2011 Tennessee State University Research Annual Report of Accomplishments and Results

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I. Report Overview

1. Executive Summary

This report consists of the FY 2011 results and accomplishments of the Tennessee State University College of Agriculture, Human and Natural Sciences. In the attached report, you will see that agricultural research at TSU is heavily aligned with the priority research areas outlined by NIFA, and productive research is being conducted in all five NIFA priority areas. This past year, we have continued to enhance our capacity in the priority areas by hiring several new faculty members to specifically address areas such as biofuels and nutrition.
We have a talented faculty who have dedicated themselves to improveing the lives of pothers. Our research accomplishments include:

- Increased efficiency of meat goat producers - goat meat is a high protein, low fat alternative to beef
- Improved production parameters in Guinea fowl - this is a poultry species that has a lower fat content than chicken, and is readily adaptable to production on smaller farms
- New fertilizers to increase production and reduce environmental contamination for limited resource farmers
- Enhanced utilization of timber by limited resource land owners, leading to improved efforts in carbon sequestration
- New crops and improved efficiencies in bioenergy crop production
- New controls for invasive pests to keep these pests from becoming established, while having minimal impact on the environment
- New disease-resistant crops that will enable our agricultural industries to remain profitable, while reducing the risk of ecological damage by pesticides
- Reduced biological contaminants on produce and vegetable crops to keep our population safer from food borne illness
- Methods to better teach people how to keep their food safe at home
- Enhanced efforts to deter bioterrorism through research in developing almost instant tests for food contaminants
- Trained our youth to understand the long-term benefits of healthy eating and healthy living

Even though some of the program emphasis in this report has been modified to suit the expertise of our scientists, the goal of agriculture research at TSU remains the same: to generate and communicate new knowledge in the agricultural and environmental sciences for the prosperity of the citizens of Tennessee, the nation and the world.

The College of Agriculture, Human and Natural Sciences employs a dedicated faculty and staff who have received their education and training from many of the best institutions and training centers in the United States and in several countries around the world. This group of individuals takes pride in partnering with NIFA to advance agricultural and environmental research at Tennessee State University and make a positive difference in our society. The research detailed in this report illustrates our commitment to educating our students, serving our stakeholders and bettering the lives of the world's citizens.

Total Actual Amount of professional FTEs/SYs for this State

Year: 2011	Extension		Research	
	1862	1890	1862	1890
Plan	0.0	0.0	0.0	61.4
Actual	0.0	0.0	0.0	70.0

II. Merit Review Process

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

- Internal University Panel
- Expert Peer Review

2. Brief Explanation

Each Planned Program in this Annual Report was approved by an internal review panel and some programs had the extra benefit of an additional review by an external panel. The external panels were composed of agricultural researchers and administrators in the 1890 University system. Potential Planned Programs were evaluated for relevance, scientific soundness, and appropriateness of planned outcomes. Only those proposed programs that successfully met all criteria were developed into Planned Programs. A number of strategies have been developed to ensure that approved programs are successful and that they are meeting goals and remaining relevant. Prior to the initiation of research projects/programs, researchers initiate and contact with appropriate stakeholders (i.e., government agencies, community groups/representatives, professional organizations, extension personnel, or industry groups) to identify and prioritize critical needs. Periodically during research projects, researchers initiate contact with appropriate stakeholders to evaluate the degree of program/project success. An administrator within the College of Agriculture, Human and Natural Sciences meets with every project leader semiannually to monitor the progress of the planned programs. If the program is not progressing as planned, appropriate remedial steps are initiated. We feel that these procedures will contribute significantly to ensuring the Planned Programs are executed completely and with maximum benefit to stakeholders.

III. Stakeholder Input

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

- Targeted invitation to traditional stakeholder groups
- Targeted invitation to traditional stakeholder individuals
- Targeted invitation to selected individuals from general public
- Survey of traditional stakeholder groups
- Survey of traditional stakeholder individuals

Brief explanation.

When appropriate to the project, either community groups, industry associations or individual stakeholders were contacted and solicited for participation. For example, our research programs relating to forestry work closely with the Tennessee Urban Forestry Council; those programs examining new sources of feed stock for biofuels utilize the expertise and stakeholder evaluation

available in our state Plant Material Advisory Committee and Plant Materials Committee. Our environmental programs still maintain a close relationship with the Cumberland River Compact, a non-profit organization concerned with the health and wellbeing of the Cumberland Watershed, which encompasses much of Middle Tennessee. In projects that have clientele who are low income and have young children, agencies such as Head Start, Habitat for Humanity, and Good Food for Good People were involved. In programs where needs were more commodity-based, trade organizations (i.e. Tennessee Nursery and Landscape Association, Professional Grounds Maintenance Association, Tennessee Goat Producers Association, Southern Nursery Association, Guinea Fowl Breeders Association) are routinely utilized for input and direction. In other cases, individuals are contacted and participation is requested. For much of the research in the area of nursery plants, surveys of nursery producers were performed and periodic meetings were held with a Nursery Advisory Group that is maintained by the University.

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
- Needs Assessments
- Use Surveys
- Other (See explanation below.)

Brief explanation.

We do not employ a single, defined strategy to identify stakeholders, rather strategies are identified through methods most suitable for a specific program. Our goal is to identify stakeholders that will provide the most useful and accurate feedback as possible about stakeholder concerns. Groups that serve the stakeholders (community based groups) or groups that represent stakeholders (industry and trade associations) are a primary source of input. Individual stakeholders are utilized where there are no associated groups representing the program area, or when an opportunity for face-to-face interaction (i.e. at an association meeting, field site visit, or community event) is presented. In these cases, individuals involved the program outputs are identified and queried for input.

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

Brief explanation.

Most stakeholder input is collected either in face-to-face discussions or via survey instruments. Each of these methods is effective. The face-to-face discussions are often held with community group representatives or trade association representatives, or with individual stakeholders in a group setting, this allows for questions and answers to direct and stimulate discussion of areas of importance to stakeholders. Survey instruments are a useful tool to assess information from broader groups of stakeholders. While some stakeholders prefer the anonymity and brevity of a survey instrument (often resulting in increased participation), a survey instrument does not always

allow for discussion of previously unrecognized areas of concern.

3. A statement of how the input will be considered

- To Identify Emerging Issues
- Redirect Research Programs
- To Set Priorities

Brief explanation.

Stakeholder input is used on many levels in research projects. It is used to determine priority areas of research, the manner in which research is conducted, and how research results are communicated.

Brief Explanation of what you learned from your Stakeholders

As in recent years, the overwhelming concern of stakeholders have related to economics and health: How do we stay in business? Are there methods to minimize expenses? How do I feed my family with less money? How do I keep my kids healthy with fewer dollars? How do we produce our goods with fewer inputs? How do we get done what we need to get done with less money? Much of our research, regardless of topic or emphasis, has these lessons in economy woven through them. In addition to the economic issues, other things we have learned from our stakeholders include:

1) Stakeholders desire increased assistance in leading healthy lifestyles, but may not be willing to make lifestyle changes to accomplish the healthier lifestyle.

2) Stakeholders turn to academia with increased frequency for advice on ways to cope with difficult economic conditions.

IV. Expenditure Summary

1. Total Actual Formula dollars Allocated (prepopulated from C-REEMS)			
Extension		Research	
Smith-Lever 3b & 3c	1890 Extension	Hatch	Evans-Allen
0	0	0	3273094

2. Totaled Actual dollars from Planned Programs Inputs				
	Extension		Research	
	Smith-Lever 3b & 3c	1890 Extension	Hatch	Evans-Allen
Actual Formula	0	0	0	2197116
Actual Matching	0	0	0	2076737
Actual All Other	0	0	0	2260247
Total Actual Expended	0	0	0	6534100

3. Amount of Above Actual Formula Dollars Expended which comes from Carryover funds from previous				
Carryover	0	0	0	1955140

V. Planned Program Table of Content

S. No.	PROGRAM NAME
1	Global Food Security and Hunger - improving animal production for small producers
2	Global Food Security and Hunger - enhancing sustainability of agricultural plant production
3	Sustainable Energy - new feedstocks and improved feedstock production
4	Climate Change- low-impact alternatives for ornamental crop production
5	Climate Change- improving the quality of water runoff from agricultural production
6	Food Safety- Keeping food contaminant-free
7	Childhood Obesity - Youth Active and Media Savvy

V(A). Planned Program (Summary)

Program # 1

1. Name of the Planned Program

Global Food Security and Hunger - improving animal production for small producers

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)				5%
301	Reproductive Performance of Animals				20%
302	Nutrient Utilization in Animals				25%
303	Genetic Improvement of Animals				25%
307	Animal Management Systems				10%
601	Economics of Agricultural Production and Farm Management				10%
604	Marketing and Distribution Practices				5%
	Total				100%

V(C). Planned Program (Inputs)

1. Actual amount of FTE/SYs expended this Program

Year: 2011	Extension		Research	
	1862	1890	1862	1890
Plan	0.0	0.0	0.0	11.3
Actual Paid Professional	0.0	0.0	0.0	9.5
Actual Volunteer	0.0	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**
0	0	0	298180
1862 Matching	**1890 Matching**	**1862 Matching**	**1890 Matching**
0	0	0	281843
1862 All Other	**1890 All Other**	**1862 All Other**	**1890 All Other**
0	0	0	306748

V(D). Planned Program (Activity)

1. Brief description of the Activity

Conduct seminars, conferences, hands-on clinics, provide proceedings and training to producers, participation in industry events and the development of industry-targeted publications based on research findings.
Conduct research on alternative forages: forage production and quality; animal performance / growth response
Conduct research on the longitudinal survival and reproductive output of meat goat does.
Conduct research on nutritional requirements for Guinea fowl.
Perform genome mapping of important production qualities in Guinea fowl.
Conduct literature review of available secondary information
Conduct focus group meetings to collect information from producers and consumers
Develop and administer surveys to selected producers and consumers
Collect and analyze several available marketing data
Identify selected meat goat consumers/ethnic groups/communities

2. Brief description of the target audience

Dairy and meat goat producers
National meat goat industry
Institutions of meat goat research
Ruminant livestock producers
Students
Public officials
Guinea fowl and poultry industries
Small farmers
Scientific community
Extension specialists

3. How was eXtension used?

eXtension was not used in this program

V(E). Planned Program (Outputs)

1. Standard output measures

2011	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Actual	125	11500	20	100

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

Patent Applications Submitted

Year: 2011

Actual: 0

Patents listed

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

2011	Extension	Research	Total
Actual	4	5	9

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

- Producer workshops to improve animal production in small farm and limited resource populations.

Year	Actual
2011	2

Output #2

Output Measure

- Dietary recommendations for improved Guinea fowl production.

Year	Actual
2011	1

Output #3

Output Measure

- Techniques to improve dairy goat production.
  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	Percentage of direct contact meat goat producers with knowledge of altered doe selection techniques
2	Percentage of direct contact meat goat producers practicing altered doe selection techniques
3	Percentage of goat producer doe non-recorders with knowledge of the advantages of doe record keeping
4	Percentage of goat producer doe non-recorders participating in doe record keeping
5	Percentage of ruminant livestock producers with knowledge of pigeon pea as an alternative forage
6	Percentage of ruminant livestock producers adopting pigeon pea as an alternative forage
7	Percentage of guinea fowl producers with knowledge of calcium and phosphorus recommendations for optimal nutrition
8	Percentage of guinea fowl producers adopting calcium and phosphorus recommendations for optimal nutrition
9	Percentage of guinea fowl producers adopting lysine recommendations for optimal nutrition
10	Percentage of guinea fowl producers with knowledge of lysine recommendations for optimal nutrition
11	Percentage of guinea fowl producers with increased profitability of production
12	Number of producers with increased knowledge of meat goat marketing channels
13	Number of researchers with increased understanding of the constraints and prospects of the meat goat industry
14	Number of producers expanding their marketing to identified channels and markets
15	Increase in number of consumers aware of the healthy benefits of meat goat consumption
16	Number of producers aware of consumer preferences for meat goat products
17	Number of producers and researchers with a better understanding of how maternal genetics can affect meat goat carcass yield

18	Number of producers with increased income by marketing through new channels

Outcome #1

1. Outcome Measures

Percentage of direct contact meat goat producers with knowledge of altered doe selection techniques

2. Associated Institution Types

- 1890 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2011	75

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Producers need to better assess the ability of breeds to contribute to an efficient production of market kids under limited inputs.

What has been done
A set of presentations and research updates were developed and distributed.

Results
Seventy-five commercial producers gained a better understanding of how to evaluate breeds for use in commercial meat goat herds.

4. Associated Knowledge Areas

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

Outcome #2

1. Outcome Measures

Percentage of direct contact meat goat producers practicing altered doe selection techniques

2. Associated Institution Types

- 1890 Research

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2011	30

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Meat goat producers need to better assess the ability of breeds to contribute to an efficient production of market kids under limited inputs.

What has been done
A set of presentations and research updates were developed and distributed to various producer groups.

Results
An increasing number of experienced and new producers are altering their breed selection to establish or improve their meat goat breeding programs.

4. Associated Knowledge Areas

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

Outcome #3

1. Outcome Measures

Percentage of goat producer doe non-recorders with knowledge of the advantages of doe record keeping

2. Associated Institution Types

- 1890 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2011	75

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Meat goat managers raising seedstock recognize the need to properly select breeding females within breeding herds for enhanced fitness.

What has been done
A system of doe herd evaluation has been offered to record and select breeding stock based on objective performance measurements.

Results
Producers have begun to reconsider the need to record performance to improve the genetic and economic status of their meat goat breeding programs.

4. Associated Knowledge Areas

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

Outcome #4

1. Outcome Measures

Percentage of goat producer doe non-recorders participating in doe record keeping

2. Associated Institution Types

- 1890 Research

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2011	15

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Meat goat managers raising seedstock recognize the need to properly select breeding females within breeding herds for enhanced fitness.

What has been done
A system of doe herd evaluation has been offered to record and select breeding stock based on objective performance measurements.

Results
Implementation of performance recording within purebred meat goat herds has occurred on a limited basis.

4. Associated Knowledge Areas

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

Outcome #5

1. **Outcome Measures**

Percentage of ruminant livestock producers with knowledge of pigeon pea as an alternative forage

Not Reporting on this Outcome Measure

Outcome #6

1. **Outcome Measures**

Percentage of ruminant livestock producers adopting pigeon pea as an alternative forage

Not Reporting on this Outcome Measure

Outcome #7

1. **Outcome Measures**

Percentage of guinea fowl producers with knowledge of calcium and phosphorus recommendations for optimal nutrition

2. **Associated Institution Types**

- 1890 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2011	20

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
While the guinea fowl industry is growing in the United States, there are constraints in developing a thriving and sustainable industry because of lack of established nutrient requirements to guide the formulation of least-cost rations. Information on the required dietary levels of calcium, phosphorus and lysine, a limiting amino acid that would ensure optimum performance of these birds, is limited.

What has been done
Dietary calcium (Ca) and phosphorus requirement for optimum growth performance of the Pearl Grey guinea fowl replacement pullets and laying hens were evaluated.

Results
Pearl Grey guinea fowl replacement seems to utilize more efficiently diets containing 0.8% Ca and 0.32-0.48% available phosphorus. Pearl Grey Guinea Fowl laying hens utilized more efficiently diets containing 3.25 to 3.75% calcium and 0.35 to 0.40% available phosphorus.

4. Associated Knowledge Areas

KA Code	Knowledge Area
302	Nutrient Utilization in Animals

Outcome #8

1. Outcome Measures

Percentage of guinea fowl producers adopting calcium and phosphorus recommendations for optimal nutrition

2. Associated Institution Types

- 1890 Research

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2011	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
The costs associated with the production of guinea fowl need to minimized for producers to realize maximum profit as this species becomes more accepted in American diets.

What has been done
Data on calcium and phosphorus requirements of the pearl grey guinea fowl replacement pullets and laying hens were shared with the scientific community at the International Poultry Scientific Forum and also the annual Poultry Association Conference, and the guinea fowl industry.

Results
Assessment of number of number of producers who have adopted the recommendations has not been completed.

4. Associated Knowledge Areas

KA Code	Knowledge Area
302	Nutrient Utilization in Animals

Outcome #9

1. **Outcome Measures**

Percentage of guinea fowl producers adopting lysine recommendations for optimal nutrition

Not Reporting on this Outcome Measure

Outcome #10

1. **Outcome Measures**

Percentage of guinea fowl producers with knowledge of lysine recommendations for optimal nutrition

2. **Associated Institution Types**

- 1890 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2011	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
The costs associated with the production of Guinea fowl need to minimized for producers to realize maximum profit as this species becomes more accepted in American diets.

What has been done
Research to determine the optimum levels of lysine is still in progress.

Results
Optimum levels have not been communicated to producers, thus no opportunity for producer knowledge/adoption of optimized levels yet.

4. Associated Knowledge Areas

KA Code	Knowledge Area
302	Nutrient Utilization in Animals

Outcome #11

1. **Outcome Measures**

   Percentage of guinea fowl producers with increased profitability of production

   Not Reporting on this Outcome Measure

Outcome #12

1. **Outcome Measures**

   Number of producers with increased knowledge of meat goat marketing channels

   Not Reporting on this Outcome Measure

Outcome #13

1. **Outcome Measures**

   Number of researchers with increased understanding of the constraints and prospects of the meat goat industry

   Not Reporting on this Outcome Measure

Outcome #14

1. **Outcome Measures**

   Number of producers expanding their marketing to identified channels and markets

   Not Reporting on this Outcome Measure

Outcome #15

1. **Outcome Measures**

   Increase in number of consumers aware of the healthy benefits of meat goat consumption

   Not Reporting on this Outcome Measure

Outcome #16

1. Outcome Measures

Number of producers aware of consumer preferences for meat goat products

Not Reporting on this Outcome Measure

Outcome #17

1. Outcome Measures

Number of producers and researchers with a better understanding of how maternal genetics can affect meat goat carcass yield

2. Associated Institution Types

- 1890 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2011	200

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
The meat goat industry has been directed towards the production of market kids over the last 10-15 years under the assumption that Boer germplasm is superior for carcass yield among goat breeds.

What has been done
Research data were provided to industry participants that provides new insight on relative breed evaluations for meat goat carcass traits.

Results
A reassessment of long-held beliefs regarding breed selection for carcass traits is occurring among researchers and producers engaged in meat goat production.

4. Associated Knowledge Areas

KA Code	Knowledge Area
303	Genetic Improvement of Animals
307	Animal Management Systems

Outcome #18

1. **Outcome Measures**

Number of producers with increased income by marketing through new channels

Not Reporting on this Outcome Measure

V(H). Planned Program (External Factors)

External factors which affected outcomes

- Natural Disasters (drought, weather extremes, etc.)
- Appropriations changes
- Government Regulations
- Competing Programmatic Challenges

Brief Explanation

Some of the state defined outcomes in the meat goat area concerning the measurement of consumer preferences and economic analyses were not met this reporting period due to staffing issues in this research area.

V(I). Planned Program (Evaluation Studies)

Evaluation Results

Most objectives in this project are on schedule for being met, notable results include:

- 75 commercial producers gained a better understanding of how to evaluate breeds for use in commercial meat goat herds
- The number of experienced and new producers altering their breed selection to establish or improve their meat goat breeding programs is increasing
- 75 percent of direct contact meat goat producers have knowledge of altered doe selection techniques; of those, 30 percent of direct contact meat goat producers are practicing altered doe selection techniques
- 20 percent of guinea fowl producers have knowledge of calcium and phosphorus recommendations for optimal nutrition
- 15 percent of goat producer doe non-recorders are participating in doe record keeping
- 200 producers and researchers have a better understanding of how maternal genetics can affect meat goat carcass yield

However, although producers have begun to reconsider the need to record performance to improve the genetic and economic status of their meat goat breeding programs, the percentage of goat producer doe non-recorders with knowledge of the advantages of doe record keeping remains low, thus an increased effort will be made in communicating the need for record keeping of performance-based. Similarly, although 15 percent of goat producer doe non-recorders are now participating in doe record keeping, this is less than optimal; and additional measure will be taken to communicate the advantages of keeping up-to-date performance records.

The target percentage of guinea fowl producers adopting calcium and phosphorus recommendations for optimal nutrition has not been met because the assessment of the number of producers who have adopted the recommendations has not been completed. This target will be measured when the assessment is completed.

Key Items of Evaluation

V(A). Planned Program (Summary)

Program # 2

1. Name of the Planned Program

Global Food Security and Hunger - enhancing sustainability of agricultural plant production

V(B). Program Knowledge Area(s)

1. Program Knowledge Areas and Percentage

KA Code	Knowledge Area	%1862 Extension	%1890 Extension	%1862 Research	%1890 Research
102	Soil, Plant, Water, Nutrient Relationships				10%
111	Conservation and Efficient Use of Water				5%
125	Agroforestry				15%
131	Alternative Uses of Land				10%
201	Plant Genome, Genetics, and Genetic Mechanisms				10%
203	Plant Biological Efficiency and Abiotic Stresses Affecting Plants				15%
204	Plant Product Quality and Utility (Preharvest)				10%
212	Pathogens and Nematodes Affecting Plants				15%
216	Integrated Pest Management Systems				10%
	Total				100%

V(C). Planned Program (Inputs)

1. Actual amount of FTE/SYs expended this Program

Year: 2011	Extension		Research	
	1862	1890	1862	1890
Plan	0.0	0.0	0.0	8.4
Actual Paid Professional	0.0	0.0	0.0	10.5
Actual Volunteer	0.0	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**
0	0	0	329567
1862 Matching	**1890 Matching**	**1862 Matching**	**1890 Matching**
0	0	0	311511
1862 All Other	**1890 All Other**	**1862 All Other**	**1890 All Other**
0	0	0	339037

V(D). Planned Program (Activity)

1. Brief description of the Activity

Conduct experimental work on molecular analyses of plants and bacterial cultures
Conduct experimental work on molecular analyses of cotton chromosomal substitution lines
Conduct research experiments on nutrient uptake, translocation, accumulation and partitioning in plants using various elements using organic and mineral fertilizers
Explore the potentials of plug transplanting and grafting technology for organic transplants
Conduct hands-on training and workshops on visual nutrient deficiency symptoms of food crops and ornamentals
Train and educate students and extension agents in plant mineral nutrition management
Develop alley cropping agroforestry systems for carbon storage, biofuel crops, and timber and ecosystems services to benifit small land owners

2. Brief description of the target audience

Scientific community, extension agents
Plant pest management researchers and agricultural producers
Organic and conventional growers of food crops and ornamentals
Professional design practitioners
Community stakeholders
Farmers, forest landowners, environmental and conservation conscious individuals
Undergraduate and graduate students

3. How was eXtension used?

eXtension was not used in this program

V(E). Planned Program (Outputs)

1. Standard output measures

2011	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Actual	65	250	0	0

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

Patent Applications Submitted

Year: 2011

Actual: 0

Patents listed

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

2011	Extension	Research	Total
Actual	6	5	11

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

- Number of exotic species/cultivars introduced as alternative crops

Year	Actual
2011	1

Output #2

Output Measure

- Number of workshops held addressing agricultural sustainability

Year	Actual
2011	3

Output #3

Output Measure

- Number of workshops held addressing the adoption of agroforestry techniques for small and limited-resource landowners

Year	Actual
2011	3

Output #4

Output Measure

- Number of demonstration sites developed for sustainable urban agriculture
  Not reporting on this Output for this Annual Report

Output #5

Output Measure

- Number of workshops held to education stakeholders on sustainable urban agriculture design principles
  Not reporting on this Output for this Annual Report

Output #6

Output Measure

- Number of curricula developed in sustainable urban design
  Not reporting on this Output for this Annual Report

Output #7

Output Measure

- Lists of inducer-regulated pathogenesis genes developed

Year	Actual
2011	1

V(G). State Defined Outcomes

V. State Defined Outcomes Table of Content

O. No.	OUTCOME NAME
1	Number of producers adopting the use of specialized fertilizer formulations to reduce environmental nutrient contamination
2	Number of producers realizing reduction in crop loss through the use of specialized fertilizer formulations to reduce environmental nutrient contamination
3	Number of producers realizing increases in crop yield and income as a result of the use of specialized fertilizer formulations
4	Number of students trained in plant biotechnology techniques related to biotic and abiotic stress
5	Number of biotic/abiotic stress management strategies developed
6	Number of farm/forest landowners with increased knowledge of multi-function land management techniques
7	Number of farm/forest landowners adopting multi-function land management techniques
8	Number of farm/forest landowners realizing increased income as a result of multi-function land management techniques
9	Number of educators (i.e. Extension agents, state forestry officials) with increased knowledge of multi-function land management techniques
10	Number of urban design professionals with increased knowledge of sustainable design principles
11	Number of protocols developed for genetic analysis of pollen
12	Number of gamete-based integrated linkage maps to facilitate market assisted selection
13	Number of students trained in genetic analysis of gametes for crop improvement
14	Number of breeders incorporating low-level pathogen inducer genes in to germplasm

Outcome #1

1. Outcome Measures

Number of producers adopting the use of specialized fertilizer formulations to reduce environmental nutrient contamination

2. Associated Institution Types

- 1890 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2011	5

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Challenges of cultural practices including water management for healthy seedling production. Utilization of alternative nutrient sources such as banana peels, potatoes, and greensand as a source of potassium in organic seedling establishment will be beneficial.

What has been done
Presentation of papers at scientific conferences.

Results
Research outcomes were communicated to the scientific community, extension specialists, extension agents, graduate students, undergraduate students and growers. This information will improve nutrient management in seedling establishment of food crops. Alternative nutrient sources may also represent a cost savings factor in sustainable production of food crops. In addition, we expect additional research interest in tropical and sub-tropical fruits, water management and enhancing the nutritional value of food crops.

4. Associated Knowledge Areas

KA Code	Knowledge Area
102	Soil, Plant, Water, Nutrient Relationships
111	Conservation and Efficient Use of Water

Outcome #2

1. Outcome Measures

Number of producers realizing reduction in crop loss through the use of specialized fertilizer formulations to reduce environmental nutrient contamination

2. Associated Institution Types

- 1890 Research

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2011	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
There is a lack of information on the precise fertilizer requirements and techniques of management for production for specialized crops, i.e. blueberry production.

What has been done
Several studies were conducted to investigate optimal nitrogen forms and pH levels for blueberry production.

Results
Master gardeners, blueberry producers and scientists were informed of new fertilizer application practices for nitrogen in blueberry production. An assessment of reduction of loss is yet to be conducted.

4. Associated Knowledge Areas

KA Code	Knowledge Area
102	Soil, Plant, Water, Nutrient Relationships
111	Conservation and Efficient Use of Water

Outcome #3

1. Outcome Measures

Number of producers realizing increases in crop yield and income as a result of the use of specialized fertilizer formulations

Not Reporting on this Outcome Measure

Outcome #4

1. Outcome Measures

Number of students trained in plant biotechnology techniques related to biotic and abiotic stress

2. Associated Institution Types

- 1890 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2011	1

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
One of the long range goals, as stated in the Tennessee State University master plan, is to develop excellence in agriculture and to provide training to minority students in the advanced field of plant biotechnology.

What has been done
Students were trained in appropriate research techniques and completed research problems of their own design.

Results
This project resulted in the M.S. thesis completion of on graduate student in agricultural sciences. The printed thesis titled 'Effect of Temperature Stress on the Response of Potato (Solanum tuberosum) to Soft Rot (Erwinia) Infection' is now available to stakeholders and the public through the Tennessee State University Graduate School.

4. Associated Knowledge Areas

KA Code	Knowledge Area

203	Plant Biological Efficiency and Abiotic Stresses Affecting Plants
212	Pathogens and Nematodes Affecting Plants

Outcome #5

1. Outcome Measures

Number of biotic/abiotic stress management strategies developed

2. Associated Institution Types

- 1890 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2011	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
The ability to reduce yield losses in a sustainable manner are important in potato and other crops. Alternative methods to control disease are needed to improve sustainability of crop production.

What has been done
This outcome determined if host stress proteome is recruited by pathogens for aiding in their survival to inflict aggressive infectivity using stressed and non-stressed potatoes to soft-rot mutants (high and low virulence). Also non-pathogen specific heat shock proteins (HSPs) were used for Pel assays to quantify if soft-rot bacterial activity increased. The data obtained were analyzed for post-project peer-viewed publication.

Results
The manuscript titled 'Concomitant Response to Heat-Stress and Soft-Rot in Potato' has been prepared and currently under review for peer-viewed publication.

4. Associated Knowledge Areas

KA Code	Knowledge Area
203	Plant Biological Efficiency and Abiotic Stresses Affecting Plants
212	Pathogens and Nematodes Affecting Plants

Outcome #6

1. Outcome Measures

Number of farm/forest landowners with increased knowledge of multi-function land management techniques

2. Associated Institution Types

- 1890 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2011	110

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Out of the 14.5 million acres of forestlands in Tennessee, 77% are non-industrial private lands, of which more than 64% of the owners have less than 10 acres in forest holdings. Landowners with small- to mid-sized tracts generally lack forestry knowledge and training, which results in their lands being less productive and more often neglected than other ownership categories. In fact, most nonindustrial private forest landowners are not realizing the full benefits of their forestland.

What has been done
Three workshops were conducted to train limited resource landowners on managing backyard wood as a multifunction woodlot in three counties of Tennessee.

Results
110 limited resource landowners participated in these training opportunities and increased their knowledge of land management techniques.

4. Associated Knowledge Areas

KA Code	Knowledge Area
125	Agroforestry
131	Alternative Uses of Land

Outcome #7

1. Outcome Measures

Number of farm/forest landowners adopting multi-function land management techniques

2. Associated Institution Types

- 1890 Research

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2011	110

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
The small-farm community of Tennessee is under pressure to adopt land management practices that are economically and ecologically sustainable. Another challenge and opportunity is how agricultural and forestry efforts can be integrated to sustainably meet the future renewable energy targets facing the United States and the world. Integrated Bioenergy Production in Agroforestry Systems that provide economic advantages of diversified production as well as ecological benefits of mixed systems seem to be appropriate in this scenario. Agroforestry offers a variety of options to create diverse, multi-purpose plantings that support energy objectives, as well as other services critical for sustainability of the lands and people. These options range from providing additional conservation services for mitigating adverse impacts from other biofuel production systems to serving as feedstock sources. Short-rotation crops, both woody and herbaceous, are ideally suited for agroforestry.

What has been done
Research and extension demonstration has focused on agroforestry as a means to create combined biomass energy production and natural resource systems. Research has explored the use of switchgrass and Loblolly Pine combinations and performance of short-rotation woody biomass species in different landscape positions as a means to develop more diverse, innovative systems that can provide income generation through the sale of biomass for energy, enhance soil carbon sequestration through targeted plantings, and generate payments for environmental services.

Results
Project has not advanced enough yet to produce tangible changes in landowner behavior.

4. Associated Knowledge Areas

KA Code	Knowledge Area
125	Agroforestry
131	Alternative Uses of Land

Outcome #8

1. Outcome Measures

Number of farm/forest landowners realizing increased income as a result of multi-function land management techniques

Not Reporting on this Outcome Measure

Outcome #9

1. Outcome Measures

Number of educators (i.e. Extension agents, state forestry officials) with increased knowledge of multi-function land management techniques

2. Associated Institution Types

- 1890 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2011	15

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
In an effort to offset the amount of carbon emitted into the atmosphere, biological carbon sequestration in general, and soil carbon sequestration in particular, is considered a long-term storage for carbon dioxide to mitigate global warming. Thus, acquiring information on awareness and willingness of limited resource landowners to participate in carbon markets through alternative land use practices that enhance soil carbon sequestration is paramount to bridge the knowledge gap between researchers, farmers, and policy makers for the development of the voluntary carbon market.

What has been done
A study was conducted using primary data collected from 35 selected small farmers who were workshop participants in three counties of Tennessee.

Results

The results of the study indicated that age and level of education of farmer were insignificant variables, unrelated to willingness to participate by landowners in the carbon market. Previous studies indicate that different segments of landowner populations have different goals for their land and may behave differently. Also there may be other factors that may have bearing on how farmers behave. Therefore, a larger study using a more representative sample with more variables that may impact farmer's willingness to participate may be conducted.

4. Associated Knowledge Areas

KA Code	Knowledge Area
125	Agroforestry
131	Alternative Uses of Land

Outcome #10

1. Outcome Measures

Number of urban design professionals with increased knowledge of sustainable design principles

Not Reporting on this Outcome Measure

Outcome #11

1. Outcome Measures

Number of protocols developed for genetic analysis of pollen

2. Associated Institution Types

- 1890 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2011	1

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Individual gamete based linkage maps can be produced without requiring large farm operations and controlled pollinations after single pollen genotyping. Molecular markers (AFLPs) are excellent tool for genotyping. For cotton new/improved plants with value added products will result if adaptability and fiber quality can be combined. This project would lead to developing such gametes

What has been done
Individual pollen grain extraction and mapping strategies were explored.

Results
Protocols for cotton pollen germination, isolation and whole genome amplification have been standardized. In addition dual-dye (IRD-800 and IRD-700) AFLP primer pairs have been identified that can be used to analyze individual cotton pollen grains for fiber quality specific markers.

4. Associated Knowledge Areas

KA Code	Knowledge Area
201	Plant Genome, Genetics, and Genetic Mechanisms

Outcome #12

1. Outcome Measures

Number of gamete-based integrated linkage maps to facilitate market assisted selection

2. Associated Institution Types

- 1890 Research

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2011	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Genetic mapping using pollen of only one parent is an alternative to genetic crosses for constructing genetic linkage maps. Plant breeders construct and use genetic maps for developing improved varieties and cultivars. In addition, the environmental inputs required in maintaining large plant fields for cross-pollinations are also circumvented. As such the completion of this project will reduce the cost of developing improved cotton varieties.

What has been done
AFLP markers will be used on individually isolated and germinated cotton pollen grains after whole genome amplification. The protocols have been standardized to continue analyzing sufficient cotton pollen grains for linkage mapping.

Results

The project has not progressed enough to demonstrate changes in action by plant breeders.

4. Associated Knowledge Areas

KA Code	Knowledge Area
201	Plant Genome, Genetics, and Genetic Mechanisms

Outcome #13

1. Outcome Measures

Number of students trained in genetic analysis of gametes for crop improvement

2. Associated Institution Types

- 1890 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2011	2

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
One of the priorities of Tennessee State University is providing training to minority students in plant biotechnology related to agricultural and environmental sciences.

What has been done
One graduate student, one undergraduate student and two pre-college summer student interns were trained in the procedures of plant material maintenance, leaf sample collection, pollen collection and isolation, gel-electrophoresis, DNA extraction, AFLP analyses, sequencing gel-analysis, and the use of bioinformatic tools for marker based genetic analyses.

Results
Student training resulted in various scientific outputs:
A. Naseer Aziz, V. L. Sahithi Kommireddy, J.N. Jenkins, Jack C. McCarty, D.M. Stelly and S. Saha. 2011. Enrichment of Chromosome 17 Specific Molecular Markers of Pima Cotton Substituted in Upland Cotton Lines. Program and Abstracts: Association of Research Directors 16th Biennial Symposium, p 124. (Abstract)
Comparative Molecular Markers' Based Analyses of Cotton Lines. Submitted to Graduate School of Tennessee State University in Partial Fulfillment of the Requirements for the Degree of Master of Science. V. L. Sahithi. Kommireddy, May 2011.
Presentations:

Ke'Onia Joy. Pollen Isolation with Micromanipulator. College of Agriculture, Human and Natural Sciences: 2011-Summer Apprenticeship Program Presentations. Tennessee State University; August 4, 2011.
Leslie Patterson. Preparation of Sequencing Gel-Plate. College of Agriculture, Human and Natural Sciences: 2011-Summer Apprenticeship Program Presentations. Tennessee State University; August 4, 2011

4. Associated Knowledge Areas

KA Code	Knowledge Area
201	Plant Genome, Genetics, and Genetic Mechanisms

Outcome #14

1. Outcome Measures

Number of breeders incorporating low-level pathogen inducer genes in to germplasm

2. Associated Institution Types

- 1890 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2011	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Soft rot is a bacterial plant disease that affects over 80 different cultivated crop species and is caused by Pectobacterium and Dickeya species. Pectobacterium and Dickeya spp are almost universal plant pathogens affecting crops both in the field and in storage. Draft or complete genome sequences are now available for at least 8 strains of these pathogens but a significant number of the genes have unknown functions. Virulence of these bacteria is induced by a yet uncharacterized chemical signal of host origin. Chemical identification of the inducer could lead to strategies to select for low inducer producing cultivars.

What has been done
The optimum level of host extract to induce pathogen virulence in culture determined the physical properties of the inducer in terms of its size. We have also determined if and how widespread in the inducer in the extract of host fruits and vegetables.

Results

We have shown the extracts from many fruits and vegetables that are host to these bacteria contain the unknown chemicals which induce bacterial virulence. We have also performed the initial characterization of the inducer by determining the physical nature of the inducer in size (less than 1KDa) and stable to head and cold. This project constitutes a diagnostic technology available for the plant pest of soft rot bacteria.

4. Associated Knowledge Areas

KA Code	Knowledge Area
201	Plant Genome, Genetics, and Genetic Mechanisms
212	Pathogens and Nematodes Affecting Plants

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

Brief Explanation

{No Data Entered}

V(I). Planned Program (Evaluation Studies)

Evaluation Results

Most objectives in this project are on schedule for being met, notable results include:
Five producers adopted the use of specialized fertilizer formulations to reduce environmental nutrient contamination.
Two producers realized increases in crop yield and income as a result of the use of specialized fertilizer formulations.
Two graduate students were trained in biotechnological techniques
110 farm/forest landowners increased their knowledge of multi-function land management techniques
15 educators (i.e. Extension agents, state forestry officials) increased their knowledge of multi-function land management techniques.
Some goals have not been met. Many of the unmet goals are the result of project maturity- the project has not progressed to the point of being able to measure some goals, i.e. the project has not advanced enough yet to measure the number of farm/forest landowners realizing increased income as a result of multi-function land management techniques, or to produce tangible changes in landowner behavior.

Key Items of Evaluation

V(A). Planned Program (Summary)

Program # 3

1. Name of the Planned Program

Sustainable Energy - new feedstocks and improved feedstock production

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				20%
213	Weeds Affecting Plants				30%
511	New and Improved Non-Food Products and Processes				30%
603	Market Economics				20%
	Total				100%

V(C). Planned Program (Inputs)

1. Actual amount of FTE/SYs expended this Program

Year: 2011	Extension		Research	
	1862	1890	1862	1890
Plan	0.0	0.0	0.0	10.0
Actual Paid Professional	0.0	0.0	0.0	10.7
Actual Volunteer	0.0	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**
0	0	0	335845
1862 Matching	**1890 Matching**	**1862 Matching**	**1890 Matching**
0	0	0	317444
1862 All Other	**1890 All Other**	**1862 All Other**	**1890 All Other**
0	0	0	345495

V(D). Planned Program (Activity)

1. Brief description of the Activity

Design and implement field and laboratory research.
Disseminate research findings to the scientific community, stakeholders, agricultural, environmental, and life science industries.
Conduct agronomic and economic analysis.
Recruit and train students, incorporating research training into teaching and extension curricula.

2. Brief description of the target audience

State, local and federal agencies, small and limited-resource farmers, researchers, educators, policy makers, consumers and bioenergy companies.

3. How was eXtension used?

eXtension was not used in this program

V(E). Planned Program (Outputs)

1. Standard output measures

2011	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Actual	25	0	0	0

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

Patent Applications Submitted

Year: 2011
Actual: 0

Patents listed

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

2011	Extension	Research	Total
Actual	1	2	3

V(F). State Defined Outputs

Output Target

<u>Output #1</u>

Output Measure

- Number of workshops and presentations concerning new or alternative biofuel feedstocks

Year	Actual
2011	4

V(G). State Defined Outcomes

V. State Defined Outcomes Table of Content

O. No.	OUTCOME NAME
1	Increase in number of producers with knowledge of production options available for growing bioenergy feedstocks
2	Increase in number of producers adopting production of bioenergy feedstocks
3	Number of students receiving training in bioenergy production
4	Number of protocols developed for mutagenesis and selection of herbicide resistant biofuel feedstock varieties
5	Number of desirable biofuel feedstock varietal mutants recovered
6	Number of new varieties of biofuel feedstocks developed
7	Increase in number of producers aware of current government policies regarding cellulosic feedstock
8	Number of producers obtaining information on production of pigeonpea under different climatic and soil conditions
9	Number of producers with increased knowledge of the benefits of producing pigeonpea stalk for bioenergy
10	Number of producers adopting pigeonpea as feedstock for bioenergy
11	Number of producers with increased income due to pigeonpea production for bioenergy

Outcome #1

1. Outcome Measures

Increase in number of producers with knowledge of production options available for growing bioenergy feedstocks

2. Associated Institution Types

- 1890 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2011	20

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Bioenergy, and biofuels in particular, are a mainstream concept as an alternative to the security and environmental issues related to fossil fuels. Many producers may be understandably skeptical about growing biofuel crops because of the lack of information available to them and the fact that there is currently no major market available for them to sell these products. However, it is important to disseminate this assistance to these producers because once the infrastructure and markets are fully established, producers will have the optimal tools available to them to succeed.

What has been done
In 2011, presentations on the use of switchgrass for forage and bioenergy were presented in Montgomery, Rutherford, Smith, and Lawrence counties in Tennessee.

A fact sheet was developed and published in conjunction with the University of Tennessee on improving switchgrass yields for bioenergy production.

Results
Of 20 producer evaluations received from Montgomery and Lawrence counties, all indicated some type of increase in knowledge.

4. Associated Knowledge Areas

KA Code	Knowledge Area
511	New and Improved Non-Food Products and Processes

Outcome #2

1. Outcome Measures

Increase in number of producers adopting production of bioenergy feedstocks

2. Associated Institution Types

- 1890 Research

3a. Outcome Type:

Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Actual
2011	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Bioenergy, and biofuels in particular, are a mainstream concept as an alternative to the security and environmental issues related to fossil fuels. Many producers may be understandably skeptical about growing biofuel crops because of the lack of information available to them and the fact that there is currently no major market available for them to sell these products. It is important, however, to disseminate this assistance to these producers because once the infrastructure and markets are fully established, they will have the optimal tools available to them to succeed.

What has been done
In 2011, presentations on the use of switchgrass for forage and bioenergy were presented in Montgomery, Rutherford, Smith, and Lawrence counties in Tennessee.

A fact sheet was developed and published in conjunction with the University of Tennessee on improving switchgrass yields for bioenergy production.

Results
The project has not progressed far enough to measure grower adoption of techniques.

4. Associated Knowledge Areas

KA Code	Knowledge Area
511	New and Improved Non-Food Products and Processes

Outcome #3

1. Outcome Measures

Number of students receiving training in bioenergy production

2. Associated Institution Types

- 1890 Research

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2011	1

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Bioenergy is a new, environmentally-focused field that encompasses a range of scientific disciplines. It has great impact on the environment due to its importance in maintaining the world's environmental and economic integrity. The U.S. has recently increased its focus in the area of bioenergy through federal mandates and funding for research, infrastructure and feedstock development, and education to enhance the nation?s energy portfolio. This emphasis has created new opportunities in the 'green jobs' market which will require new efforts and new programs for training future professionals.

What has been done
Research has been conducted on optimal harvest timing of switchgrass for bioenergy production. This research has been performed with assistance from a graduate student. The research is part of the graduate student thesis.

Results
Samples have been harvested in the field and are currently being processed for analyses by students.

4. Associated Knowledge Areas

KA Code	Knowledge Area
511	New and Improved Non-Food Products and Processes

Outcome #4

1. Outcome Measures

Number of protocols developed for mutagenesis and selection of herbicide resistant biofuel feedstock varieties

2. Associated Institution Types

- 1890 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2011	1

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Competition from weeds is one major cause for inferior switchgrass establishment under field conditions, presenting an increased risk and cost for the growers.

What has been done
We expect that the tetraploidy genome structure of 'Alamo' could be a reason for screening mutant with phenotypes in the M0 generation. We have obtained diploid foxtail millet seeds to continue the mutagenesis selection for herbicide sensitive or tolerance traits.

Results
One protocol for treating switchgrass 'Alamo' with sodium azide was developed.

4. Associated Knowledge Areas

KA Code	Knowledge Area
213	Weeds Affecting Plants
511	New and Improved Non-Food Products and Processes

Outcome #5

1. **Outcome Measures**

Number of desirable biofuel feedstock varietal mutants recovered

Not Reporting on this Outcome Measure

Outcome #6

1. **Outcome Measures**

Number of new varieties of biofuel feedstocks developed

Not Reporting on this Outcome Measure

Outcome #7

1. **Outcome Measures**

Increase in number of producers aware of current government policies regarding cellulosic feedstock

Not Reporting on this Outcome Measure

Outcome #8

1. **Outcome Measures**

Number of producers obtaining information on production of pigeonpea under different climatic and soil conditions

Not Reporting on this Outcome Measure

Outcome #9

1. **Outcome Measures**

Number of producers with increased knowledge of the benefits of producing pigeonpea stalk for bioenergy

Not Reporting on this Outcome Measure

Outcome #10

1. **Outcome Measures**

Number of producers adopting pigeonpea as feedstock for bioenergy

Not Reporting on this Outcome Measure

Outcome #11

1. **Outcome Measures**

Number of producers with increased income due to pigeonpea production for bioenergy

Not Reporting on this Outcome Measure

V(H). Planned Program (External Factors)

External factors which affected outcomes

- Natural Disasters (drought, weather extremes, etc.)
- Economy
- Appropriations changes

Brief Explanation

{No Data Entered}

V(I). Planned Program (Evaluation Studies)

Evaluation Results

It shoudl be noted that a relatively large number of objectives relating to the use of pigeon pea as biofuel feedstock will not be met due to the elimination of that specific research priority in our Plan of Work.

Ofhte remaing objectives inth is project, many are on schedule for being met, notable results include:

- 20 producers have increased knowledge of production options available for growing bioenergy feedstocks
- One student has received training in bioenergy production
- One protocol has been developed for mutagenesis and selection of herbicide resistant biofuel feedstock varieties

However, the project has not progressed far enough to measure the increase in number of producers adopting production of bioenergy feedstocks.

Key Items of Evaluation

V(A). Planned Program (Summary)

Program # 4

1. Name of the Planned Program

Climate Change- low-impact alternatives for ornamental crop production

V(B). Program Knowledge Area(s)

1. Program Knowledge Areas and Percentage

KA Code	Knowledge Area	%1862 Extension	%1890 Extension	%1862 Research	%1890 Research
133	Pollution Prevention and Mitigation				20%
211	Insects, Mites, and Other Arthropods Affecting Plants				40%
212	Pathogens and Nematodes Affecting Plants				40%
	Total				100%

V(C). Planned Program (Inputs)

1. Actual amount of FTE/SYs expended this Program

Year: 2011	Extension		Research	
	1862	1890	1862	1890
Plan	0.0	0.0	0.0	19.0
Actual Paid Professional	0.0	0.0	0.0	15.7
Actual Volunteer	0.0	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**
0	0	0	492782
1862 Matching	**1890 Matching**	**1862 Matching**	**1890 Matching**
0	0	0	465782
1862 All Other	**1890 All Other**	**1862 All Other**	**1890 All Other**
0	0	0	506941

V(D). Planned Program (Activity)

1. Brief description of the Activity

Identify new pesticide, biopesticide, and treatment methodologies for container and field-grown nursery stock to manage disease and insect problems.
Determine the lowest effective rates for synthetic petroleum-based pesticides and develop new reduced rate insecticide / biopesticide combinations.
Identify new biopesticides that can substitute for synthetic petroleum-based pesticides and reduce worker exposure risk and environmental impact.
Release phorid-decapitating flies in Tennessee to provide imported fire ant biological control.
Provide extension training and literature to producers on imported fire ant and Japanese beetle management and train students in pest management and research techniques.
Provide data to support new treatments in the Domestic Japanese Beetle Harmonization Plan and the Federal Imported Fire Ant Quarantine, as well as data to support new insecticide label amendments.

2. Brief description of the target audience

Nursery growers and extension specialists
Regulatory agencies (e.g., U.S. Environmental Protection Agency, USDA-APHIS, Tennessee Department of Agriculture)

3. How was eXtension used?

Survey of imported fire ant populations in Tennessee. (J. Entomol. Science. 44: 1-9) and made available to the public by the eXtension Imported Fire Ant Community of Practice (http://www.extension.org/pages/9725/geographic-distribution-of-fire-ants). Documentation of the Tennessee data source is available on the eXtension website under 'Additional Information About the Interactive IFA Map' and the "IFA Species Layer'. Our program also reviewed the interactive map page for eXtension, as well as assisted in the review and development of an online eXtension module on IFA

V(E). Planned Program (Outputs)

1. Standard output measures

2011	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Actual	125	50	2	0

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

Patent Applications Submitted

Year: 2011
Actual: 0

Patents listed

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

2011	Extension	Research	Total
Actual	7	4	11

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

- Workshops to inform producers about alternative insect control methodologies

Year	Actual
2011	4

Output #2

Output Measure

- Disease resistant cultivars developed

Year	Actual
2011	0

Output #3

Output Measure

- Extension factsheets about alternative methods to control disease and insects in nursery production

Year	Actual
2011	1

V(G). State Defined Outcomes

V. State Defined Outcomes Table of Content

O. No.	OUTCOME NAME
1	Number of producers educated on proper management of invasive pests through presentations and workshops
2	Number of producers educated on proper management of invasive pests through publications and factsheets
3	Number of new treatments for invasive pests
4	Number of new reduced-risk treatments developed for invasive pests
5	Number of new treatments for invasive pests approved by quarantine regulatory agencies
6	Number of confirmed establishments of new invasive pest parasites
7	Number of producers informed about new or emerging diseases
8	Number of producers informed about new biological control treatments
9	Number of producers informed about new sources of host resistance
10	New cultivars exhibiting disease resistance available to growers
11	Organisms identified as potential biocontrol candidates
12	Number of biological control product efficacy tests conduced for invasive insect control
13	Number of new product registrations for biological control of invasive insects

Outcome #1

1. Outcome Measures

Number of producers educated on proper management of invasive pests through presentations and workshops

2. Associated Institution Types

- 1890 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2011	838

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Invasive pest species disrupt natural ecosystems and are detrimental to agriculture because they exhibit rapid population growth that can cause greater crop damage and harm to human health and welfare. Multiple invasive pests now impact the U.S. nursery industry. Many producers must manage multiple invasive pests simultaneously with limited, ineffective, and costly treatments, which threatens economic viability and undermines integrated pest management efforts. Producer education via workshops and other training outlets is essential for providing up to date information on rapidly evolving modifications to agro-ecosystems and guidance on successful and profitable control tactics.

What has been done
Producers and other agricultural stakeholders were trained at multiple workshop and educational venues on the latest management techniques developed from field research on invasive insects.

Results
Producer and stakeholder attendance to workshops on invasive pest management presented by this program or by others using information from this program were estimated at 838 during this reporting period. In addition, 36 direct requests for information on invasive insects and their management were received from growers or extension agents serving growers during this reporting period, which we estimate impacted 2,122 producers and 241 stakeholders. The information requests are a direct measure of the need for information by producers.

4. Associated Knowledge Areas

KA Code	Knowledge Area
133	Pollution Prevention and Mitigation
211	Insects, Mites, and Other Arthropods Affecting Plants

Outcome #2

1. Outcome Measures

Number of producers educated on proper management of invasive pests through publications and factsheets

2. Associated Institution Types

- 1890 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2011	570

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Due to time constraints with managing and running farm operations, as well as expense, some producers are not able to physically attend educational workshops to obtain information on management of invasive insects. As a result, publications, factsheets, and internet available materials are another route to indirectly reach these producers and stakeholders with guidance, training, and the latest successful measures for effective and sustainable pest management.

What has been done
Producers and stakeholders were educated by multiple printed and internet based outlets.

Results
We estimate 300 stakeholders per year are likely viewing the eXtension IFA materials developed or reviewed by our program. We estimate 120 growers per year are benefiting from USDA-APHIS and Southern Nursery Association online publications. We estimate 50 Tennessee growers were impacted by the IFA bait publication that was provided to our regional nursery extension specialist for distribution to producers.

4. Associated Knowledge Areas

KA Code	Knowledge Area
133	Pollution Prevention and Mitigation
211	Insects, Mites, and Other Arthropods Affecting Plants

Outcome #3

1. Outcome Measures

Number of new treatments for invasive pests

2. Associated Institution Types

- 1890 Research

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2011	1

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Treatment methods for cleansing nursery stock of imported fire ant, Japanese beetle, and numerous non-indigenous ambrosia beetles are expensive, hazardous, impractical or ineffective, and often require shipping delays. Imported fire ant treatment methods like the Federal drench protocol are hazardous due to producer handling and site re-entry, labor intensive, and expensive. Most treatments for these pests rely on only a few active ingredients (i.e., chlorpyrifos, imidacloprid, or permethrin), providing producers with only limited alternatives. New biopesticide treatments that are under development may have a role in reducing climate change by offering producers substitutes for synthetic petroleum based agrochemicals. Invasive borers also have major impacts on forest systems that serve as important carbon-sinks, so improved treatments for borers may indirectly reduce climate change

What has been done
A new in-field drench treatment was tested for imported fire ant and Japanese beetle larvae. The treatments utilized commonly accessible items (5-gallon buckets) and bio-pesticides.

Results
Because nursery growers often employ buckets or other irrigation devices to water trees before harvest, this procedure appears to have potential for applying fire ant and Japanese beetle insecticide treatments to individual trees, while still fitting within common production practices. Soil and burlap samples harvested from root balls provided 100% alate imported fire ant control at all post-harvest sampling intervals. Japanese beetle results have not been collected at this time.

4. Associated Knowledge Areas

KA Code	Knowledge Area
133	Pollution Prevention and Mitigation

211 Insects, Mites, and Other Arthropods Affecting Plants

Outcome #4

1. Outcome Measures

Number of new reduced-risk treatments developed for invasive pests

Not Reporting on this Outcome Measure

Outcome #5

1. Outcome Measures

Number of new treatments for invasive pests approved by quarantine regulatory agencies

2. Associated Institution Types

- 1890 Research

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2011	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Imported fire ants (IFA) have expanded their range into multiple nursery production systems in the southern United States. Currently, only three IFA quarantine treatments are approved for field-grown nurseries. All treatments are expensive, rely on one active ingredient (chlorpyrifos), and the post-harvest treatments are hazardous. More options are available for Japanese beetle quarantines than IFA quarantines, but treatments are still expensive for producers due to the limited number of options.

What has been done
No new insecticides have been submitted for regulatory approval at this time. Tests are still on-going for IFA (bifenthrin) and Japanese beetle (clothianidin, carbaryl, trichlorfon, and numerous biopesticides). Products evaluated for Japanese beetle control were compared against U.S. Domestic Japanese Beetle Harmonization Plan (DJBHP) insecticide standards.

Results
Several insecticide products have demonstrated consistent efficacy against IFA and Japanese beetle and may have potential after additional field testing for approval by quarantine regulatory

agencies. Bifenthrin (Onyx Pro) has been labeled for use as a nursery stock dip treatment for IFA and Japanese beetle using data from this program, but the treatment has only been approved for use in the DJBHP. Two generic imidacloprid products (Quali-Pro Imidacloprid 2F and Mallet 2F) provided Japanese beetle grub control equivalent to approved DJBHP standards (Discus and Marathon 60WP), but USDA-APHIS is requiring additional field data before approving their use in the DJBHP.

4. Associated Knowledge Areas

KA Code	Knowledge Area
133	Pollution Prevention and Mitigation
211	Insects, Mites, and Other Arthropods Affecting Plants

Outcome #6

1. Outcome Measures

Number of confirmed establishments of new invasive pest parasites

2. Associated Institution Types

- 1890 Research

3a. Outcome Type:

Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Actual
2011	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Imported fire ants (IFA) infest over 325 million acres in North America and are continuing to expand their range. IFA cause billions of dollars in damage in the United States each year and are a human, livestock, and wildlife health threat. To slow IFA spread and provide region-wide sustainable suppression of IFA populations, the USDA has an on-going classical biocontrol program to establish phorid-decapitating fly parasitoids (Pseudacteon spp.) of IFA from South America into the United States. There are about 20 species of Pseudacteon flies in South America, which exhibit niche partitioning of IFA by worker size, species, activity (foraging, mating flights), and time of the day. Therefore, to effectively manage IFA with Pseudacteon flies, it will likely require introductions of a suite of fly species.

What has been done
Multiple Pseudacteon species have been released in Tennessee over several years, including P. curvatus (Formosan and Los Flores biotypes), P. tricuspis, and P. obtusus. P. obtusus was released in Tennessee for the first time in three middle Tennessee counties, including Moore

(2009), Sequatchie (2010), and Franklin (2011).

Results
The P. curvatus Los Flores biotype is now established statewide and was confirmed at all of our sites where new species like P. obtusus are being released. We do not know the success of the P. curvatus Formosan biotype, since it was released after the Los Flores biotype and the two biotypes cannot be readily distinguished. Field recovery efforts have been made for P. tricuspis and P. obtusus, but neither of these species has been recovered at this time.

4. Associated Knowledge Areas

KA Code	Knowledge Area
133	Pollution Prevention and Mitigation
211	Insects, Mites, and Other Arthropods Affecting Plants

Outcome #7

1. Outcome Measures

Number of producers informed about new or emerging diseases

2. Associated Institution Types

- 1890 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2011	100

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Nursery growers need to be informed about new and emerging diseases so that they can be prepared for the disease by taking preventive measures and minimize the potential economic impact of the disease.

What has been done
Cherry Leaf spot is an emerging disease that can impact plant sales and increase production cost, subsequently reduce net income from flowering cherry plants. Studies on the source of initial infection and the timing of infection establishment were performed to confirm previous results.

Results

Studies on this disease have shown the source of initial infection and how to avoid economic impact from this disease. Disease management strategies developed have confirmed previous results on effective fungicides and the timing of fungicide applications as well as cultural practices that can reduce disease incidence.

4. Associated Knowledge Areas

KA Code	Knowledge Area
133	Pollution Prevention and Mitigation

Outcome #8

1. Outcome Measures

Number of producers informed about new biological control treatments

2. Associated Institution Types

- 1890 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2011	100

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Nursery production systems use high rates of chemical fungicides to control powdery mildew of dogwood; this is detrimental to the environment and grower income by increasing dogwood production costs. Alternatives to chemical fungicides would be desirable.

What has been done
Microorganisms isolated from dogwood leaves in the wild where chemical fungicides have not been used were isolated and some bacteria, fungi and yeast showed good potential in powdery mildew control. The organisms were evaluated for best application methods and their mechanism of action.

Results
Results confirmed previous studies showing two biological control bacteria had superior activity against powdery mildew; they not only reduce disease severity, they also improved plant growth. The bacteria produced some chemical metabolites that may be involved in disease control; these metabolites were isolated and characterized. The bacteria were applied through the roots and by foliar sprays and both methods produced positive results. The bacteria colonized the roots endophytically.

4. Associated Knowledge Areas

KA Code	Knowledge Area
133	Pollution Prevention and Mitigation
212	Pathogens and Nematodes Affecting Plants

Outcome #9

1. Outcome Measures

Number of producers informed about new sources of host resistance

Not Reporting on this Outcome Measure

Outcome #10

1. Outcome Measures

New cultivars exhibiting disease resistance available to growers

2. Associated Institution Types

- 1890 Research

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2011	2

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Disease resistance is the best method for disease control by farmers. New generation of cultivars that are resistant to powdery mildew would be a great contribution to nursery growers in that they would not require routine fungicide applications

What has been done
Powdery mildew resistant selections have been identified and characterized for release as new disease resistant cultivars.

Results
Two selections are ready for release as new powdery mildew resistant cultivars.

4. Associated Knowledge Areas

KA Code	Knowledge Area
133	Pollution Prevention and Mitigation
212	Pathogens and Nematodes Affecting Plants

Outcome #11

1. Outcome Measures

Organisms identified as potential biocontrol candidates

2. Associated Institution Types

- 1890 Research

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2011	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Alternatives to fungicides in powdery mildew control are needed so as to reduce the number of fungicide applications. Biopesticides and biological agents provide good alternatives to chemical fungicide either individually or as part of an integrated disease management system.

What has been done
Research on how to integrate biological organisms or biodegradable biopesticides with host resistance was initiated.

Results
The integration of moderate resistance with biological agents and with biopesticides improved disease control. Results are preliminary at this stage.

4. Associated Knowledge Areas

KA Code	Knowledge Area
133	Pollution Prevention and Mitigation
212	Pathogens and Nematodes Affecting Plants

Outcome #12

1. **Outcome Measures**

Number of biological control product efficacy tests conduced for invasive insect control

Not Reporting on this Outcome Measure

Outcome #13

1. **Outcome Measures**

Number of new product registrations for biological control of invasive insects

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

Brief Explanation

V(I). Planned Program (Evaluation Studies)

Evaluation Results

The objectives of this program were to educate growers on invasive pests and alternative pest control strategies by presentations and workshops (outcome #1) and publications and factsheets (outcome #2), as well as to develop new treatments for invasive insects (outcome #3), obtain approval by quarantine regulatory agencies for new invasive insect treatments (outcome #5), and confirm the establishment of new invasive insect parasites (outcome #6).
Successes at meeting program objectives were measured by several methods. First, for outcomes #1 and #2, we received 36 direct requests for information on invasive insects and their management during the fiscal year, which indicated a producer and stakeholder need for the information developed by our program. We estimated that 2,363 individuals (89.8% producers) were impacted by the information provided from these 36 informational requests. For outcome #3 and #5, the development of new treatments and their approval by regulatory agencies is a direct measure of program success. One new promising treatment was developed this year, but regulatory approval of treatments, which can require multiple years of replicated data, are still pending. Subjective measures of success included verbal feedback from nursery producers at the Tennessee State University (TSU) Small Farms Field Day, Middle Tennessee Nursery Association, and Tennessee Nursery &

Landscape Association Winter Educational Workshop that presented research results were meeting their needs. Semi-monthly reports of project outputs were prepared and sent to the 12 member TSU Nursery Advisory Group (TSU-NAG), which is our stakeholder advisory group that critiques all of our projects, research, and results for applicability to their needs. Comments back from the TSU-NAG were all favorable. Other measures of success included Buprestidae wood-borer insect identifications performed by our program for stakeholders, which included 72 people in 33 states and 4 Canadian provinces. For outcome #6, periodic attempts to recover imported fire ant parasitoids at release sites were made and the direct recovery of one fly species (Pseudacteon curvatus Los Flores biotype) was an indication of program success.

Key Items of Evaluation

V(A). Planned Program (Summary)

Program # 5

1. Name of the Planned Program

Climate Change- improving the quality of water runoff from agricultural production

V(B). Program Knowledge Area(s)

1. Program Knowledge Areas and Percentage

KA Code	Knowledge Area	%1862 Extension	%1890 Extension	%1862 Research	%1890 Research
112	Watershed Protection and Management				50%
133	Pollution Prevention and Mitigation				50%
	Total				100%

V(C). Planned Program (Inputs)

1. Actual amount of FTE/SYs expended this Program

Year: 2011	Extension		Research	
	1862	1890	1862	1890
Plan	0.0	0.0	0.0	4.7
Actual Paid Professional	0.0	0.0	0.0	7.2
Actual Volunteer	0.0	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**
0	0	0	225989
1862 Matching	**1890 Matching**	**1862 Matching**	**1890 Matching**
0	0	0	213607
1862 All Other	**1890 All Other**	**1862 All Other**	**1890 All Other**
0	0	0	232482

V(D). Planned Program (Activity)

1. Brief description of the Activity

Conduct research in water quality monitoring.
Develop outreach materials.
Communicate findings to producers/end users.

Train students.

2. Brief description of the target audience

Agricultural producers, environmental scientists, environmental regulatory agencies.

3. How was eXtension used?

{No Data Entered}

V(E). Planned Program (Outputs)

1. Standard output measures

2011	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Actual	14	0	0	0

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

Patent Applications Submitted

Year: 2011

Actual: 0

Patents listed

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

2011	Extension	Research	Total
Actual	0	1	1

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

- Workshops to communicate research findings to stakeholders

Year	Actual
2011	0

Output #2

Output Measure

- Workshops to educate producers in the target population on how to reduce sediment load to surface water

Year	Actual
2011	0

V(G). State Defined Outcomes

V. State Defined Outcomes Table of Content

O. No.	OUTCOME NAME
1	Increase in number of nursery producers in the target population aware of nonpoint source pollution from field production of specialty crops
2	Students trained in water quality monitoring
3	Number of producers in the target population with increased knowledge of the relationship between land cultivation practices and sediment load to surface water

Outcome #1

1. Outcome Measures

Increase in number of nursery producers in the target population aware of nonpoint source pollution from field production of specialty crops

2. Associated Institution Types

- 1890 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2011	7

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
During storm events, a large volume of sediment can be added to creeks from surface runoff, especially in field plots where the landscape has been disturbed (plowed or disked). Nursery crop growers are not aware of the impact of this management practices on surface water. Water managers and residents that live in the Collins River sub-watershed and the State regulatory agency (Tennessee Department of Environment & Conservation, TDEC) are concerned about this issue because plowing, liming and fertilization of nursery fields can result in the runoff of tons of soil and essential crop nutrient such as phosphorus to inflow creeks (tributaries) of the Collins River. Phosphorus, metals and many organics adsorb to fine silt and clay, resulting in increased potential for surface water contamination. Fine silt and clay are some component of sediments.

What has been done
Hills Creek and Mountain Creek in Warren County Tennessee were sampled for eight (8) consecutive weeks in the summer and fall of 2011. These creeks are major tributaries of the Collins River. Water samples were collected mostly during base flow (normal stream flow) and in very few instances after rainstorm events. The creeks were monitored for the following water quality parameters: Turbidity (because of the strong correlation between turbidity and sediment), Specific conductance, Total dissolved solids, Dissolved oxygen, pH and Temperature. Nitrogen, Phosphorous, Calcium, Magnesium and Potassium were also monitored in the creek water samples.

Results
While growers are being viewed as contributors to surface water quality degradation, our data thus far indicate otherwise. We found during base flow that essential crop nutrients like phosphorus (P) were relatively low in the creeks monitored; the dissolved P in the creeks monitored ranged from 0.02 ppm in Mountain Creek to 0.08 ppm in Hills Creek. It is worth mentioning that the dissolved form of phosphorous usually serves as potential nutrient for algae in

the water and as such may support eutrophication in surface water. However there was no visual evidence of eutrophication in either creek.

4. Associated Knowledge Areas

KA Code	Knowledge Area
112	Watershed Protection and Management
133	Pollution Prevention and Mitigation

Outcome #2

1. Outcome Measures

Students trained in water quality monitoring

2. Associated Institution Types

- 1890 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2011	3

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
There is the need to train future workforce (students) to meet the need of water resource issues, especially in the area of surface and ground water quality assessment and monitoring.

What has been done
Three students (one graduate student and two undergraduate students) hired as student workers are involved in the project; they are gaining both research and extension experiential training.

Results
The students are assisting in instrument calibration and method development for analyses stream water quality.

4. Associated Knowledge Areas

KA Code	Knowledge Area

112	Watershed Protection and Management
133	Pollution Prevention and Mitigation

Outcome #3

1. Outcome Measures

Number of producers in the target population with increased knowledge of the relationship between land cultivation practices and sediment load to surface water

2. Associated Institution Types

- 1890 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2011	7

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Nursery crop production activities can contribute to both point and non-point source pollution. While the majority of ornamental plants in the sub-watershed are field grown, plowing, liming and fertilization of nursery fields can result in the runoff of soil and essential crop nutrients at a watershed scale. There is a strong correlation between surface water quality and land use within a watershed. The residents, including nursery growers, in the Collins River watershed care about the water quality of the water bodies that drain the watershed.

What has been done
Preliminary results of our finding have been shared with some nursery crop growers and county agents in forums such as field days and organized workshops.

Results
Turbidity values for the creeks monitored were relatively low. Turbidity ranged from 2.5 NTU to 7.5NTU. Concentrations of essential crop nutrients such as phosphorus were also found to be low in the creeks monitored; suggesting efficient use of fertilizers by growers. Seven (7) growers in the sub-watershed indicated an increase in knowledge concerning land use and water quality.

4. Associated Knowledge Areas

KA Code	Knowledge Area
112	Watershed Protection and Management
133	Pollution Prevention and Mitigation

V(H). Planned Program (External Factors)

External factors which affected outcomes

- Economy
- Appropriations changes
- Government Regulations
- Competing Public priorities

Brief Explanation

{No Data Entered}

V(I). Planned Program (Evaluation Studies)

Evaluation Results

The primary deliverable of this project is creating a new paradigm for field nursery crop growers, especially in Middle Tennessee, so that they are well educated on surface water quality and watershed management principles. Thus, growers will be able to make improved field-scale decisions in a sub-watershed dominated by nursery crop production systems. The effectiveness (success) of the project will be measured by a) workshop(s) in forums such as field days and nursery associations expos that educate growers and increase their awareness of surface water quality problems and solutions associated with field nursery crop productions. b) heightened local awareness of surface water quality problems and solutions; c) best management practices (BMPs) adopted by growers for individual nursery fields; d) demand by growers for better and efficient fertilizers that are not prone to excessive surface runoff during storm events and e) better trained students in the environmental protection and enhancement area.

Key Items of Evaluation

V(A). Planned Program (Summary)

Program # 6

1. Name of the Planned Program

Food Safety- Keeping food contaminant-free

V(B). Program Knowledge Area(s)

1. Program Knowledge Areas and Percentage

KA Code	Knowledge Area	%1862 Extension	%1890 Extension	%1862 Research	%1890 Research
711	Ensure Food Products Free of Harmful Chemicals, Including Residues from Agricultural and Other Sources				50%
712	Protect Food from Contamination by Pathogenic Microorganisms, Parasites, and Naturally Occurring Toxins				50%
	Total				100%

V(C). Planned Program (Inputs)

1. Actual amount of FTE/SYs expended this Program

Year: 2011	Extension		Research	
	1862	1890	1862	1890
Plan	0.0	0.0	0.0	7.5
Actual Paid Professional	0.0	0.0	0.0	9.5
Actual Volunteer	0.0	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**
0	0	0	298180
1862 Matching	**1890 Matching**	**1862 Matching**	**1890 Matching**
0	0	0	281843
1862 All Other	**1890 All Other**	**1862 All Other**	**1890 All Other**
0	0	0	306748

V(D). Planned Program (Activity)

1. Brief description of the Activity

Experiments will be conducted to:
• Identify risk factors for cross contamination by investigating storage practices of refrigerated foods
• Determine the likelihood and mechanisms of cross contamination by mapping the fingerprints for strains of bacteria from the same refrigerator
• Change potentially unsafe consumer practices through effective intervention strategies,
• Characterize, analyze, and identify antibiotic-resistant bacteria in the farm environment (animal manure, soil) and irrigation water
Train students on isolation and characterization of foodborne pathogens in fresh produce and the farm environment.
Develop and deliver educational materials on hygienic agricultural practices needed to reduce the use of antibiotics and safe fresh produce handling practices.
The development, maintenance, and revision of an educational website and brochure on safe fresh produce handling practices and judicious use of antibiotic in agriculture.

2. Brief description of the target audience

Fresh produce farmers and consumers, households in the metropolitan Nashville area.

3. How was eXtension used?

{No Data Entered}

V(E). Planned Program (Outputs)

1. Standard output measures

2011	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Actual	120	0	0	0

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

Patent Applications Submitted

Year: 2011
Actual: 0

Patents listed

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

2011	Extension	Research	Total
Actual	0	1	1

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

- Website developed to educate consumers on antibiotic resistant pathogens on fresh produce.

Year	Actual
2011	0

Output #2

Output Measure

- Database of characterized antibiotic resistant microorganisms isolated from animal manure.

Year	Actual
2011	0

Output #3

Output Measure

- Database of characterized antibiotic resistant microorganisms isolated from irrigation water and watersheds.

Year	Actual
2011	0

V(G). State Defined Outcomes

V. State Defined Outcomes Table of Content

O. No.	OUTCOME NAME
1	Consumers educated via booklets on the occurrence and prevention of antibiotic resistant pathogens on fresh produce
2	Number of producers practicing judicious use of antibiotics on farms through improved agricultural practices
3	Increase in number of consumers practicing safe fresh produce handling practices via food safety education
4	Number of target consumers with increased knowledge of improved kitchen cleanliness
5	Number of target consumers with increased knowledge of means to reduce the chance of cross contamination
6	Number of target consumers adopting safer food storage practices
7	Number of target consumers adopting improved cleaning skills

Outcome #1

1. Outcome Measures

Consumers educated via booklets on the occurrence and prevention of antibiotic resistant pathogens on fresh produce

2. Associated Institution Types

- 1890 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2011	10

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
A majority of consumers have become increasingly aware of the risks of foodborne pathogens associated with fresh produce; more concern especially if the pathogens were antibiotic resistant. Data obtained in this study will be used to educate on risks of using contaminated irrigation water, animal manure, and safe handling practices. Consumers, who adopt to food safety practices, reduce the risks of cross contaminating their fresh produce.

What has been done
Data from this research was used to develop booklets on consumer?s safe handling of fresh produce. Families were invited for a hands-on workshop on safe handling of fresh produce (use of separate boards for raw meats and vegetables, washing of fresh produce, storage of fruits and vegetables, clean food preparation areas before handling produce).

Results
Hand-on workshop resulted in knowledgeable families on safe handling of fresh produce. Families educated on the risks of antibiotic resistant bacteria in irrigating water and animal manure.

4. Associated Knowledge Areas

KA Code	Knowledge Area
711	Ensure Food Products Free of Harmful Chemicals, Including Residues from Agricultural and Other Sources
712	Protect Food from Contamination by Pathogenic Microorganisms, Parasites, and Naturally Occurring Toxins

Outcome #2

1. Outcome Measures

Number of producers practicing judicious use of antibiotics on farms through improved agricultural practices

2. Associated Institution Types

- 1890 Research

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2011	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Antibiotic resistant foodborne pathogens in fresh produce may cause personal distress, preventable death, and avoidable economic burden. Profiles of antibiotic resistant bacteria obtained from animal manure and irrigation water is applied to educate growers the importance of judicious use of antibiotics in the fields. This contributes to the efforts in reducing the prevalence of antibiotic resistant bacteria in farms.

What has been done
Data from this research was used to develop booklets on antibiotic use in farms to increase food safety. The major focus of the booklets is the guidelines set for the judicious use of antimicrobial drugs to control the use of antibiotics in farming; to prevent the rise of antibiotic resistant bacteria in farming community.

Results
Profiles of antibiotic resistant bacteria in water and animal manure have been constructed. Educational materials, on judicious use of antimicrobial drugs and safe production of fresh produce have been developed and ready to be distributed to farmers.

4. Associated Knowledge Areas

KA Code	Knowledge Area
711	Ensure Food Products Free of Harmful Chemicals, Including Residues from Agricultural and Other Sources
712	Protect Food from Contamination by Pathogenic Microorganisms, Parasites, and Naturally Occurring Toxins

Outcome #3

1. Outcome Measures

Increase in number of consumers practicing safe fresh produce handling practices via food safety education

2. Associated Institution Types

- 1890 Research

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2011	60

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Contaminated produce is a risk to the public. This is an increased concern now, because more consumers have increased consumption of raw greens in their diets due to increased knowledge of the health benefits of consumption of raw greens.

What has been done
A workshop was organized to get the basic information regarding to the current food handling practices, consumers were educated on safe handling of fresh produce.

Results
Consumers are sensitized about the risks of cross contamination of fresh produce with foodborne pathogens. Food preparers (15) adopted new hand washing practices, cleaning of preparation areas before and after food preparation, and generally taking steps to reduce cross contamination. Additionally, 60 consumers (15 educated through workshop; and 45 via mailing booklets) received food safety training and educated on safe food handling practices.

4. Associated Knowledge Areas

KA Code	Knowledge Area
711	Ensure Food Products Free of Harmful Chemicals, Including Residues from Agricultural and Other Sources
712	Protect Food from Contamination by Pathogenic Microorganisms, Parasites, and Naturally Occurring Toxins

Outcome #4

1. Outcome Measures

Number of target consumers with increased knowledge of improved kitchen cleanliness

2. Associated Institution Types

- 1890 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2011	25

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Cross-contamination during food handling, preparation, and storage is one of the major contributing factors in the transmission of foodborne diseases at home. Improving the effectiveness of microbiological control measures in home kitchens is crucial in preventing foodborne diseases.

What has been done
Studies were conducted to evaluate the effectiveness of consumers? cleaning practices in controlling microbiological contamination in home kitchens.

Results
Several practices and socioeconomic characteristics have been identified that may account for the high microbiological contamination of home kitchens. Consumers need to learn effective cleaning methods and to be reminded of the importance of a routine cleaning schedule.

4. Associated Knowledge Areas

KA Code	Knowledge Area
711	Ensure Food Products Free of Harmful Chemicals, Including Residues from Agricultural and Other Sources
712	Protect Food from Contamination by Pathogenic Microorganisms, Parasites, and Naturally Occurring Toxins

Outcome #5

1. Outcome Measures

Number of target consumers with increased knowledge of means to reduce the chance of cross contamination

2. Associated Institution Types

- 1890 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2011	15

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Home refrigerators can harbor pathogenic bacteria that pose a potential to contaminate stored foods. Consumers should be informed about safe handling of refrigerated foods to reduce the risk of food contamination.

What has been done
A total of 122 swabs and food samples were collected from participants' refrigerators through arranged home visits. Microbiological analyses were performed on the collected samples.

Results
The results of microbiological examination indicated poor sanitation and prolonged storage of leftover foods in the refrigerators. Situations needed for improvement of food safety at home and the essential information to develop effective intervention strategies were identified. Information on proper storage of refrigerated leftovers to reduce the chances of cross contamination was disseminated to the participants during home visits.

4. Associated Knowledge Areas

KA Code	Knowledge Area
711	Ensure Food Products Free of Harmful Chemicals, Including Residues from Agricultural and Other Sources
712	Protect Food from Contamination by Pathogenic Microorganisms, Parasites, and Naturally Occurring Toxins

Outcome #6

1. Outcome Measures

Number of target consumers adopting safer food storage practices

2. Associated Institution Types

- 1890 Research

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2011	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Cross-contamination during food preparation and storage is one of the major contributing factors in the transmission of foodborne diseases. Many foods, such as raw poultry, meat, eggs, fish, shellfish, fruits and vegetables have been cited as the potential contamination sources of foodborne pathogens. Proper food handling and storage practices by consumers will reduce the risk of foodborne illness at home.

What has been done
Data on consumer practices are still being collected.

Results
Data on consumer practices are still being collected.

4. Associated Knowledge Areas

KA Code	Knowledge Area
711	Ensure Food Products Free of Harmful Chemicals, Including Residues from Agricultural and Other Sources
712	Protect Food from Contamination by Pathogenic Microorganisms, Parasites, and Naturally Occurring Toxins

Outcome #7

1. Outcome Measures

Number of target consumers adopting improved cleaning skills

2. Associated Institution Types

- 1890 Research

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2011	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Consumer hygiene practices have been frequently reported to be inefficient in controlling bacterial growth and survival in the kitchen environment. Practice of effective cleaning methods by consumers will reduce microbial contamination in home kitchens.

What has been done
Data on consumer practices are still be collected.

Results
Data on consumer practices are still be collected.

4. Associated Knowledge Areas

KA Code	Knowledge Area
711	Ensure Food Products Free of Harmful Chemicals, Including Residues from Agricultural and Other Sources
712	Protect Food from Contamination by Pathogenic Microorganisms, Parasites, and Naturally Occurring Toxins

V(H). Planned Program (External Factors)

External factors which affected outcomes

- Natural Disasters (drought, weather extremes, etc.)
- Economy
- Appropriations changes

Brief Explanation

{No Data Entered}

V(I). Planned Program (Evaluation Studies)

Evaluation Results

This project was evaluated on the following criteria.

1. Number of peer-reviewed articles reported:

A peer-reviewed research paper has been published in the Food Protection Trends, a scientific journal broadly distributed to food safety professionals and government regulatory agencies.

2. Number of target consumers with increased knowledge of improved kitchen cleanliness:

Twenty-five participants have learned proper cleaning methods to improve kitchen cleanliness.

3. Number of target consumers with increased knowledge of means to reduce the chance of cross contamination:

Fifteen participants have learned proper storage of refrigerated leftovers to reduce the chances of cross contamination.

Key Items of Evaluation

Twenty-five participants have learned proper cleaning methods to improve kitchen cleanliness.

Fifteen participants have learned proper storage of refrigerated leftovers to reduce the chances of cross contamination.

V(A). Planned Program (Summary)

Program # 7

1. Name of the Planned Program

Childhood Obesity - Youth Active and Media Savvy

V(B). Program Knowledge Area(s)

1. Program Knowledge Areas and Percentage

KA Code	Knowledge Area	%1862 Extension	%1890 Extension	%1862 Research	%1890 Research
703	Nutrition Education and Behavior				50%
724	Healthy Lifestyle				25%
806	Youth Development				25%
	Total				100%

V(C). Planned Program (Inputs)

1. Actual amount of FTE/SYs expended this Program

Year: 2011	Extension		Research	
	1862	1890	1862	1890
Actual Paid Professional	0.0	0.0	0.0	6.9
Actual Volunteer	0.0	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**
0	0	0	216573
1862 Matching	**1890 Matching**	**1862 Matching**	**1890 Matching**
0	0	0	204707
1862 All Other	**1890 All Other**	**1862 All Other**	**1890 All Other**
0	0	0	222796

V(D). Planned Program (Activity)

1. Brief description of the Activity

The Youth Active and Media Savvy (YAMS) project is intended to encourage healthier lifestyles by promoting cultural empowerment to teach weight management skills to African American youth at risk for

adult obesity. This research incorporates cultural empowering techniques with media literacy education. Media literacy is an effective strategy because it teaches individuals to deconstruct media messages and identify the sponsor's motives in representing the intended audience's point of view. Exploring and integrating relevant attitudes, values, goals, and practices of the African American experience and African traditions will help build cultural empowerment. This project supports the USDA-NIFA strategic goal of preventing childhood obesity and the priority areas of human health and obesity as it relates to nutrition and youth and families development. This project addresses the national need to reduce childhood obesity by developing and delivering a culturally empowering intervention that promotes healthy dietary habits, physical activity, and media literacy to historically disadvantaged youth.

2. Brief description of the target audience

African American children, ages 8 to 14 years, living in Davidson County, Tennessee.

3. How was eXtension used?

An Extension Specialist whose area is in health education, conducted a kitchen hygiene and safety tutorial for the program participants.

V(E). Planned Program (Outputs)

1. Standard output measures

2011	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Actual	9	24	9	2

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

Patent Applications Submitted

Year: 2011

Actual: 0

Patents listed

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

2011	Extension	Research	Total
Actual	0	0	0

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

- Number of focus groups held to determine perceived benefits, value and needs for relationships by probing habits, needs, preferences, values and lifestyles associated with food and media.

Year	Actual
2011	2

Output #2

Output Measure

- Number of summer camps held to collect data and educate youth in healthy eating and physical activities.

Year	Actual
2011	1

V(G). State Defined Outcomes

V. State Defined Outcomes Table of Content

O. No.	OUTCOME NAME
1	Number of target youth attending summer camps (Children Engage in Healthy Levels of Physical Activity).
2	Youth with intentions to limit television viewing, internet surfing and video games to less than one hour per day each (Children Engage in Healthy Levels of Physical Activity).
3	Target youth with intentions to increase fruit and vegetable intake (Children Practicing Healthy Eating).
4	Target youth with intent to increase daily physical activities (Children Engage in Healthy Levels of Physical Activity).
5	Number of youth with intent to limit fast food meals to fewer than four per month (Children Practice Healthy Eating).
6	Number of target youth with increases in self-efficacy and self-esteem.
7	Number of target youth maintaining healthy behaviors 12 months post-intervention (Children Engage in Healthy Levels of Physical Activity).

Outcome #1

1. Outcome Measures

Number of target youth attending summer camps (Children Engage in Healthy Levels of Physical Activity).

2. Associated Institution Types

- 1890 Research

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2011	8

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
African-Americans have disproportionately higher rates of obesity and reportedly watch more television than other Americans. Although many social, cultural, and environmental factors influence childhood and adolescent risk for obesity, marketing may have an especially powerful impact on food and beverage consumption.
Using a summer camp setting, YAMS was developed to combat the influences of media, insufficient nutrient intake and excess caloric consumption, and inactivity on childhood obesity through media literacy, nutrition education, and physical activity, respectively.

What has been done
A pilot, one-week long camp was held in July 2011, involving participants ages 9 to 15.
A series of surveys and questionnaires were administered throughout the camp session to record the camper's understanding of media influence, nutrition and physical activity attitudes and behaviors, and the likeability of daily camp activities.
Camp participants were instructed using the NIH's Media Smart Youth curriculum, completing two lessons per day (10 lessons total)
Lunch was prepared by the campers, who received food safety and preparation lessons beforehand.
Campers were involved in 30 - 45 minutes of physical activity a day ranging from exercise DVD's, walks around park trails, and swimming.

Results
Surveys and pre/post curriculum assessments indicate that the subjects? understanding of media, nutrition, and physical activity improved significantly upon completion of the pilot camp. Recorded observations affirm that the participants found the material relevant and stimulating.

Negative outcomes include a general impression that the program 'felt like school', and schedule delays and/or time constraints.

4. Associated Knowledge Areas

KA Code	Knowledge Area
703	Nutrition Education and Behavior
724	Healthy Lifestyle
806	Youth Development

Outcome #2

1. Outcome Measures

Youth with intentions to limit television viewing, internet surfing and video games to less than one hour per day each (Children Engage in Healthy Levels of Physical Activity).

2. Associated Institution Types

- 1890 Research

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2011	3

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Media usage contributes to childhood obesity by reducing the amount of daily physical activity and by encouraging the consumption of high calorie foods via advertising and marketing of primarily candy, cereal and fast food.

What has been done
Camp participants learned to: 1) analyze and recognize marketing techniques used to gain viewers' attention; 2) evaluate obvious and subtle messages for accuracy and consistency with what they learned is healthy; 3) expressed their thoughts by developing their own messages.

Results
Youth presented created materials to their parents during pilot camp week (July 25 - 28, 2011):
Rap song about YAMS program written by camp participants.
Video of youth performing the rap.
Posters created by youth promoting healthy habits.

4. Associated Knowledge Areas

KA Code	Knowledge Area
724	Healthy Lifestyle
806	Youth Development

Outcome #3

1. Outcome Measures

Target youth with intentions to increase fruit and vegetable intake (Children Practicing Healthy Eating).

2. Associated Institution Types

- 1890 Research

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2011	8

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Overweight and obesity of youth are forms of malnutrition that are linked to low consumption of fruits and vegetables. Fruits and vegetables are high in nutrients, such as antioxidants, and low in calories. At least five servings are recommended daily for good health and to prevent cancer.

What has been done
Participants prepared and consumed nutritious meals and snacks that included fruits and vegetables. Meals and snacks provided 3 to 5 servings of fruit and vegetables per day.

Results
Campers indicated they understood the importance of proper nutrition and increasing intake of fruits and vegetables. Campers committed to increase fruit and vegetable intake.

4. Associated Knowledge Areas

KA Code	Knowledge Area
703	Nutrition Education and Behavior
724	Healthy Lifestyle

Outcome #4

1. **Outcome Measures**

   Target youth with intent to increase daily physical activities (Children Engage in Healthy Levels of Physical Activity).

2. **Associated Institution Types**

   - 1890 Research

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2011	8

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Lack of physical activity is linked to overweight and obesity.

What has been done
Participants learned the importance of physical activity in promoting health and participated in daily physical activities.

Results
The youth committed to increase their daily physical activity after the week of camp.

4. Associated Knowledge Areas

KA Code	Knowledge Area
724	Healthy Lifestyle
806	Youth Development

Outcome #5

1. **Outcome Measures**

   Number of youth with intent to limit fast food meals to fewer than four per month (Children Practice Healthy Eating).

2. **Associated Institution Types**

- 1890 Research

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2011	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Eating fast food contributes to childhood obesity by increasing the amount and type of calories consumed. It is recommended that children limit their consumption of high fat/high calorie foods which are typically served at fast food restaurants.

What has been done
Participants read calories tables of fast food menus to learn about the amount of calories from fat and sugar in their favorite fast foods. Campers also learned about the importance of portion sizes and limiting soft drink intake.

Results
Youth indicated they understood the benefits of reducing fast-food consumption, it is too early to tell if their understanding of the issue will translate in to action.

4. Associated Knowledge Areas

KA Code	Knowledge Area
703	Nutrition Education and Behavior
724	Healthy Lifestyle

<u>Outcome #6</u>

1. Outcome Measures

Number of target youth with increases in self-efficacy and self-esteem.

2. Associated Institution Types

- 1890 Research

3a. Outcome Type:

Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Actual
2011	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Self-esteem is important to building self-efficacy needed to read food labels, prepare healthy meals, etc.

What has been done
NA- the pilot group tested surveys and camp materials but was not given a self-esteem assessment.

Results
none, self-esteem assessment not performed.

4. Associated Knowledge Areas

KA Code	Knowledge Area
806	Youth Development

Outcome #7

1. Outcome Measures

Number of target youth maintaining healthy behaviors 12 months post-intervention (Children Engage in Healthy Levels of Physical Activity).

Not Reporting on this Outcome Measure

V(H). Planned Program (External Factors)

External factors which affected outcomes

- Economy
- Appropriations changes

Brief Explanation

V(I). Planned Program (Evaluation Studies)

Evaluation Results

Evaluation assessments are not quantified as of yet, but initial review of the measurements show the program is on track . Two items were noted that need to be corrected: a self-esteem evaluation was not performed during the camp and some of the instructional modules were not as appealing to the campers as was intended. Steps will be taken to ensure that all evaluations will be performed in future camps. Also modifications to modules are being made to make them more enjoyable for the recipients.

Key Items of Evaluation