Knowledge Area	%1862 Extension	%1890 Extension	%1862 Research	%1890 Research
801	Individual and Family Resource Management	5%	15%	0%	10%
802	Human Development and Family Well-Being	15%	15%	0%	20%
803	Sociological and Technological Change Affecting Individuals, Families, and Communities	10%	10%	0%	20%
806	Youth Development	70%	60%	0%	50%
Total		100%	100%	0%	100%

V(C). Planned Program (Inputs)**1. Actual amount of professional FTE/SYs expended this Program**

Year: 2009	Extension		Research	
	1862	1890	1862	1890
Plan	35.0	17.0	0.0	3.0
Actual	41.6	11.0	0.0	4.0

2. Actual dollars expended in this Program (includes Carryover Funds from previous years)

Extension		Research	
Smith-Lever 3b & 3c	1890 Extension	Hatch	Evans-Allen
1267350	564879	0	664149
1862 Matching	1890 Matching	1862 Matching	1890 Matching
1267350	344132	0	377566
1862 All Other	1890 All Other	1862 All Other	1890 All Other
0	0	0	0

V(D). Planned Program (Activity)**1. Brief description of the Activity**

Clemson University Cooperative Extension 4-H and youth programs as well as 1890 Extension programs were conducted to provide a wide variety of experiential educational opportunities and curricula through a number of different delivery modes such as clubs, short term interest programs, camps, etc. dependent upon their personnel and budgets. Volunteers led educational programming that provided productive youth/adult partnerships.

Several 1890 research projects were developed focusing on youth development and families. One study explored action

research of teachers examining the outcomes of students. The conceptualized action research looked at the wide variety of "best practices". The research investigated the effectiveness of differentiated action research use and instructional belief and skill practices of nine routines among pre and in-service teachers in rural schools. An instrument was administered to 12 pre and in-service 4th and 5th grade teachers in five school districts. A final bulletin is being prepared for publication. Another researcher continued to respond to referrals from clinicians and supervisors for clients needing assessment and intervention services at SC State University. Articles, posters, and papers were prepared and presented at conferences, workshops, etc. Training methods and approaches were explored that would appeal to practitioners as well as students. A survey targeting undergraduate and graduate students regarding knowledge and skills in the area of augmentative and alternative communication was prepared.

The 1890 Research study using qualitative methods to obtain data relevant to parents' participation in their children's education in targeted school districts was addressed. Parents shared information about how they communicate and interact with their children's teachers, principals and school administrator and the kinds of responses they receive from the mentioned sources. One hundred and twenty-five parents were interviewed during eight focus group sessions held at the targeted schools.

Another project examined how Hispanics, between the ages of 12 to 65 in 23 selected counties in South Carolina were using the existing Social Services Programs. Application systems were developed for data validity, data integrity and data corrections in the databases of the social service programs. An application system to assess the programs was developed. Research papers, posters and presentations were developed from the study. The findings are being compiled and written for publication in a research bulletin.

2. Brief description of the target audience

The target audience included all youth between the ages of nine and nineteen, parents and other adults interested in the development of South Carolina youth, toddlers, adult learners, teachers, policymakers as well as social service agencies.

V(E). Planned Program (Outputs)

1. Standard output measures

2009	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Plan	3200	50	60000	45000
Actual	4168	377	93171	600

2. Number of Patent Applications Submitted (Standard Research Output)

Patent Applications Submitted

Year: 2009

Plan: 0

Actual: 0

Patents listed

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

2009	Extension	Research	Total
Plan	0	0	
Actual	0	2	0

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

- Number of educational workshops conducted

Year	Target	Actual
2009	2700	3539

Output #2

Output Measure

- Total number of adult volunteers (including non-Extension staff) trained in club, school enrichment, and special interest program delivery and management in all 4-H project areas.

Year	Target	Actual
2009	340	3223

Output #3

Output Measure

- Number of final research bulletins prepared

Year	Target	Actual
2009	{No Data Entered}	2

V(G). State Defined Outcomes**V. State Defined Outcomes Table of Content**

O. No.	OUTCOME NAME
1	Number of trained adult volunteers and staff, (including non-Extension staff) who teach subject matter and life skills to youth, meeting S.C. educational standards by utilizing National 4-H Cooperative Curriculum System (4-HCCS) curriculum materials as available
2	Number of youth submitting completed 4-H project record books this year in all 4-H project areas.
3	Number of military youth (children with a parent in the military) integrated into 4-H Projects
4	Number of youth who gain knowledge in leadership and citizenship projects areas
5	Number of youth participating in service learning projects for the community and to improve themselves, and help others
6	Number of youth who develop skills in workforce preparation through non-formal educational experiences
7	Number of youth who gain knowledge and skills about plants, livestock and/or pets.
8	Number of youth who develop knowledge and skills in science, engineering, and technology (including electricity, computers, pontoon classroom, etc.).
9	Number of youth gain knowledge in nutrition and fitness
10	Number of youth who make healthy food choices after participating in selected food and nutrition programs/projects
11	Number of youth who gain knowledge in natural resources and shooting sports
12	Number of youth who develop and improve communication skills through speaking and debating
13	Number of youth who increased knowledge after School Leadership Program
14	Number of Pre and In-service teachers utilizing action research strategies.

Outcome #1

1. Outcome Measures

Number of trained adult volunteers and staff, (including non-Extension staff) who teach subject matter and life skills to youth, meeting S.C. educational standards by utilizing National 4-H Cooperative Curriculum System (4-HCCS) curriculum materials as available

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2009	2200	104

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

There is a need for an effective system to develop volunteer trainers in 4-H Youth Development.

What has been done

This year 104 additional volunteers were trained and taught others using approved curriculum materials.

Results

Volunteers were equipped for leadership roles and have made positive impacts in their communities, trained youth with new knowledge and skills, and provided positive contributions to their communities.

4. Associated Knowledge Areas

KA Code	Knowledge Area
806	Youth Development

Outcome #2

1. Outcome Measures

Number of youth submitting completed 4-H project record books this year in all 4-H project areas.

Not Reporting on this Outcome Measure

Outcome #3

1. Outcome Measures

Number of military youth (children with a parent in the military) integrated into 4-H Projects

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2009	20	181

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

4-H youth development programs can assist families with parents in the military (National Guard and Reserve) through the Operation Military Kids program by exposing youth to positive educational, recreational, and social support experiences.

What has been done

Some 181 youth participated in 4-H activities to help them strengthen reasoning skills, develop new friendships, learn independence, and offer opportunities for physical development.

Results

Skills learned as a result of 4-H involvement are valued and can help youth to grow into positive, contributing members of society.

4. Associated Knowledge Areas

KA Code	Knowledge Area
806	Youth Development

Outcome #4

1. Outcome Measures

Number of youth who gain knowledge in leadership and citizenship projects areas

2. Associated Institution Types

- 1862 Extension
- 1890 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2009	2400	13053

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Youth have basic needs that include developing a sense that they are valuable contributing members of their family and of the community.

What has been done

Approximately 100 youth received Officer Training attended leadership conference, Jr. leadership training and ambassador training to help them in serving in their leadership roles at the club, county, regional, or state levels. A team of nine participated in government awareness projects, learning about careers in government. Youth participated in 4-H Legislative Day at the SC State House.

Results

Of the total number of youth participating in programs, approximately 96% reported knowledge gained. During the 4-H Legislative Day at the SC State House, the youth had discussions with their state Senators and heads of state level committees. The youth demonstrated skills learned in decision-making and teamwork. Youth submitted a grant proposal with the city and were awarded \$500 to support their 4-H Club.

4. Associated Knowledge Areas

KA Code	Knowledge Area
806	Youth Development

Outcome #5

1. Outcome Measures

Number of youth participating in service learning projects for the community and to improve themselves, and help others

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2009	300	148

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Youth have basic needs that include developing a sense that they are valuable contributing members of their family and of the community.

What has been done

Over 123 youth participated in 4-H service learning or community development projects.

Results

Youth participated in a Habitat for Humanity building project, conducted service projects for local a children's shelter and a children's home, conducted a food drive and prepared food baskets for Department of Social Services. The value of in-kind donations to youth-focused service learning or community development projects was \$16,580. Skills learned as a result of 4-H involvement are valued and can help youth to grow into positive, contributing members of society.

4. Associated Knowledge Areas

KA Code	Knowledge Area
802	Human Development and Family Well-Being
806	Youth Development

Outcome #6

1. Outcome Measures

Number of youth who develop skills in workforce preparation through non-formal educational experiences

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2009	50	1265

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Society has undergone dramatic social, demographic and economic changes that have deeply affected individuals and families in this country. Extension continues to focus on strengthening individuals and families while addressing current issues facing children, youth and families across their lifespan. The impact of these programs has been reduced because of funding and program redirection. However, creating caring families and communities through collaborative efforts is a must if we are to meet the challenges today and beyond. This approach demands a team approach to programming that focuses on the needs of the total family. Strong families provide children with a sense of belonging and identity and create hope for the future. Extension programming in Building Family Strengths provides opportunities to strengthen families and address issues facing children, youth and families. The program has a developmentally appropriate curriculum designed to strengthen families. The current emphasis had been shifted to programming to youth and the South Carolina Family and Community Leaders organization

What has been done

Sixty programs were conducted in the area of Resource Management for Youth. Programs such as Financial Champions, Consumer Savvy, Money My Way and Go for the Goal were conducted. Of the 1,523 youth participating, almost all reported that they had gained knowledge in the area of resource management. Over 1265 youth actually used their skills in workforce preparation and financial resource management.

Specialists worked with a Southern Region interdisciplinary Team to administer a grant that supported the preparation of educational materials that specifically addressed the needs of older adults and disasters. She conducted two workshops at National EDEN (Extension Disaster Education Network) Conference; wrote, edited and reviewed materials for posting on EDEN web site for Caregiving During Disasters; participated in conference calls, meetings and group work; served as Director of Outreach for CU Institute for Engaged Aging by planning, organizing, marketing, conducting and appropriate outreach educational opportunities in partnership with Extension and Public Service Activities.

A partnership has been created with 1890 and 1862 Extension Universities, which resulted in the planning, marketing, organizing and evaluating of the regional Caring for the Caregiver Conference, which will serve as professional development for community leaders, caregivers and Extension educators in 10 southern states. She managed update of Conference website. Developed conference promotional brochures, marketing PSA; coordinated Request for Proposals for presentations, set up Peer Review Committees; notified selected presenters, coordinate equipment; edited and published official conference proceedings, handouts; helped coordinate on-site registration and conference logistics; served as a member of steering committee for eXtension Community of Practice; submitted, reviewed and answered Frequently Asked Questions for eXtension web site; worked with sub committee to develop articles for Disaster Information for Caregivers for eXtension web site; exhibited eXtension Community of Practice at Extension Galaxy meeting; helped to conduct roundtable workshop on Community of Practices; completed CLEMSON PAWS (prevention and Awareness for Wellness Success) grant activities; planned and conducted trainings on Preparing Youth and Families for Disasters; and trained agents, nutrition education associates and 4-H coordinators in strategies to educate youth and families in strategies to better prepare families to cope in times of disasters.

Results

The impact of this program is seen in a variety of settings. Examples include providing teacher training to Family and Consumer Science teachers, mental health collaborations, after school youth programs, Department of Juvenile Justice county programs, county 4-H Day Camps, Family Readiness, Childrens Garden Projects, and Family Day programs. Programs were conducted with local Chamber of Commerce groups on Strong Families Build Strong Communities. Throughout the year, many train-the-trainer workshops were conducted by state and county Extension faculty. The current focus of the Building Family Strengths program is to integrate curriculum onto the 4-H youth development program. To this end, professionals representing Extension, secondary schools, daycare personnel, higher education, human service agencies, law enforcement, and clergy have been trained throughout the state. In addition 13 military installations in the Southeast have adopted the BFS curriculum for use in the afterschool programs and over 650 professionals will receive the training. The SC 4-H Operation Military Kids project is using the Building Family Strengths model to address family needs of deploying service men and women. The Taking Charge in Challenging Times materials are proving effective for use with many unemployed workers due to manufacturing plant closings in the state due to outsourcing of labor. Materials are used as part of the mandated training for Child Care providers. Training were conducted with community groups in educating families on the dangers and benefits of technology on family development.

The trainings were designed for diverse work settings and provided the basis for partnerships in the project. It also increases Extension's visibility and ability to program in many different settings. In addition, the curriculum design is applicable to audiences reached by many organizations. The delivery of the Building Family Strengths curriculum throughout the state has demonstrated Extension's ability to offer train-the-trainer trainings (for a fee) to other professionals.

4. Associated Knowledge Areas

KA Code	Knowledge Area
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- 801 Individual and Family Resource Management
- 802 Human Development and Family Well-Being
- 806 Youth Development

Outcome #7

1. Outcome Measures

Number of youth who gain knowledge and skills about plants, livestock and/or pets.

2. Associated Institution Types

- 1862 Extension
- 1890 Extension

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2009	12000	19980

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Youth need opportunities to develop assets such as communication skills, organizational abilities, wise decision-making skills, independence, and self-confidence and should demonstrate caring. They have opportunities for such development by participating in the 4-H Plants and Animals project.

What has been done

4-H members learn at their own speed based on their interests and abilities. Youth participated in livestock, barrow, swine, dairy heifer, beef showmanship, canine clubs, gardening, poultry, goat, rabbit, and horse projects. Youth received first responder service work training.

Results

Over 95% of the youth participating in programs gained knowledge and skills. The participation in plant and animal science programs has a positive influence on life skills development, engages the youth in learning by doing and gives them the opportunity for mastery. In addition, youth participated in Farm-City events. The programs trained youth to plan, reason, and be useful, helpful, and skillful. Volunteers generated \$17,132 to assist with livestock programs.

4. Associated Knowledge Areas

KA Code	Knowledge Area
806	Youth Development

Outcome #8**1. Outcome Measures**

Number of youth who develop knowledge and skills in science, engineering, and technology (including electricity, computers, pontoon classroom, etc.).

2. Associated Institution Types

- 1862 Extension
- 1890 Extension

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2009	1350	6863

3c. Qualitative Outcome or Impact Statement**Issue (Who cares and Why)**

Science and technology skills are needed if youth are to keep up with the rapidly changing knowledge-based and knowledge-transfer society. The 4-H program in South Carolina offers youth the opportunity to develop knowledge and skills in science, engineering, and technology.

What has been done

A total of 147 programs reached 7,198 youth in the Science, Technology, and Engineering for youth projects.

Results

Over 95% of the youth gained knowledge in GPS/GIS, robotics, hydrogels, technology, photography, and 4-H20 Pontoon Classroom.

4. Associated Knowledge Areas

KA Code	Knowledge Area
802	Human Development and Family Well-Being
803	Sociological and Technological Change Affecting Individuals, Families, and Communities
806	Youth Development

Outcome #9**1. Outcome Measures**

Number of youth gain knowledge in nutrition and fitness

2. Associated Institution Types

- 1862 Extension
- 1890 Extension

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2009	8000	14572

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Gaining knowledge in nutrition and fitness can help youth make decisions that will positively affect their lifestyles as they mature into adulthood.

What has been done

Some 525 Nutrition, Fitness, and Safety programs were conducted reaching 14,572 youth. Youth participated in programs such as MyPyramid, Basics of Nutrition, Color Me Healthy and 4-H Diabetes Wellness Group that were conducted in afterschool, club, and community settings.

Results

Of those participating in programs, 89% reported knowledge gained.

4. Associated Knowledge Areas

KA Code	Knowledge Area
802	Human Development and Family Well-Being
806	Youth Development

Outcome #10

1. Outcome Measures

Number of youth who make healthy food choices after participating in selected food and nutrition programs/projects

2. Associated Institution Types

- 1862 Extension
- 1890 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
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2009

3500

7128

3c. Qualitative Outcome or Impact Statement**Issue (Who cares and Why)**

Gaining knowledge and skills in nutrition and fitness can help youth make decisions that will positively affect their lifestyles as they mature into adulthood.

What has been done

Some 525 Nutrition, Fitness, and Safety programs were conducted reaching 14,572 youth. Youth participated in programs such as MyPyramid, Basics of Nutrition, Color Me Healthy and 4-H Diabetes Wellness Group that were conducted in afterschool, club, and community settings.

Results

Youth were able to select healthy meal choices from various foods. They were able to demonstrate proper measuring for meal preparation. In the Nutrition and Physical Fitness program over 75% of the youth reported that they were exercising more by playing games such as frisbee, jump rope, and dancing.

4. Associated Knowledge Areas

KA Code	Knowledge Area
802	Human Development and Family Well-Being
806	Youth Development

Outcome #11**1. Outcome Measures**

Number of youth who gain knowledge in natural resources and shooting sports

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2009	2200	8192

3c. Qualitative Outcome or Impact Statement**Issue (Who cares and Why)**

Youth need opportunities to develop assets such as organizational abilities, wise decision-making skills, independence, and self-confidence and should demonstrate caring. They have opportunities for such development through participating in the 4-H Natural Resources and Shooting Sports project.

What has been done

Some 260 programs were conducted reaching over 8,240 youth. Over 900 youth participated in the natural resources and shooting sports activities. Over 147 participated in county shooting sports clubs and activities.

Youth participated in day camps and natural resource clubs in Jr. Naturalists, Enviroscope, Food and Cover Establishment for wildlife programs.

Results

Youth demonstrated wise decision-making skills and self-confidence. They demonstrated caring of their environment and established food plots to benefit small game and other wildlife species.

4. Associated Knowledge Areas

KA Code	Knowledge Area
806	Youth Development

Outcome #12

1. Outcome Measures

Number of youth who develop and improve communication skills through speaking and debating

2. Associated Institution Types

- 1862 Extension
- 1890 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2009	30	95

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Youth need opportunities to develop assets such as good communication skills, organizational abilities, reasoning skills, and self-confidence. They have opportunities for such development through participating in the Communication and Expressive Arts project.

What has been done

Twenty-eight programs were conducted with reaching 324 youth. Youth gave presentations and demonstrations during club and county level contests.

Results

Youth successfully prepared and gave presentations. They demonstrated good communication skills, organizational abilities, reasoning skills, and self-confidence.

4. Associated Knowledge Areas

KA Code	Knowledge Area
806	Youth Development

Outcome #13

1. Outcome Measures

Number of youth who increased knowledge after School Leadership Program

2. Associated Institution Types

- 1890 Extension

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2009	{No Data Entered}	1632

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Adults who have school aged children who do not have planned afterschool activities need a venue for young people. It has been documented that youth and children tend to be involved in risky behaviors during the hours of 3:00 PM to 6:00 PM. This is because they are usually home or in the streets with no adult supervision.

What has been done

To address the issue, a partnership was formed with the Anderson Area YMCA to provide an after school program that would provide a safe place for youth where they can get assistance with homework, participate in leadership activities and receive a healthy snack during a given timeframe.

Results

As a result of students who participate in the after school program, grades have increased, their behavior in school improved and risky behaviors have decreased during the hours of 3:00 PM to 6:00 PM.

4. Associated Knowledge Areas

KA Code	Knowledge Area
806	Youth Development

Outcome #14

1. Outcome Measures

Number of Pre and In-service teachers utilizing action research strategies.

2. Associated Institution Types

- 1890 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2009	{No Data Entered}	1000

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Pre and in-service teachers were encouraged to utilize differentiated action research strategies to motivate the learning of rural students. Differentiated action research was designed to attend to individual pre and in-service teacher needs and encourage them to reflect on and evaluate their own practice for student success.

What has been done

Pre and in-service teachers' classroom practices became grounded in reserach. Research findings were linked to the developmental classroom needs of students. Pre and in-service teachers were encouraged to keep abreast of current best thinking and practices in their content areas through Routine of the Action Research Model.

Results

The results were published in a research bulletin for dissemination.

4. Associated Knowledge Areas

KA Code	Knowledge Area
803	Sociological and Technological Change Affecting Individuals, Families, and Communities
806	Youth Development

V(H). Planned Program (External Factors)

External factors which affected outcomes

- Economy
- Appropriations changes
- Competing Public priorities
- Competing Programmatic Challenges
- Populations changes (immigration, new cultural groupings, etc.)

Brief Explanation

V(I). Planned Program (Evaluation Studies and Data Collection)

1. Evaluation Studies Planned

- After Only (post program)
- Retrospective (post program)
- Before-After (before and after program)
- During (during program)

- Time series (multiple points before and after program)
- Comparisons between different groups of individuals or program participants experiencing different levels of program intensity.
- Comparison between locales where the program operates and sites without program intervention

Evaluation Results

Key Items of Evaluation

V(A). Planned Program (Summary)**Program # 10****1. Name of the Planned Program**

Environmental Conservation for Wildlife

V(B). Program Knowledge Area(s)**1. Program Knowledge Areas and Percentage**

KA Code	Knowledge Area	%1862 Extension	%1890 Extension	%1862 Research	%1890 Research
135	Aquatic and Terrestrial Wildlife	100%	0%	0%	0%
	Total	100%	0%	0%	0%

V(C). Planned Program (Inputs)**1. Actual amount of professional FTE/SYs expended this Program**

Year: 2009	Extension		Research	
	1862	1890	1862	1890
Plan	5.0	0.0	0.0	0.0
Actual	4.2	0.0	0.0	0.0

2. Actual dollars expended in this Program (includes Carryover Funds from previous years)

Extension		Research	
Smith-Lever 3b & 3c	1890 Extension	Hatch	Evans-Allen
158267	0	0	0
1862 Matching	1890 Matching	1862 Matching	1890 Matching
158267	0	0	0
1862 All Other	1890 All Other	1862 All Other	1890 All Other
0	0	0	0

V(D). Planned Program (Activity)**1. Brief description of the Activity**

The Clemson University Cooperative Extension Service educational programs focused on Master Wildlife, Master Naturalist, Urban Wildlife, Nuisance Species, and Wildlife Conservation. Agents and specialists developed and delivered educational programs and products on wildlife conservation and management on private lands.

2. Brief description of the target audience

The audience includes state and local government, civic leaders, business owners, developers, home and garden clubs, area homeowners, wildlife specialists, state and federal biologists and administrators, potential volunteers, farm and forest owners, landowners/homeowners, Nuisance Wildlife Control Operators, natural resource professionals, Aquatic Pesticide Applicators, general public, farmers, ranchers, poultry and swine producers, foresters, urban, suburban and rural residents, urban planners

and managers, concerned citizens, land owners/managers, agency personnel, citizens of South Carolina, Extension agents, youth, municipal officials, and local community groups statewide, children in school, after-school, summer and 4-H, programs, Extension administrators, and support staff.

V(E). Planned Program (Outputs)

1. Standard output measures

2009	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Plan	2500	1000	0	0
Actual	6014	0	0	0

2. Number of Patent Applications Submitted (Standard Research Output)

Patent Applications Submitted

Year: 2009

Plan: 0

Actual: 0

Patents listed

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

2009	Extension	Research	Total
Plan	0	0	
Actual	0	0	0

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

- Number of people completing educational workshops

Year	Target	Actual
2009	3500	3313

V(G). State Defined Outcomes

V. State Defined Outcomes Table of Content

O. No.	OUTCOME NAME
1	Number of people reporting knowledge gained

Outcome #1**1. Outcome Measures**

Number of people reporting knowledge gained

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2009	3000	3182

3c. Qualitative Outcome or Impact Statement**Issue (Who cares and Why)**

Over three-fourths of the wildlife habitat in SC is owned by private landowners, primarily forest and farm owners. Consequently, there is an information need related to managing wildlife on these lands and improving aquatic wildlife habitat.

What has been done

Over 127 educational programs were conducted including Master Wildlifer, Master Naturalist, Backyard Wildlife Course, Best Management practices for Wildlife Control Operators. A Cogongrass Invasive Species Survey was conducted. Clemson University partnered with the University of Nebraska, Utah State University, and Cornell, on the national Internet Center for Wildlife Damage Management web-based clearinghouse. Extension professionals gave a lecture at the Southeast Exotic Pest Plant Council. One agent presented a program, "Buggin Out with Ben," for youth at the Surfside Library. Extension professionals developed 36 web-based Extension circulars on a variety of wildlife and natural resource conservation topics for landowners, conducted the Natural Resource Enterprises Workshop, and continued demonstration efforts to illustrate USDA Farm Bill Conservation practices for wildlife to farmers in South Carolina at the Pee Dee Research and Education Center.

Results

The partnership for the National Internet Center for Wildlife Damage Management web-based clearinghouse was recognized nationally as a leading eXtension effort. In addition, 96% of landowners gained knowledge as a result of participation in educational programs.

4. Associated Knowledge Areas

KA Code	Knowledge Area
135	Aquatic and Terrestrial Wildlife

V(H). Planned Program (External Factors)

External factors which affected outcomes

- Natural Disasters (drought, weather extremes, etc.)
- Economy
- Public Policy changes
- Government Regulations
- Competing Public priorities
- Competing Programmatic Challenges

Brief Explanation

V(I). Planned Program (Evaluation Studies and Data Collection)

1. Evaluation Studies Planned

- After Only (post program)
- Retrospective (post program)
- During (during program)

Evaluation Results

Key Items of Evaluation

V(A). Planned Program (Summary)**Program # 11****1. Name of the Planned Program**

Sustainable Forest Management

V(B). Program Knowledge Area(s)**1. Program Knowledge Areas and Percentage**

KA Code	Knowledge Area	%1862 Extension	%1890 Extension	%1862 Research	%1890 Research
122	Management and Control of Forest and Range Fires	45%	0%	0%	0%
123	Management and Sustainability of Forest Resources	50%	0%	0%	0%
124	Urban Forestry	5%	0%	0%	0%
	Total	100%	0%	0%	0%

V(C). Planned Program (Inputs)**1. Actual amount of professional FTE/SYs expended this Program**

Year: 2009	Extension		Research	
	1862	1890	1862	1890
Plan	5.0	0.0	0.7	0.0
Actual	1.4	0.0	0.0	0.0

2. Actual dollars expended in this Program (includes Carryover Funds from previous years)

Extension		Research	
Smith-Lever 3b & 3c	1890 Extension	Hatch	Evans-Allen
47419	0	0	0
1862 Matching	1890 Matching	1862 Matching	1890 Matching
47419	0	0	0
1862 All Other	1890 All Other	1862 All Other	1890 All Other
0	0	0	0

V(D). Planned Program (Activity)**1. Brief description of the Activity**

The Clemson University Cooperative Extension Service developed and conducted training programs to teach sustainable forestry principles. Projects under this focus area included Alternative Silvicultural Systems, Restoration and Management of Longleaf Pine, and Master Tree Farmer/Master Naturalists. Agents worked with established groups within the forestry community to support and promote appropriate training and outreach programs related to sustainable forest management and taught landowners about the economic and environmental benefits of using BMPs in all forest management operations.

2. Brief description of the target audience

The target audience included private landowners, loggers, professional resource managers, foresters and other natural resource professionals, road building and site preparation contractors, family forest landowners, consulting foresters that assist private landowners, and the general public.

V(E). Planned Program (Outputs)

1. Standard output measures

2009	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Plan	3200	350	0	0
Actual	1589	3149	0	0

2. Number of Patent Applications Submitted (Standard Research Output)

Patent Applications Submitted

Year: 2009
 Plan: 0
 Actual: 0

Patents listed

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

2009	Extension	Research	Total
Plan	0	2	
Actual	0	0	0

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

- Number of people completing educational workshops

Year	Target	Actual
2009	3000	911

Output #2

Output Measure

- Disclosures

Year	Target	Actual
2009	0	0

Output #3

Output Measure

- New Products, Processes, Procedures and Policies

Year	Target	Actual
2009	0	0

Output #4

Output Measure

- Percent increase of outside funds for grants, contracts and gifts

Year	Target	Actual
2009	4	0

V(G). State Defined Outcomes

V. State Defined Outcomes Table of Content

O. No.	OUTCOME NAME
1	Number of people reporting increased knowledge
2	Number of landowner acres impacted.

Outcome #1**1. Outcome Measures**

Number of people reporting increased knowledge

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2009	2200	864

3c. Qualitative Outcome or Impact Statement**Issue (Who cares and Why)**

Many landowners fail to manage their forest land because they object to clear cutting or other conventional intensive practices that focus primarily on timber production. There is a need for South Carolina land owners to develop management skills and knowledge about best management practices that can be applied to their lands.

What has been done

Over 40 educational workshops were conducted reaching some 911 landowners, loggers, and natural resource professionals. Topics of classes included Restoring Longleaf Pine, Master Tree Farmer, Managing Risk, and TOP Logger programs.

One project involved research of court house records to identify landowners who own land along specified sections of Stevens and Turkey Creeks. These landowners were invited to the educational meeting to explain conservation easements including how they work and potential tax savings for landowners donating easements and to prompt work with interested parties individually to prepare conservation easements. Several speakers made presentations, addressing the significance of these creeks, with Stevens Creek being number 15 in the nation in importance in terms of biodiversity. Speakers discussed the significant tax advantages of donating a conservation easement for federal tax purposes.

Results

Of the 911 people attending programs, over 94% reported a gain in knowledge. One county reported that the economic impact from skills applied as a result of knowledge gained from these workshops was \$250,000.

Four landowners are in the process of developing conservation easements on 2,760 acres of forest land. This has the potential of saving them almost two million dollars as well as protecting natural resources. The Upper Savannah Land Trust will continue working with these and other landowners in the watershed to protect the integrity of the streams. The US Forest Service is developing a landscape plan to help private landowners implement conservation practices to protect water quality in Stevens and Turkey Creeks. Clemson Extension Service will serve as an educational conduit to accomplish these goals.

4. Associated Knowledge Areas

KA Code	Knowledge Area
122	Management and Control of Forest and Range Fires
123	Management and Sustainability of Forest Resources

Outcome #2

1. Outcome Measures

Number of landowner acres impacted.

Not Reporting on this Outcome Measure

V(H). Planned Program (External Factors)

External factors which affected outcomes

- Economy
- Appropriations changes
- Public Policy changes
- Government Regulations

Brief Explanation

V(I). Planned Program (Evaluation Studies and Data Collection)

1. Evaluation Studies Planned

- Retrospective (post program)
- Before-After (before and after program)
- During (during program)
- Case Study
- Comparisons between program participants (individuals, group, organizations) and non-participants
- Comparisons between different groups of individuals or program participants experiencing different levels of program intensity.
- Comparison between locales where the program operates and sites without program intervention

Evaluation Results

Key Items of Evaluation

V(A). Planned Program (Summary)**Program # 12****1. Name of the Planned Program**

Childhood Obesity

V(B). Program Knowledge Area(s)**1. Program Knowledge Areas and Percentage**

KA Code	Knowledge Area	%1862 Extension	%1890 Extension	%1862 Research	%1890 Research
502	New and Improved Food Products	0%	0%	20%	0%
701	Nutrient Composition of Food	0%	0%	20%	0%
702	Requirements and Function of Nutrients and Other Food Components	0%	0%	60%	0%
703	Nutrition Education and Behavior	50%	45%	0%	55%
723	Hazards to Human Health and Safety	5%	30%	0%	10%
724	Healthy Lifestyle	45%	25%	0%	35%
	Total	100%	100%	100%	100%

V(C). Planned Program (Inputs)**1. Actual amount of professional FTE/SYs expended this Program**

Year: 2009	Extension		Research	
	1862	1890	1862	1890
Actual	12.3	3.0	0.3	2.0

2. Actual dollars expended in this Program (includes Carryover Funds from previous years)

Extension		Research	
Smith-Lever 3b & 3c	1890 Extension	Hatch	Evans-Allen
0	62764	22770	110692
1862 Matching	1890 Matching	1862 Matching	1890 Matching
0	38238	18500	62929
1862 All Other	1890 All Other	1862 All Other	1890 All Other
513181	0	0	0

V(D). Planned Program (Activity)**1. Brief description of the Activity**

Researchers are developing new crops for health conscious consumers seeking enriched fruits and vegetables. In South Carolina, about 60 percent of the population is obese or overweight and over 20 percent children are obese. Obesity related medical costs amount to about \$1 billion in South Carolina. Research on environmental factors can influence phytochemicals, which offer health benefits and can be used to develop practical ways to improve productivity of greenhouse. Small sustainable

farmers can especially benefit with value-added produce. With increasing knowledge of the importance of vegetables in the diet, vegetable consumption is increasing about 15 percent per year

The 1890 Researchers conducted research experiments by providing a health and wellness camp, conducted workshops and meetings, provided training and counseling to project participants.

Clemson University Cooperative Extension nutrition programs for youth focused on the prevention of childhood obesity, increasing physical activity and the development of food preparation skills that fit current nutritional needs and lifestyles.

Good nutrition is important not only because it promotes a feeling of well-being, but it also has an important role in disease prevention. The 1890 Extension Program provided nutrition education intervention and demonstrated food preparation of nutritious meals consistent with the groups cultural traditions and resources. Nutrition education programs were interactive and taught skills needed to adopt healthy eating practices, provided training that contributed toward eating patterns that were consistent with the Dietary Guidelines for Americans, provided workshops that helped develop the knowledge, attitudes, skills, behaviors, and confidence needed to be physically active for life and provided workshops that addressed safe food handling, storage and preparation.

2. Brief description of the target audience

This research has the potential to impact a significant portion of the citizens in the state, since 60% is estimated to be obese or overweight. There is also the real potential of reducing medical costs in the state. Parents and youth are the target audiences. For the 1890 Program, emphasis was, specifically, placed on food stamp recipients, low-income individuals, EFNEP - limited resource families, youth, and the general public.

V(E). Planned Program (Outputs)

1. Standard output measures

2009	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Plan	{NO DATA ENTERED}	{NO DATA ENTERED}	{NO DATA ENTERED}	{NO DATA ENTERED}
Actual	4930	85	48438	0

2. Number of Patent Applications Submitted (Standard Research Output)

Patent Applications Submitted

Year: 2009

Plan:

Actual: 0

Patents listed

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

2009	Extension	Research	Total
Plan			
Actual	0	0	0

V(F). State Defined Outputs

Output Target

Output #1**Output Measure**

- Number of educational workshops conducted.

Year	Target	Actual
2009	{No Data Entered}	3954

Output #2**Output Measure**

- Number of Attendees Completing Educational Workshops

Year	Target	Actual
2009	{No Data Entered}	3180

Output #3**Output Measure**

- Number of Persons Making Healthy Food Choices After Program Participation

Year	Target	Actual
2009	{No Data Entered}	1810

V(G). State Defined Outcomes

V. State Defined Outcomes Table of Content

O. No.	OUTCOME NAME
1	Number of people gaining knowledge and skills to prevent childhood obesity.

Outcome #1**1. Outcome Measures**

Number of people gaining knowledge and skills to prevent childhood obesity.

2. Associated Institution Types

- 1862 Extension
- 1890 Extension
- 1890 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2009	{No Data Entered}	25401

3c. Qualitative Outcome or Impact Statement**Issue (Who cares and Why)**

South Carolina is the 5th fattest state in the nation. Overweight, obesity and the associated risk factors of unhealthy eating and inadequate amounts of physical activity increase the risk for developing other chronic conditions such as diseases, such as diabetes, cardiovascular disease, certain cancers, arthritis, sleep apnea, and depression. The total cost of obesity in the United States was \$117 billion in 2000. Obesity-attributable medical costs for South Carolina alone reached over one billion dollars in 2003.

What has been done

Over 3700 educational programs were conducted reaching approximately 46,357 children. Children of all ages from elementary, middle, and high school were reached through Building Healthy Habits for a Lifetime, Color Me Healthy, Jump Into Food and Fitness and Eat Fit workshops. Parents and Childcare Providers were reached through trainings, PTO meetings, Toddler Tidbits workshop, Young Children Mini Conference, Health and Wellness Camp and Veggie Olympics sessions. Over 3,644 volunteers worked with children and youth.

Results

Over 25,400 (55%) youth reported a gain in knowledge. In the Anderson Cluster, one male toddler with diabetes, now, enjoys eating fresh produce and is managing the disease with guidance from his guardians, teachers and Extension agents. The use of fun, innovative and interactive activities inspired the toddler to develop a preference for eating vegetables and fruits. After the 1890 Health and Wellness Camp, an analysis of the data strongly supported the participants were strong in about 70% of the concepts taught.

4. Associated Knowledge Areas

KA Code	Knowledge Area
701	Nutrient Composition of Food
702	Requirements and Function of Nutrients and Other Food Components
703	Nutrition Education and Behavior
724	Healthy Lifestyle

V(H). Planned Program (External Factors)

External factors which affected outcomes

- Economy
- Public Policy changes
- Populations changes (immigration, new cultural groupings, etc.)

Brief Explanation

V(I). Planned Program (Evaluation Studies and Data Collection)

1. Evaluation Studies Planned

- After Only (post program)
- Retrospective (post program)
- Before-After (before and after program)
- During (during program)

Evaluation Results

Key Items of Evaluation

V(A). Planned Program (Summary)**Program # 13****1. Name of the Planned Program**

Climate Change

V(B). Program Knowledge Area(s)**1. Program Knowledge Areas and Percentage**

KA Code	Knowledge Area	%1862 Extension	%1890 Extension	%1862 Research	%1890 Research
101	Appraisal of Soil Resources	0%	0%	40%	0%
132	Weather and Climate	0%	0%	20%	100%
135	Aquatic and Terrestrial Wildlife	0%	0%	40%	0%
Total		0%	0%	100%	100%

V(C). Planned Program (Inputs)**1. Actual amount of professional FTE/SYs expended this Program**

Year: 2009	Extension		Research	
	1862	1890	1862	1890
Actual	0.0	0.0	0.5	1.0

2. Actual dollars expended in this Program (includes Carryover Funds from previous years)

Extension		Research	
Smith-Lever 3b & 3c	1890 Extension	Hatch	Evans-Allen
0	0	19637	149332
1862 Matching	1890 Matching	1862 Matching	1890 Matching
0	0	31438	88257
1862 All Other	1890 All Other	1862 All Other	1890 All Other
0	0	0	0

V(D). Planned Program (Activity)**1. Brief description of the Activity**

Research is underway to address Coastal South Carolina's need for understand the effects of population growth and climate change on greenhouse gas emissions and carbon recycling. This research also seeks to determine the sources and inputs of halogenated organics to coastal South Carolina ecosystems. The first step to understanding the impacts of sea level rise and population growth in coastal ecosystems is to determine the salinity, water chemistry, characteristics of natural organic matter, and other environmental factors that are representative parameters of environmental quality.

Despite uncertainties surrounding the precise scale of change to be expected, there is now a consensus that global temperatures will likely change more in the next century than they have typically changed over recent geologic history. Research is underway to determine if natural coastal marine communities consist of species tightly bound together by strong ecological

interactions or do species respond individually to environment. This should serve as a means to evaluate the impact that climate change has on community composition, diversity and cohesiveness.

An 1890 Research Project is underway to integrate readily available hydrology analysis systems with accumulated in-situ and real-time remotely sensed precipitation data to predict the likelihood that roads, bridges, underpasses, etc. in rural areas are flooded during severe rain events. The project uses U. S. Weather Service NEXRad integrated precipitation products as an input to a GIS-compatible hydrology model.

Extension Specialists have applied for research funds to study climate change on water quality. There have been formal discussions to establish the first state-wide automated agricultural meteorology station network and irrigation information web site for South Carolina (SCAgMet) The State Climate Office Director will provide data quality control services. He provided meteorology sensors to increase the number of new towers in SC.

2. Brief description of the target audience

This research will provide answers to specific questions that resource managers, policy makers and resource regulators require answers for. South Carolina's coastal region is the fastest growing region in the state. A large number of people will be impacted by the implementation of science based policies and procedures to deal with potential of climate change. The 1890 Research Project is geared, specifically, towards emergency management officials. However, the project will benefit all the citizens of South Carolina and has national and international potential, once the project is completed.

V(E). Planned Program (Outputs)

1. Standard output measures

2009	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Plan	{NO DATA ENTERED}	{NO DATA ENTERED}	{NO DATA ENTERED}	{NO DATA ENTERED}
Actual	50	2000	0	0

2. Number of Patent Applications Submitted (Standard Research Output)

Patent Applications Submitted

Year: 2009

Plan:

Actual: 0

Patents listed

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

2009	Extension	Research	Total
Plan			
Actual	0	2	2

V(F). State Defined Outputs

Output Target

Output #1**Output Measure**

- Number of National Media Placements

Year	Target	Actual
2009	{No Data Entered}	5

Output #2**Output Measure**

- Number of Educational Workshops Conducted.

Year	Target	Actual
2009	{No Data Entered}	2

Output #3**Output Measure**

- Number of Attendees Completing Educational Workshops.

Year	Target	Actual
2009	{No Data Entered}	50

Output #4**Output Measure**

- Number of Board Members Trained.

Year	Target	Actual
2009	{No Data Entered}	30

V(G). State Defined Outcomes

V. State Defined Outcomes Table of Content

O. No.	OUTCOME NAME
1	Number of Emergency management officials who gained knowledge.

Outcome #1

1. Outcome Measures

Number of Emergency management officials who gained knowledge.

2. Associated Institution Types

- 1890 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2009	{No Data Entered}	50

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Emergency management officials in conjunctin with county and city officials as well as the general public. Torrential weather such as hurricanes and tropical storms tend to cause flooding in many lowland areas in the state. The unknown conditions of South Carolina's rural roads during the storms may delay the arrival of first responders to an emergency, which, along with other circumstances such as the severity of pre-existing health conditions, could determine a victim's fate (life or death).

What has been done

In emergency situations, it is vital that response personnel have the necessary resources to get to a crisis. The system is similar to GPS devices found in many vehicles. The information transmitted to the device is based on already existing technology. One of the main technologies used on the project on the application side was JavaScript. Two other libraries are being tested to determine if a change is needed. Work is being done to animate the data that is outputted on the application.

Results

Flood data has been combined with geographic information systems and hydrology models, similar to storm-tracking devices used by meteorologists. Such as in-car navigational devices, emergency personnel would view a screen with visual markers that show the gradual flooding of roads during a storm. First responders could then identify an alternate route to get to the crisis. A website is being developed.

4. Associated Knowledge Areas

KA Code	Knowledge Area
132	Weather and Climate

V(H). Planned Program (External Factors)

External factors which affected outcomes

- Natural Disasters (drought, weather extremes, etc.)
- Economy
- Public Policy changes
- Competing Public priorities
- Populations changes (immigration, new cultural groupings, etc.)

Brief Explanation

V(I). Planned Program (Evaluation Studies and Data Collection)

1. Evaluation Studies Planned

- After Only (post program)
- Retrospective (post program)
- Before-After (before and after program)
- During (during program)
- Case Study
- Comparisons between program participants (individuals, group, organizations) and non-participants
- Comparisons between different groups of individuals or program participants experiencing different levels of program intensity.
- Comparison between locales where the program operates and sites without program intervention

Evaluation Results

Key Items of Evaluation

V(A). Planned Program (Summary)**Program # 14****1. Name of the Planned Program**

Sustainable Energy

V(B). Program Knowledge Area(s)**1. Program Knowledge Areas and Percentage**

KA Code	Knowledge Area	%1862 Extension	%1890 Extension	%1862 Research	%1890 Research
101	Appraisal of Soil Resources	0%	0%	40%	0%
123	Management and Sustainability of Forest Resources	100%	0%	0%	0%
201	Plant Genome, Genetics, and Genetic Mechanisms	0%	0%	20%	0%
402	Engineering Systems and Equipment	0%	0%	10%	0%
511	New and Improved Non-Food Products and Processes	0%	0%	30%	0%
Total		100%	0%	100%	0%

V(C). Planned Program (Inputs)**1. Actual amount of professional FTE/SYs expended this Program**

Year: 2009	Extension		Research	
	1862	1890	1862	1890
Actual	2.4	0.0	1.8	0.0

2. Actual dollars expended in this Program (includes Carryover Funds from previous years)

Extension		Research	
Smith-Lever 3b & 3c	1890 Extension	Hatch	Evans-Allen
80167	0	51079	0
1862 Matching	1890 Matching	1862 Matching	1890 Matching
80167	0	444431	0
1862 All Other	1890 All Other	1862 All Other	1890 All Other
0	0	0	0

V(D). Planned Program (Activity)**1. Brief description of the Activity**

Bioengineers are developing "energy farms," using technology to capture nitrogen and phosphorus from agricultural surface waters and processing them into high value aquatic biofuels and biofertilizers. The system relies on growing micro-algae. Scientists estimate that micro-algae could produce 100 times more fuel than soybean oil, but it's difficult to harvest. Research trials have shown that brine shrimp, which feed on micro-algae, can produce as much as 500 gallons of biodiesel per acre per

year with no environmental waste discharge. Tests have demonstrated that that about 70 percent of the fats and oils extracted from the shrimp can be used as biodiesel. What's more, the process creates relatively inexpensive fertilizer and methane gas byproducts. Other researchers identified catalysts and enzymes that could be engineered to improve oil yield. South Carolina uses approximately 680 million gallons of diesel fuel yearly. Currently, the state has resources only to replace 3.6 percent of diesel use with biodiesel.

Researchers are analyzing sorghum to improve its ability to be converted to ethanol. Additionally, the research will provide data that will help producers of related crops, including corn, rice and turfgrass. South Carolina uses nearly 2.5 times more energy than it produces, according to U.S. Energy Information Administration. While the state does not have oil, natural gas or coal resources, biofuels from crops show promise as renewable energy sources that can be produced here.

The Clemson University Cooperative Extension Service staff developed and conducted educational programs to inform landowners about best management and conservation practices and continue to advise farmers on switchgrass as bio-fuel.

2. Brief description of the target audience

Research in sustainable energy impacts all the citizens of South Carolina as power and fuel consumption grows with the population, along with the costs. New fuel options and new approaches to the generation of energy which can be environmentally safe and cost effective will be critical to growing the state's economy in the future.

V(E). Planned Program (Outputs)

1. Standard output measures

2009	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Plan	{NO DATA ENTERED}	{NO DATA ENTERED}	{NO DATA ENTERED}	{NO DATA ENTERED}
Actual	3757	22819	0	0

2. Number of Patent Applications Submitted (Standard Research Output)

Patent Applications Submitted

Year: 2009

Plan:

Actual: 0

Patents listed

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

2009	Extension	Research	Total
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Plan			
Actual	0	0	0

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

- Number of educational workshops conducted

Year	Target	Actual
2009	{No Data Entered}	70

V(G). State Defined Outcomes**V. State Defined Outcomes Table of Content**

O. No.	OUTCOME NAME
1	Creating new income sources for South Carolina farmers by finding markets for crops which can be converted to energy
2	Number of people gaining knowledge

Outcome #1

1. Outcome Measures

Creating new income sources for South Carolina farmers by finding markets for crops which can be converted to energy

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2009	{No Data Entered}	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

The identification of alternative energy sources is a critical national and international issue because of the limited availability of petroleum products and the volatility in prices.

What has been done

Clemson has conducted extensive research and field testing to determine best practices for the production of switchgrass in the Southeastern United States.

Results

Researchers at the Pee Dee Research and Education Center in Florence have teamed with a Charleston South Carolina company to begin supplying switchgrass to European power plants as a substitute for coal to generate electricity.

Carolina-Pacific LLC will ship more than 350,000 tons of switchgrass per year beginning in 2012. The initiative will be worth more than \$20 million a year to South Carolina farmers during the next decade.

This initiative will be a big benefit to South Carolina farmers and rural communities along the I-95 corridor.

4. Associated Knowledge Areas

KA Code	Knowledge Area
101	Appraisal of Soil Resources
511	New and Improved Non-Food Products and Processes

Outcome #2

1. Outcome Measures

Number of people gaining knowledge

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2009	{No Data Entered}	2354

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Forestry and crops for bioenergy production can contribute to the goal of energy independence for the country. In addition, many landowners are unaware of best practices for broadening sustainable forestry on their land.

What has been done

The Clemson University Cooperative Extension Service staff developed and conducted educational programs to inform landowners about best management and conservation practices. Over 70 programs were conducted. In addition, agents are serving as a part of the eXtension Community of Practice for wood energy, serving on statewide bio-energy committees, advising farmers on switch grass as bio-fuel and making presentations to advisory councils on alternative fuels for the 4-H Science, Engineering and Technology program.

Results

Of the 2,469 persons participating in educational programs, over 95% reported a gain in knowledge.

4. Associated Knowledge Areas

KA Code	Knowledge Area
123	Management and Sustainability of Forest Resources

V(H). Planned Program (External Factors)

External factors which affected outcomes

- Public Policy changes
- Government Regulations

Brief Explanation

V(I). Planned Program (Evaluation Studies and Data Collection)

1. Evaluation Studies Planned

- After Only (post program)
- Retrospective (post program)
- Before-After (before and after program)
- During (during program)
- Case Study
- Comparisons between program participants (individuals, group, organizations) and non-participants
- Comparisons between different groups of individuals or program participants experiencing different levels of program intensity.
- Comparison between locales where the program operates and sites without program intervention

Evaluation Results

Key Items of Evaluation

V(A). Planned Program (Summary)

Program # 15

1. Name of the Planned Program

Global Food Security and Hunger

V(B). Program Knowledge Area(s)

1. Program Knowledge Areas and Percentage

KA Code	Knowledge Area	%1862 Extension	%1890 Extension	%1862 Research	%1890 Research
203	Plant Biological Efficiency and Abiotic Stresses Affecting Plants	0%	10%	10%	20%
204	Plant Product Quality and Utility (Preharvest)	50%	15%	10%	20%
205	Plant Management Systems	25%	20%	5%	20%
212	Pathogens and Nematodes Affecting Plants	25%	0%	10%	20%
301	Reproductive Performance of Animals	0%	15%	10%	0%
302	Nutrient Utilization in Animals	0%	10%	5%	0%
303	Genetic Improvement of Animals	0%	0%	10%	0%
304	Animal Genome	0%	0%	10%	0%
305	Animal Physiological Processes	0%	0%	5%	0%
307	Animal Management Systems	0%	20%	10%	20%
311	Animal Diseases	0%	10%	10%	0%
701	Nutrient Composition of Food	0%	0%	5%	0%
Total		100%	100%	100%	100%

V(C). Planned Program (Inputs)

1. Actual amount of professional FTE/SYs expended this Program

Year: 2009	Extension		Research	
	1862	1890	1862	1890

Actual	9.2	3.0	10.1	0.0
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2. Actual dollars expended in this Program (includes Carryover Funds from previous years)

Extension		Research	
Smith-Lever 3b & 3c	1890 Extension	Hatch	Evans-Allen
405763	62765	760861	0
1862 Matching	1890 Matching	1862 Matching	1890 Matching
405763	38237	2175962	0
1862 All Other	1890 All Other	1862 All Other	1890 All Other
0	0	0	0

V(D). Planned Program (Activity)

1. Brief description of the Activity

Researchers have developed safe and economical methods to control honeybee pests in an integrated management approach. The information and methods assists beekeepers in determining the level of beetles that warrant treatment and will prevent unnecessary beetle treatments in the future. This will save beekeepers financially by not treating for this hive pest at low population levels. The Hood beetle trap that was developed offers the beekeeper an alternative non-chemical control technique. Up to one third of the world's food supply is dependent upon bee pollination to produce a successful crop. Among the crops in South Carolina that require the help of honey bees to make them economically viable are apple, corn, strawberries, melons and squash. Approximately, 25,000 honeybee colonies in the state are managed by about 2,000 beekeepers, mostly for pollination purposes, according to Clemson University Extension Services.

Food animal researchers are looking at how animals gain fat and what can be done to minimize fatty tissue. The work leads to new production methods that would increase the health value of meats and help livestock producers improve the feed-to-food ratio for their cattle. There are more than 6,700 cattle-producers statewide, generating sales of more than \$105 million yearly. The research includes identifying the genes and proteins that signal the development of fat cells and fatty acids.

Researchers have developed variable rate irrigation technology that enables an overhead irrigation system to match specific needs in different zones within a field and minimize water use. The technique can lead to substantial water conservation while increasing crop yields and significant cost savings -- as much as 40 percent -- for plant growth chemicals. New tillage techniques show considerable promise for reducing the energy and labor requirement, equipment cost, soil erosion and cotton plant damage from blowing sand. Cost savings of approximately \$20 per acre could be achieved compared to conventional methods. Cotton and cottonseed is grown by more than 450 farmers and generates sales of more than \$46 million annually.

Research and field demonstration activities led by scientists to determine the economic value of Integrated Pest Management programs have been made available to farmers and policy makers in the Southeast and worldwide. Sustainable technologies, where economic, environmental and social sectors intersect, are an emerging business trend. The key to success is profitability. Researchers have conducted economic assessment of emerging technologies to evaluate the sustainability of the technology and to provide guidance for policy makers to promote adoption of sustainable practices. Independent research using secondary data provided insight into policy implications for environmental protection at the national and regional levels.

Clemson University Extension educational programs were conducted. Field trials were conducted and demonstrated. Evaluation programs provided growers with comprehensive and updated information on performance so that they can make informed decisions, especially about the selection of profitable peach varieties for new plantings. In addition, agents promoted and encouraged activities that foster sustainable agricultural practices and policies.

The 1890 Extension Program held educational workshops and trainings to assist program participants in improving their quality of life. Students participated in food demonstrations and taste testing games. Trainings were designed to teach the dangers of food-borne illnesses and the keys to food safety.

2. Brief description of the target audience

The research has the potential to address food security needs for vulnerable populations in the US and around the world. In addition, training will reach producers, small farmers and Extension personnel.

V(E). Planned Program (Outputs)

1. Standard output measures

2009	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Plan	{NO DATA ENTERED}	{NO DATA ENTERED}	{NO DATA ENTERED}	{NO DATA ENTERED}
Actual	7231	16149	0	0

2. Number of Patent Applications Submitted (Standard Research Output)

Patent Applications Submitted

Year: 2009

Plan:

Actual: 1

Patents listed

Feed Supplement Delivery System

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

2009	Extension	Research	Total
Plan			
Actual	0	2	0

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

- Number of educational workshops conducted

Year	Target	Actual
2009	{No Data Entered}	298

V(G). State Defined Outcomes**V. State Defined Outcomes Table of Content**

O. No.	OUTCOME NAME
1	Number of people gaining knowledge in Global Food Security and Hunger programs
2	Number of acres affected by ICM activities.

Outcome #1**1. Outcome Measures**

Number of people gaining knowledge in Global Food Security and Hunger programs

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2009	{No Data Entered}	4798

3c. Qualitative Outcome or Impact Statement**Issue (Who cares and Why)**

The Global Food Security and Hunger program focuses on teaching best management practices that lead to the reduction of negative environmental impacts of cropping systems and improved quality and quantity of food for South Carolina citizens.

What has been done

Some 248 programs were conducted in the area of Global Food Security and Hunger. Some programs focused on Integrated Crop Management for Horticultural crops such as muscadines, blackberries, strawberries, collard, and peaches. Agents assessed for possible freeze damage to peaches. They answered calls regarding plant disease for commercial businesses and individual landowners. Beekeeping programs were conducted. Specialists designed a drip irrigation water management training program for vegetable production, taught sessions on nutrient remediation using vegetated floating mats. Agents produced and delivered programs and information for media, including TV, radio, websites and newsletters.

Results

Of the 7,231 people participating in programs, 86% reported a gain in knowledge. Over 50% of these participating in programs reported that they used practices learned.

4. Associated Knowledge Areas

KA Code	Knowledge Area
204	Plant Product Quality and Utility (Preharvest)
205	Plant Management Systems
212	Pathogens and Nematodes Affecting Plants

Outcome #2

1. Outcome Measures

Number of acres affected by ICM activities.

2. Associated Institution Types

- 1862 Extension
- 1890 Extension

3a. Outcome Type:

Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2009	{No Data Entered}	554538

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Integrated Crop Management practices are needed to reduce negative environmental impacts of cropping systems.

What has been done

Over 554,538 acres were affected by ICM practices.

Results

Over 40,526 acres were planted to collard production, 17,000 used for peach production and 125,256 were used in the production of new alternative crops. Over 662 persons reported a profitability gain. Thirty participants who used IPM strategies in collard production reported an estimated \$2,000 net increase due to reduction in number of spary applications.

4. Associated Knowledge Areas

KA Code	Knowledge Area
204	Plant Product Quality and Utility (Preharvest)
205	Plant Management Systems
212	Pathogens and Nematodes Affecting Plants

V(H). Planned Program (External Factors)

External factors which affected outcomes

- Natural Disasters (drought, weather extremes, etc.)
- Economy
- Public Policy changes
- Competing Public priorities
- Populations changes (immigration, new cultural groupings, etc.)

Brief Explanation

V(I). Planned Program (Evaluation Studies and Data Collection)

1. Evaluation Studies Planned

- After Only (post program)
- Retrospective (post program)
- Before-After (before and after program)
- During (during program)
- Case Study
- Comparisons between program participants (individuals, group, organizations) and non-participants
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- Comparison between locales where the program operates and sites without program intervention

Evaluation Results

Key Items of Evaluation