2011 University of Tennessee Research and Extension and Tennessee State University Extension Combined 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 Agricultural Research and Extension System. The University of Tennessee Extension and the Tennessee Agricultural Experiment Station (UT AgResearch) comprise the 1862 institution and the Tennessee State University Cooperative Extension Program and the Tennessee State University Institute for Agricultural and Environmental Research comprise the 1890 institution.

This report represents the combined efforts of the University of Tennessee (UT) Extension, the Tennessee Agricultural Experiment Station (UT AgResearch), and the Tennessee State University (TSU) Cooperative Extension Program. UT and TSU Extension extend the knowledge and expertise of the state's two land grant institutions to the 6.2 million people of Tennessee through agents and specialists in all 95 counties.

Our work is providing education that produces solutions to societal, economic and environmental issues. Engagement of the state's citizens occurs where they live, work and play through hundreds of programs which are planned, conducted and evaluated by UT and TSU Extension. In FY 2011, Extension continued its excellence in economic development and outreach.

Extension's Excellence in Economic Development: Extension's educational programs in 4-H youth development, agriculture and natural resources, family and consumer sciences and resource development produce substantial returns for Tennessee. Using research, questionnaires, observations and sales records, an estimated impact was $537 million for FY 2011. It was estimated that for every $1 in public funds invested in Extension, $9.38 was returned to the people of Tennessee in increased revenue, increased savings and one time capital purchases.

The recurring economic impacts were estimated at over $255 million. These recurring economic values include increased revenue, increased savings and one time capital purchases associated with four Extension programs: crop variety trials/pest control, forage systems, 4-H camping, and optimizing beef production. Using the United States Department of Defense formula, an estimated 5,119 jobs in Tennessee were created or maintained because of the recurring economic impacts produced by Extension.

The one time, non recurring economic values were estimated at over $282 million from seven Extension programs. The programs included in this analysis were nutrition education, health literacy, Tennessee Saves, 4-H scholarships, farm financial planning, better beef marketing, and volunteerism.

Extension's Excellence in Outreach: UT and TSU Extension professionals and the volunteers they recruited, trained and managed made 5.6 million direct contacts through group meetings, on site visits, phone calls, direct mail, and client visits to local Extension offices. In addition, indirect educational methods included mass media, exhibits, and Internet resources.

Data for the Extension portion of this report utilized the Extension reporting system, System for University Planning, Evaluation and Reporting (SUPER). In 2011, this reporting system was demonstrated

to Extension administrative teams in two states who regard the system as a national model for effective program planning and evaluation.

Total Actual Amount of professional FTEs/SYs for this State

Year: 2011	Extension		Research	
	1862	1890	1862	1890
Plan	450.0	43.0	300.0	0.0
Actual	450.0	53.0	356.9	0.0

II. Merit Review Process

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

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

2. Brief Explanation

The merit review and peer review processes established in the latest Plan of Work were implemented in FY 2011. The external university panel review was completed with program planning and evaluation experts from Virginia Tech and the University of Maryland. This review panel found that the Tennessee Plan of Work was of exceptional quality. The panel's major suggestion was to continue a strong needs assessment and evaluation process focused on measuring substantial outcome indicators.

III. Stakeholder Input

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

- Targeted invitation to traditional stakeholder individuals
- Targeted invitation to non-traditional stakeholder individuals
- Targeted invitation to selected individuals from general public
- Survey specifically with non-traditional groups
- Survey of selected individuals from the general public
- Other (Local and State Advisory Councils)

Brief explanation.

In FY 2011, UT and TSU Extension made 10,256 contacts for needs assessment purposes, with these methods highlighted:

- 327 advisory committee meetings
- 89 focus groups
- 1560 inteviews with key informants

Tennessee Extension Agents placed special emphasis on involving youth and other under represented groups in needs assessment activities. Of these needs assessment contacts, 30% were young people under 18 years of age.

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
- Open Listening Sessions
- Needs Assessments

Brief explanation.

All Extension Agents receive instruction in selecting needs assessment strategies and in selecting individuals for Advisory Committees. Community leaders selected for Advisory Committees are chosen to represent the diversities (i.e., gender, age, racial/ethnic, socio-economic, political, educational, etc.) of the county or area served. Extension Agents recruit individuals who have participated in past and current Extension programs; and they recruit individuals who have not used Extension to serve on local advisory committees and participate in open listening sessions.

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
- Meeting with the general public (open meeting advertised to all)
- Survey specifically with non-traditional individuals

Brief explanation.

The System for University Planning, Evaluation and Reporting (SUPER) tracks Extension's needs assessment efforts across Tennessee. In FY 2011, Extension conducted 89 different focus groups and 1560 interviews with key informants. Regarding interviews with key informants, 45% involved individuals who were not previously active in Extension (defined as those not previously on an Extension mailing list). These individuals were identified in various ways such as asking Advisory Committee members and community leaders to suggest names.

3. A statement of how the input will be considered

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

Brief explanation.

The State Action Agendas (state plans of work) delineated programs, curricula, partners and

resources for addressing stakeholder concerns. Individual plans were created and implemented by Extension Agents and Specialists based on the results of the needs assessment. The plans were monitored and adjusted by Regional Program Leaders and Department Heads. In FY 2011, stakeholder input was used to identify volunteer leaders, identify new audiences, and identify and secure locations for Extension programs. Stakeholder input was used to modify four programs, as described below:

The UT Department of Family and Consumer Sciences conducted an extensive strategic planning effort that led to the creation of a new Extension program called **Senior Living**. This program is targeted to the needs of Tennessee's aging population and in FY2011, Extension personnel and the volunteers they trained made 13,003 direct educational contacts in 50 Tennessee counties. Topics taught to the elderly and their caregivers included: living environments, food safety, relationships, assets and retirement, and nutritional needs of the elderly.

UT Extension entered the third year as a partner in the **Tennessee Farmland Legacy Partnership**, a coalition of government agencies, farmer organizations, and community groups working to keep the state's farmland viable. Collaborators include Cumberland Region Tomorrow (a grassroots planning organization in Middle Tennessee), Tennessee Department of Agriculture, The Land Trust for Tennessee, and USDA Natural Resources Conservation Service. In FY 2011, UT Extension placed greater emphasis on estate planning.

In response to the economic downturn, UT Extension entered its third year of a revised **Tennessee Saves** program. Stakeholder input has been instrumental in changing the focus of Extension's Tennessee Saves programming from savings and investment education to coping with economic loss.

UT Extension introduced **the Tennessee Yards and Neighborhoods** program to focus attention on landscape management practices that would conserve water, promote wildlife habitat, and reduce surface and groundwater pollution. The pilot program was completed by 310 people in six counties.

Brief Explanation of what you learned from your Stakeholders

We continued to implement our State Extension Strategic Plan for 2010-2020. This document, titled Advancing Tennessee, is a guide for identifying emerging issues, redirecting Extension programs, building state action agendas and setting program priorities. Stakeholder input at the local, regional and statewide level is used to monitor and adjust deployment of the strategic plan. To illustrate this important process, consider that stakeholder input was used to modify these programs in FY 2011:

- **Senior Living** - Tennesseans are concerned about the elderly in all parts of the state: rural, urban and suburban. Specifically, concerns were expressed about helping seniors to improve their understanding of food safety and nutritional needs; relationships, assets and retirement, and living environments.
- **Tennessee Farmland Legacy Partnership** - In FY 2011, UT Extension placed greater emphasis on estate planning to address stakeholders concerns.
- **Tennessee Saves** -In addition to coping with the nationwide economic downturn, Tennesseans are still recovering from historic 2010 floods and numerous 2011 tornados that touched every region of the state.
- **Tennessee Yards and Neighborhoods** - Tennesseans are concerned reducing surface and groundwater pollution. This was emphasized with the high-demand for Extension's new Tennessee Yards and Neighborhoods program.

IV. Expenditure Summary

1. Total Actual Formula dollars Allocated (prepopulated from C-REEMS)			
Extension		Research	
Smith-Lever 3b & 3c	1890 Extension	Hatch	Evans-Allen
8536563	2801819	5965383	0

2. Totaled Actual dollars from Planned Programs Inputs				
	Extension		Research	
	Smith-Lever 3b & 3c	1890 Extension	Hatch	Evans-Allen
Actual Formula	8536563	2773795	5491117	0
Actual Matching	37102139	2773795	35148163	0
Actual All Other	7323219	155385	9381736	0
Total Actual Expended	52961921	5702975	50021016	0

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

V. Planned Program Table of Content

V(A). Planned Program (Summary)

Program # 1

1. Name of the Planned Program

4-H Positive Youth Development

V(B). Program Knowledge Area(s)

1. Program Knowledge Areas and Percentage

KA Code	Knowledge Area	%1862 Extension	%1890 Extension	%1862 Research	%1890 Research
803	Sociological and Technological Change Affecting Individuals, Families, and Communities	20%	20%	0%	
806	Youth Development	80%	80%	0%	
	Total	100%	100%	0%	

V(C). Planned Program (Inputs)

1. Actual amount of FTE/SYs expended this Program

Year: 2011	Extension		Research	
	1862	1890	1862	1890
Plan	138.0	13.0	0.0	0.0
Actual Paid Professional	153.0	18.0	0.0	0.0
Actual Volunteer	117.0	8.0	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
2902432	952618	0	0
1862 Matching	**1890 Matching**	**1862 Matching**	**1890 Matching**
12614729	952618	0	0
1862 All Other	**1890 All Other**	**1862 All Other**	**1890 All Other**
41000	0	0	0

V(D). Planned Program (Activity)

1. Brief description of the Activity

• **Clubs/Project Groups -** In 94 Tennessee counties, over 4,000 4-H clubs were organized where workforce preparation was the major emphasis. Project work was emphasized, and the experiential learning model was used to highlight jobs and careers aligned with 4-H projects. All program efforts were aimed at teaching practical skills which align with jobs and careers.

• **School Enrichment -** Various school enrichment programs in 50 Tennessee counties focused on science, engineering and technology. Youth were exposed to jobs and careers associaited with science fields.

• **Mass media** - Mass media was used to inform parents, participants and stakeholders about program opportunities and achievements.

• **Youth from Under-Served and Limited Resource Families:** In FY2011, TSU Extension 4-H Youth Development programs placed special emphasis on SET programs in clubs, afterschool settings and other venues to reach youth. The ultimate goal was to increase science literacy among the state's young people. TSU Extension will reach under-served and limited resource youth.

2. Brief description of the target audience

Tennessee youth in grades 4-12 were targeted for this program. To encourage participation of underserved and minority youth, the majority of programs were delievered in public schools.

3. How was eXtension used?

Tennessee is represented by 108 eXtension members in 42 of the 59 approved Communites of Practice (CoP). Tennessee Extension personnel have addressed over 800 Frequently Asked Questions through eXtension.

This Positive Youth Development Planned Program was enhanced through the service of seven Tennesseee Extension personnel on the "For Youth, For Life" and "Military Families" CoP. Tennessee Extension personnel shared implementation strategies, outcome measurement, and evaluation protocols with their CoP colleagues.

V(E). Planned Program (Outputs)

1. Standard output measures

2011	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Actual	93570	2424838	490005	1562832

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	0	4

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

- Number of volunteers utilized in delivering this program.

Year	Actual
2011	3680

Output #2

Output Measure

- Number of exhibits produced.

Year	Actual
2011	1060

V(G). State Defined Outcomes

V. State Defined Outcomes Table of Content

O. No.	OUTCOME NAME
1	Achieving Goals: Number of youth who now put their goal in writing.
2	Achieving Goals: Number of youth who now report they set high goals.
3	Achieving Goals: Number of high school youth who have set a goal for their job or career.
4	Communicating: Number of youth who can express ideas with a poster, exhibit, or other display.
5	Communicating: Number of youth who can use technology to help themselves express ideas.
6	Communicating: Number of youth who have learned at least five jobs in which communication skills are important.
7	Communicating (Public Speaking): Number of youth who can deal with their nervousness when giving a speech or talk.
8	Communicating (Public Speaking): Number of youth who can select a topic for a speech or talk.
9	Communicating (Public Speaking): Number of youth who can speak loudly enough to be heard when giving a speech or talk.
10	Communicating (Public Speaking): Number of youth who feel comfortable sharing their thoughts and feelings in a speech or talk.
11	SET: Number of youth who can design a scientific procedure to answer a question.

Outcome #1

1. Outcome Measures

Achieving Goals: Number of youth who now put their goal in writing.

2. Associated Institution Types

- 1862 Extension
- 1890 Extension

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2011	15184

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done

Results

4. Associated Knowledge Areas

KA Code	Knowledge Area
806	Youth Development

Outcome #2

1. Outcome Measures

Achieving Goals: Number of youth who now report they set high goals.

2. Associated Institution Types

- 1862 Extension
- 1890 Extension

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2011	17079

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done

Results

4. Associated Knowledge Areas

KA Code	Knowledge Area
806	Youth Development

Outcome #3

1. Outcome Measures

Achieving Goals: Number of high school youth who have set a goal for their job or career.

2. Associated Institution Types

- 1862 Extension
- 1890 Extension

3a. Outcome Type:

Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Actual
2011	11574

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done

Results

4. Associated Knowledge Areas

KA Code	Knowledge Area
806	Youth Development

Outcome #4

1. Outcome Measures

Communicating: Number of youth who can express ideas with a poster, exhibit, or other display.

2. Associated Institution Types

- 1862 Extension
- 1890 Extension

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2011	22336

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done

Results

4. Associated Knowledge Areas

KA Code	Knowledge Area
806	Youth Development

Outcome #5

1. Outcome Measures

Communicating: Number of youth who can use technology to help themselves express ideas.

2. Associated Institution Types

- 1862 Extension
- 1890 Extension

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2011	14747

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done

Results

4. Associated Knowledge Areas

KA Code	Knowledge Area
806	Youth Development

Outcome #6

1. Outcome Measures

Communicating: Number of youth who have learned at least five jobs in which communication skills are important.

2. Associated Institution Types

- 1862 Extension
- 1890 Extension

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2011	14240

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done

Results

4. Associated Knowledge Areas

KA Code	Knowledge Area
806	Youth Development

Outcome #7

1. Outcome Measures

Communicating (Public Speaking): Number of youth who can deal with their nervousness when giving a speech or talk.

2. Associated Institution Types

- 1862 Extension
- 1890 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2011	37274

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done

Results

4. Associated Knowledge Areas

KA Code	Knowledge Area
806	Youth Development

Outcome #8

1. Outcome Measures

Communicating (Public Speaking): Number of youth who can select a topic for a speech or talk.

2. Associated Institution Types

- 1862 Extension
- 1890 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2011	42918

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done

Results

4. Associated Knowledge Areas

KA Code	Knowledge Area
806	Youth Development

Outcome #9

1. Outcome Measures

Communicating (Public Speaking): Number of youth who can speak loudly enough to be heard when giving a speech or talk.

2. Associated Institution Types

- 1862 Extension
- 1890 Extension

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2011	32936

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done

Results

4. Associated Knowledge Areas

KA Code	Knowledge Area
806	Youth Development

Outcome #10

1. Outcome Measures

Communicating (Public Speaking): Number of youth who feel comfortable sharing their thoughts and feelings in a speech or talk.

2. Associated Institution Types

- 1862 Extension
- 1890 Extension

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2011	28257

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done

Results

4. Associated Knowledge Areas

KA Code	Knowledge Area
806	Youth Development

Outcome #11

1. Outcome Measures

SET: Number of youth who can design a scientific procedure to answer a question.

2. Associated Institution Types

- 1862 Extension
- 1890 Extension

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2011	19875

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

The National Science Foundation's (NSF), Science and Engineering Indicators 2012, concluded that most Tennessee 4th and 8th graders did not demonstrate proficiency in the knowledge and

skills taught at their grade level in science and mathematics.

What has been done

In FY 2011, UT and TSU Extension made 169,619 direct educational contacts to help youth gain new knowledge, acquire new skills and increase aspirations regarding science, engineering, and technology. Programs were delivered through 4,495 group meetings including organized clubs, camps, project groups and school enrichment by Extension 4-H Agents and volunteers. Educational programs were reinforced by 134 exhibits, 176 news articles, 14 radio programs and seven television programs.

Results

Because of this program, more than 19,000 youth can now design a scientific procedure to answer a question. Other impacts include:
*39% report they can analyze the results of a scientific investigation.
*55% report they can ask a question that can be answered by collecting data.
*41% report they design a scientific procedure to answer a question.
*51% report they can record data accurately.
*52% report they can use specific scientific knowledge to form a question.

4. Associated Knowledge Areas

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

V(H). Planned Program (External Factors)

External factors which affected outcomes

- Competing Public priorities

Brief Explanation

V(I). Planned Program (Evaluation Studies)

Evaluation Results

2,745 youth were involved in evaluated programs that focused on science, engineering, and technology. The evlauation involved the 4-H SCience Process Skills Inventory developed at Orgeon State University with an additional validation study at the University of Tennessee. Intact groups of 4-H youth were randomly selected for post-test only questionnaires. The questionnaires were valid and reliable instruments from the University of Tennessee Program Evaluation Network, an online tool used to measure and evaluate statewide outcomes. The questionnaires used a four-part Likert scale (never, sometimes, usually, and always) to discern intermediate and long-term behaviors of program participants.

2,338 youth were involved in evaluated programs that focused on intermediate skills related to science, engineering, and technology. Completed questionnaires were obtained from 471 youth (20% of the total program participants). The following outcome indicator data was obtained:

Because of their 4-H experiences,

- 39% report they can analyze the results of a scientific investigation.
- 55% report they can ask a question that can be answered by collecting data.
- 51% report they can record data accurately.
- 52% report they can use specific scientific knowledge to form a question.

407 youth were involved in evaluated programs that focused on long-term skills related to science, engineering, and technology. Completed questionnaires were obtained from 231 youth (57% of the total program participants). The following outcome indicator data was obtained:

Because of their 4-H experiences,

- 44% report they can communicate a scientific procedure to others.
- 43% report they can create a display to communicate scientific data and observations.
- 48% report they can use data to create a graph for presentation to others.
- 54% report they can use models to explain scientific results.
- 48% report they can use science terms to share scientific results
- 50% report they can use the results of their investigation to answer the question they had asked.

Key Items of Evaluation

2,338 youth were involved in evaluated programs that focused on intermediate skills related to science, engineering, and technology. Completed questionnaires were obtained from 471 youth (20% of the total program participants). The following outcome indicator data was obtained:

Because of their 4-H experiences,

- 39% report they can analyze the results of a scientific investigation.
- 55% report they can ask a question that can be answered by collecting data.
- 51% report they can record data accurately.
- 52% report they can use specific scientific knowledge to form a question.

V(A). Planned Program (Summary)

Program # 2

1. Name of the Planned Program

Agronomic Crop Systems

V(B). Program Knowledge Area(s)

1. Program Knowledge Areas and Percentage

KA Code	Knowledge Area	%1862 Extension	%1890 Extension	%1862 Research	%1890 Research
205	Plant Management Systems	50%	50%	0%	
211	Insects, Mites, and Other Arthropods Affecting Plants	5%	5%	0%	
212	Pathogens and Nematodes Affecting Plants	5%	5%	0%	
601	Economics of Agricultural Production and Farm Management	40%	40%	0%	
	Total	100%	100%	0%	

V(C). Planned Program (Inputs)

1. Actual amount of FTE/SYs expended this Program

Year: 2011	Extension		Research	
	1862	1890	1862	1890
Plan	86.0	8.0	0.0	0.0
Actual Paid Professional	13.0	2.0	0.0	0.0
Actual Volunteer	10.0	1.0	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**
256096	84054	0	0
1862 Matching	**1890 Matching**	**1862 Matching**	**1890 Matching**
1113064	84054	0	0
1862 All Other	**1890 All Other**	**1862 All Other**	**1890 All Other**
57577	0	0	0

V(D). Planned Program (Activity)

1. Brief description of the Activity

The Extension portion of this report includes cotton, irrigation, entomology, plant pathology and row crops management and marketing issues. This report is organized via the Innovation-Decision Process (Rogers, 1995). It is important to organize the agronomic crop systems planned program activity in this way because producers of various row crops, in various locations in the state are in different stages of this process for the array of research-based practices. Based on needs assessments conducted by Extension Specialists, the following pactices were targeted in FY 2011: conservation-tillage; planting insect-tolerant crops; planting herbicide-tolerant crops; spaying crops with foliar fungicide to manage disease; using recommended varieties (based on UT field trial results)

Knowledge: Newspaper articles, radio programs, websites and newsletters were used to build awareness of UT Extension resources and practices for more profitable production. Mass media was also used to highlight pests and pesticides in a timely manner.

Persuasion: Farm visits and group meetings were used to showcase practices.

Decision: Group meetings and classes were held in which Extension specialists delivered detailed instruction to producers.

Implementation: On-farm demonstrations were conducted, particularly in the 31 West Tennessee counties, to highlight research-based practices. To the extent possible, integrated research and extension was conducted such as result demonstrations and test plots in all 31 West Tennessee counties.

Confirmation: Farm visits and telephone calls were made to assist producers in the continued use of the practices, respond to environmental factors, and realize greater profits.

2. Brief description of the target audience

The primary audience for this program was Tennessee row crop producers, and the secondary audience were the professionals, business owners/cooperatives, and government officials who serve row crop producers.

3. How was eXtension used?

Tennessee is represented by 108 eXtension members in 42 of the 59 approved Communites of Practice (CoP). Tennessee Extension personnel have addressed over 800 Frequently Asked Questions through eXtension.

ThisAgronomic Crop Systems Planned Program was enhanced through the service of three Tennessee Extension personnel and one stakeholder on the "Cotton" CoP and one Extension personnel and one stakeholder on the "Pesticide Environmental Stewardship" CoP. Tennessee Extension personnel shared implementation strategies, outcome measurement, and evaluation protocols with their CoP colleagues.

V(E). Planned Program (Outputs)

1. Standard output measures

2011	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Actual	53297	358000	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	15	0	15

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

- Number of exhibits displayed to promote awareness and participation in this planned program.

Year	Actual
2011	1

Output #2

Output Measure

- Number of research-based publications distributed as part of this program.

Year	Actual
2011	2700

V(G). State Defined Outcomes

V. State Defined Outcomes Table of Content

O. No.	OUTCOME NAME
1	Row Crops Production: Number of participants who implemented one or more management practices based on data provided by UT (e.g., conservation tillage, plant population, growth retardants, IPM strategies, disease and weed control).
2	Row Crops Production: Number of producers, farm workers and other ag professionals who received pesticide certification, recertification and pesticide safety training.
3	Row Crops Production: Number of participants who improved their income by following the recommended best management practices for crop production, including plant pest management.

Outcome #1

1. Outcome Measures

Row Crops Production: Number of participants who implemented one or more management practices based on data provided by UT (e.g., conservation tillage, plant population, growth retardants, IPM strategies, disease and weed control).

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2011	1441

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done

Results

4. Associated Knowledge Areas

KA Code	Knowledge Area
205	Plant Management Systems

Outcome #2

1. Outcome Measures

Row Crops Production: Number of producers, farm workers and other ag professionals who received pesticide certification, recertification and pesticide safety training.

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2011	30318

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Tennessee's Pesticide Safety Education Program (PSEP) educates commercial and private pesticide applicators. New workers commonly lack necessary training which is essential for them to be aware of pesticide safety related matters.

What has been done
The PSEP Program offers monthly training for individuals who would like to obtain commercial pesticide applicator certification. Training materials were developed for county offices so they could provide training to their clientele.

Results
During 2011, 12 certification meetings were held with approximately 250 individuals attending initial certification. Training materials were used to educate approximately 10,000 private applicators during 2011 in the areas of pesticide safety, pest management, proper pest identification and other areas of pest control.By improving applicators' knowledge they will be more likely to target specific pests, reduce harm to human health and/or the environment, and reduce pest populations.

The certification cycle is a three year cycle and during the past three years, the PSEP program has provided training for more than 20,000 pesticide applicators located across the state.

The PSEP also provides educational materials for pesticide applicators during annual recertification workshops. During 2011, two workshops were held so commercial applicators would be able to keep and maintain their certification. These meetings helped 68 individuals to retain their certification.

4. Associated Knowledge Areas

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

Outcome #3

1. Outcome Measures

Row Crops Production: Number of participants who improved their income by following the recommended best management practices for crop production, including plant pest management.

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Actual
2011	462

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Cotton production in Tennessee has become increasing difficult with the development of more herbicide resitant weeds.

What has been done
In 2011, Extension focused on helping producers to use existing technologies to manage problem weeds. More than 600 group meetings were held with cottton producers with 3,244 contacts.

Results
*Producers increased yield by 159 pounds by selecting top yielding varieities on 347,219 acres of cotton, earning an extra $25 million.
*462 cotton producers reports a $7.6 million reduction in pest control costs by following recommended control strategic for insects, weeds, or plant diseases.

4. Associated Knowledge Areas

KA Code	Knowledge Area
211	Insects, Mites, and Other Arthropods Affecting Plants
601	Economics of Agricultural Production and Farm Management

V(H). Planned Program (External Factors)

External factors which affected outcomes

- Natural Disasters (drought, weather extremes, etc.)
- Economy
- Competing Programmatic Challenges

Brief Explanation

Cotton is an indeterminate crop grown as an annual and requires a unique level of management. Cotton is grown on a multitude a soil types and under many different environments in Tennessee. Rolling hills, creek bottoms and alluvial flood plains make Tennessee cotton production a challenge. Since Tennessee is on the Northern edge of the Cotton Belt, growers show a particular interest in earliness management. Cotton is produced in 23 counties statewide with the majority grown in the western part of the state.

V(I). Planned Program (Evaluation Studies)

Evaluation Results

In Tennessee, limited cotton acres are grown under irrigation. Tennessee has long been a proponent of conservation and no-tillage systems. In 2011, approximately 52% of the cotton was grown no-till and an additional 24% was grown using some form of conservation tillage. Additionally, Tennessee has rapidly adopted the use of transgenic varieties with >95% of the acreage planted to Roundup Ready and Bt-cotton varieties.

Key Items of Evaluation

In Tennessee, limited cotton acres are grown under irrigation. Tennessee has long been a proponent of conservation and no-tillage systems. In 2011, approximately 52% of the cotton was grown no-till and an additional 24% was grown using some form of conservation tillage

V(A). Planned Program (Summary)

Program # 3

1. Name of the Planned Program

Animal Systems

V(B). Program Knowledge Area(s)

1. Program Knowledge Areas and Percentage

KA Code	Knowledge Area	%1862 Extension	%1890 Extension	%1862 Research	%1890 Research
301	Reproductive Performance of Animals	15%	15%	0%	
303	Genetic Improvement of Animals	10%	10%	0%	
307	Animal Management Systems	60%	60%	0%	
311	Animal Diseases	15%	15%	0%	
	Total	100%	100%	0%	

V(C). Planned Program (Inputs)

1. Actual amount of FTE/SYs expended this Program

Year: 2011	Extension		Research	
	1862	1890	1862	1890
Plan	37.0	3.5	0.0	0.0
Actual Paid Professional	32.0	4.0	0.0	0.0
Actual Volunteer	24.0	2.0	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
597560	196127	0	0
1862 Matching	**1890 Matching**	**1862 Matching**	**1890 Matching**
2597150	196127	0	0
1862 All Other	**1890 All Other**	**1862 All Other**	**1890 All Other**
250000	25000	0	0

V(D). Planned Program (Activity)

1. Brief description of the Activity

The Master Beef Producer Program was led by a team of University of Tennessee Extension specialists and agents, with the support and involvement of representatives of state agencies, businesses and organizations with an interest in the state's cattle industry. Master Beef Producer programs were taught by agents who completed the comprehensive training curriculum. Industry professionals, veterinarians, and other local industry leaders were included as a part of the teaching team. The Master Beef Producer Program:

1. Included a series of 12 educational sessions that focueds on cow-calf production and issues facing the beef industry. These were conducted at various off-campus locations accessible to Tennessee beef producers. These sessions included hands-on demonstrations, mini-lectures, discussions, question and answer sessions, etc.

2. Enhanced the profitability and competitiveness of cow-calf operations by providing essential, technical information.

3. Provided participants with a beef production reference manual.

4. Allowed producers to interact with trained facilitators and encourage sharing of ideas with other producers.

Goats are an environmentally adaptive species of livestock, extremely opportunistic and afford the small limited resource landowner(s) an alternative enterprise. The goat provides food security, high quality protein (for human nutrition), biological land enhancement and many 'value-added' products to increase revenue generated on a holistically sustainable rural farm. With the decrease in planted tobacco acreage and income from this traditional crop, the production of goats becomes a natural alternative. Tennessee continues to rank second in meat goats in the U.S. The total number of meat goats in Tennessee on January 1, 2009 was 133,000 head, up 9,000 head from 2008. Milk goats totaled 5,800 head, unchanged from the previous year (TN Farm Facts, February 4, 2009). Meat goat numbers have been significantly increasing within the United States since the early 1990's but goat meat consumption has surpassed available supply, based on ethnic group statistics. The importation of goat meat (30 pound carcass equivalent) surpassed export in 1994. There is no longer an export value for goat meat; the import value has tripled.

The Tennessee Browsing Academy was established in May 2007 as an extensive four day hands-on training for producers, educators / government agency personnel interested in the biological and environmentally sound practices of vegetative management with small ruminants (specifically goats). This class is taught through lecture and applied practices as the participants learn new techniques.

The most outstanding example of successful outcomes encompassing the work of extension specialists, county extension agents, and clients is the Master Meat Goat Producer Program. The Small Ruminant College has become an annual two-day event covering a different major production theme each year. Along with the two days of both inside lectures and outside hands-on demonstrations, the attendees receive proceedings to complement the topics covered. Work will continue in working with small ruminant farmers as well as with professionals through Heifer International. Presentations and demonstrations in the state are designed for extension agents, government agencies, meat goat organizations, farmer forum initiatives, and 4-H groups.

2. Brief description of the target audience

Producers, veterinarians, and others associated with the animal industry.

Tennessee cattle producers are primarily cow-calf operators. All of the state's cow-calf operators compose the target audience for this planned program.

3. How was eXtension used?

Tennessee is represented by 108 eXtension members in 42 of the 59 approved Communities of Practice (CoP). Tennessee Extension personnel have addressed over 800 Frequently Asked Questions through eXtension.

This Animal Systems Planned Program was enhanced through the service of:

- 13 Tennessee Extension personnel on the "Beef Cattle" CoP,
- two Tennessee Extension personnel on the "Goat Industry" CoP, and
- two Tennessee Extension personnel on the HorseQuest CoP.

Tennessee Extension personnel shared implementation strategies, outcome measurement, and evaluation protocols with their CoP colleagues.

V(E). Planned Program (Outputs)

1. Standard output measures

2011	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Actual	268156	1335807	81838	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	4	0	4

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

- Number of exhibits displayed to promote awareness of and participation in this planned program.

Year	Actual
2011	197

Output #2

Output Measure

- Number of research-based publications distributed as part of this program.

Year	Actual
2011	578

V(G). State Defined Outcomes

V. State Defined Outcomes Table of Content

O. No.	OUTCOME NAME
1	Extension Economic Impact: The total economic impact of Extension animal systems programs. (The target is expressed in millions of dollars.)
2	Beef Production and Marketing: Number of beef producers who utilized improved sires, artificial insemination or other genetic improvement methods.
3	Educational assistance was provided to beef producers resulting in increased Tennessee Department of Agriculture cost-share assistance for improved facilities, equipment and genetics.
4	Beef Production and Marketing: Number of beef producers who improved marketing methods.
5	Beef Production and Marketing: Number of producers who improved forages for livestock by broadleaf weed control, planting clover, stockpiling fescue or planting warm-season grasses.
6	Beef Production and Marketing: The number of calves managed according to Beef Quality Assurance (BQA) guidelines.
7	Goat Production: Number of goat producers who have implemented practices related to genetic improvement, nutrition, health, reproduction and other information as a result of the Master Goat Program.

Outcome #1

1. Outcome Measures

Extension Economic Impact: The total economic impact of Extension animal systems programs. (The target is expressed in millions of dollars.)

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Actual
2011	22600000

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Feeder cattle buyers prefer to purchase truckload lots of cattle that are similar in age, size, weight, and color, and they are willing to pay premiums to producers who participate in cooperative marketing ventures to assemble cattle to meet their needs.

What has been done
Extension agents and specialists helped beef cattle producers to market feeder cattle through cooperative marketing arrangements, including alliances, graded feeder calf sales, and age and source verification programs.

Results
Experts estimate farmers earned an average of $8 per head more by managing cattle according to Extension?s beef quality assurance program and $25 per head by selecting bulls based on genetic potential. As a result of these programs, farmers realized $22.6 million in additional sales revenue.

4. Associated Knowledge Areas

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

Outcome #2

1. Outcome Measures

Beef Production and Marketing: Number of beef producers who utilized improved sires, artificial insemination or other genetic improvement methods.

2. Associated Institution Types

- 1862 Extension
- 1890 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2011	6265

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done

Results

4. Associated Knowledge Areas

KA Code	Knowledge Area
303	Genetic Improvement of Animals

Outcome #3

1. Outcome Measures

Educational assistance was provided to beef producers resulting in increased Tennessee Department of Agriculture cost-share assistance for improved facilities, equipment and genetics.

Not Reporting on this Outcome Measure

Outcome #4

1. Outcome Measures

Beef Production and Marketing: Number of beef producers who improved marketing methods.

2. Associated Institution Types

- 1862 Extension
- 1890 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2011	12365

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done

Results

4. Associated Knowledge Areas

KA Code	Knowledge Area
307	Animal Management Systems

Outcome #5

1. Outcome Measures

Beef Production and Marketing: Number of producers who improved forages for livestock by broadleaf weed control, planting clover, stockpiling fescue or planting warm-season grasses.

2. Associated Institution Types

- 1862 Extension
- 1890 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2011	6880

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Tennessee has 3.5 million acres of forages, 2.1 million head of beef cattle, 210,000 horses and 102,000 goats. Total economic impact of the livestock sector is $5 billion annually in the state. To remain viable in a competitive marketplace, livestock and forage producers must improve their management efficiency, sustainability and productivity. Tennesseans need education in maintaining or improving production efficiency, marketing, product quality and food safety.

What has been done
UT Extension educated farmers on the benefits of warm-season grasses, clover, and stockpiling tall fescue. Extension also demonstrated hay storage and feeding methods to reduce waste and spoilage. A renewed emphasis was placed on broadleaf weed control.

Results
Tennessee farmers saved more than $71.4 million from better forage production, including following fertilizer recommendations, storage, and feeding practices.

4. Associated Knowledge Areas

KA Code	Knowledge Area
307	Animal Management Systems

Outcome #6

1. Outcome Measures

Beef Production and Marketing: The number of calves managed according to Beef Quality Assurance (BQA) guidelines.

2. Associated Institution Types

- 1862 Extension
- 1890 Extension

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2011	12427

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done

Results

4. Associated Knowledge Areas

KA Code	Knowledge Area
307	Animal Management Systems

Outcome #7

1. Outcome Measures

Goat Production: Number of goat producers who have implemented practices related to genetic improvement, nutrition, health, reproduction and other information as a result of the Master Goat Program.

2. Associated Institution Types

- 1890 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2011	524

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done

Results

4. Associated Knowledge Areas

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

V(H). Planned Program (External Factors)

External factors which affected outcomes

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

Brief Explanation

V(I). Planned Program (Evaluation Studies)

Evaluation Results

Better Beef Marketing in Tennessee

Feeder cattle buyers prefer to purchase truckload lots of cattle that are similar in age, size, weight, and color, and they are willing to pay premiums to producers who participate in cooperative marketing ventures to assemble cattle to meet their needs. Extension agents and specialists helped beef cattle producers to market feeder cattle through cooperative marketing arrangements, including alliances, graded feeder calf sales, and age and source verification programs. Experts estimate farmers earned an average of $8 per head more by managing cattle according to Extension's beef quality assurance program and $25 per head by selecting bulls based on genetic potential. As a result of these programs, farmers realized $22.6 million in additional sales revenue.

Forage Systems

UT Extension educated farmers on the benefits of warm-season grasses, clover, and stockpiling tall fescue. Extension also demonstrated hay storage and feeding methods to reduce waste and spoilage. A renewed emphasis was placed on broadleaf weed control. Tennessee farmers saved more than $71.4 million from better forage production, including following fertilizer recommendations, storage, and feeding practices.

Optimizing Beef Production

Tennessee beef producers depend on UT Extension's expertise and unbiased services to optimize production and enhance profitability. Extension agents and specialists formulated 580 custom rations based on forage sample test results by the UT Soil, Plant and Pest Center. Past research has shown that each ration results in a mean savings of $1,125 in reduced annual feed costs. Tennessee beef producers realized $652,500 in reduced feed costs.

Key Items of Evaluation

Better Beef Marketing in Tennessee

Feeder cattle buyers prefer to purchase truckload lots of cattle that are similar in age, size, weight, and color, and they are willing to pay premiums to producers who participate in cooperative marketing ventures to assemble cattle to meet their needs. Extension agents and specialists helped beef cattle producers to market feeder cattle through cooperative marketing arrangements, including alliances, graded feeder calf sales, and age and source verification programs. Experts estimate farmers earned an average of $8 per head more by managing cattle according to Extension's beef quality assurance program and $25 per head by selecting bulls based on genetic potential. As a result of these programs, farmers realized $22.6 million in additional sales revenue.

V(A). Planned Program (Summary)

Program # 4

1. Name of the Planned Program

Childhood Obesity

V(B). Program Knowledge Area(s)

1. Program Knowledge Areas and Percentage

KA Code	Knowledge Area	%1862 Extension	%1890 Extension	%1862 Research	%1890 Research
603	Market Economics	0%	0%	25%	
701	Nutrient Composition of Food	5%	5%	15%	
702	Requirements and Function of Nutrients and Other Food Components	0%	0%	10%	
703	Nutrition Education and Behavior	95%	95%	50%	
	Total	100%	100%	100%	

V(C). Planned Program (Inputs)

1. Actual amount of FTE/SYs expended this Program

Year: 2011	Extension		Research	
	1862	1890	1862	1890
Plan	97.0	9.0	8.0	0.0
Actual Paid Professional	99.0	12.0	13.3	0.0
Actual Volunteer	77.0	5.0	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
1878044	616400	325922	0
1862 Matching	**1890 Matching**	**1862 Matching**	**1890 Matching**
8162471	616400	550969	0
1862 All Other	**1890 All Other**	**1862 All Other**	**1890 All Other**
5401045	117185	476726	0

V(D). Planned Program (Activity)

1. Brief description of the Activity

UT and TSU Extension used the Power U curriculum in Tennessee schools and afterschool programs. Extension personnel and volunteers used the curriculum to teach diet quality to young adolescents. The program was delivered through 10 interactive lessons. Extension obesity prevention programs emphasized the following:

- how to use MyPyramid.gov and followng Dietray Guidelines.
- how to use the Healthy Plate Method.
- decreasing consumption of high-fat foods like fried foods, bologna, hot dogs, etc.
- increasing consumption of fruits, vegetables and whole-grains.

We conduct applied and basic research in food-borne risks and nutrition to address high priority issues for consumers of food products. We disseminate information gained from these studies to food industries and consumers through outreach programs, including workshops and educational events at the county level, and through a variety of publications.

Research projects in food safety are multi-pronged in their objectives. A major thrust is characterization of the antimicrobial activity of novel natural (i.e., plant-, animal- or microbial-based) compounds and better targeting through controlled-delivery encapsulation systems and incorporation into nanofibers and packaging films. Encapsulation strategies include micelles, liposomes, chitosans, supercritical carbon dioxide, high pressure homogenization and ultrasound. Novel molecular biology strategies are used to identify stress mechanisms in bacteria that allow them to resist interventions.

Studies are underway on how non-thermal processing (high pressure, ultrasound, solvents) affect the functional properties of proteins for food and non-food applications. Supercritical carbon dioxide will be used to produce biopolymers encapsulation systems for flavors and nutraceuticals and to modify functional properties of proteins.

2. Brief description of the target audience

Tennesseans targeted include consumers and youth. Because of the prevalence of obesity in the state, all consumer are potentially members of the target audience. However, the TNCEP and EFNEP programs will be targeted to the state's limited resource population. In addition, the TSU Food Nutrition Education Program will be targeted to eligible food stamp recipients.

3. How was eXtension used?

Tennessee is represented by 108 eXtension members in 42 of the 59 approved Communities of Practice (CoP). Tennessee Extension personnel have addressed over 800 Frequently Asked Questions through eXtension.

This Childhood Obesity Planned Program was enhanced through the service of

- 12 Tennessee Extension personnel on the "Families, Food and Fitness" CoP, and the leader of this CoP is the Associate Dean of Family and Consumer Sciences for UT Extension.
- two Tennessee Extension personnel on the "A,B,C's of Omega 3's" CoP.

Tennessee Extension personnel shared emerging research, implementation strategies, outcome measurement, and evaluation protocols with their CoP colleagues.

V(E). Planned Program (Outputs)

1. Standard output measures

2011	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Actual	136990	11835186	659536	8120

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	14	15

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

- Number of exhibits displayed to promote program awareness and participation.

Year	Actual
2011	2071

Output #2

Output Measure

- Number of research-based publications distributed as part of this program.

Year	Actual
2011	189904

Output #3

Output Measure

- Hold symposium to educate the nutrition science community about the use of systems genetics as a tool for linking genetic variation to nutrient metabolism and energy balance and the overlying effects on health and disease (Moustaid-Moussa).

Not reporting on this Output for this Annual Report

Output #4

Output Measure

- A Bayesian Markov chain Monte Carlo (MCMC) procedure was developed to estimate consumer demand systems with censored dependent variables. There is a large menu of demand system estimators and they all have shortcomings. The Bayesian estimator offers a practical solution to a very difficult problem, which is expected to be very useful to empirical analysts struggling with the censoring issues in micro-level demand systems. (Yen)

Year	Actual
2011	1

Output #5

Output Measure

- A positive association between smoking cessation and body weight was found. Differentiated effects of quitting smoking on BMI are found among quitters by gender, between age groups, and by length of time since quitting smoking. Major conclusion: the price that must be paid, in terms of weight gain to enjoy the health benefits of smoking cessation, is trivial even for the obese population. (Yen)

Year	Actual
2011	1

V(G). State Defined Outcomes

V. State Defined Outcomes Table of Content

O. No.	OUTCOME NAME
1	Tennessee Shapes Up: Number of participants who decreased consumption of high-fat foods such as chips, fast food, fried foods, sausage, bacon, bologna, hot dogs, etc.
2	Tennessee Shapes Up: Number of participants who decreased consumption of high-sugar foods and sweetened beverages, such as soft drinks, Kool Aide type beverages, sweetened tea, etc.
3	Tennessee Shapes Up: Number of participants who increased consumption of dairy foods.
4	Tennessee Shapes Up: Number of participants who increased consumption of fruits.
5	Tennessee Shapes Up: Number of participants who increased consumption of vegetables.
6	Tennessee Shapes Up: Number of participants increased consumption of whole grains.
7	Tennessee Shapes Up: Number of participants who improved their blood sugar.
8	Tennessee Shapes Up: Number of participants who improved their cholesterol levels.

Outcome #1

1. Outcome Measures

Tennessee Shapes Up: Number of participants who decreased consumption of high-fat foods such as chips, fast food, fried foods, sausage, bacon, bologna, hot dogs, etc.

2. Associated Institution Types

- 1862 Extension
- 1890 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2011	2708

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done

Results

4. Associated Knowledge Areas

KA Code	Knowledge Area
703	Nutrition Education and Behavior

Outcome #2

1. Outcome Measures

Tennessee Shapes Up: Number of participants who decreased consumption of high-sugar foods and sweetened beverages, such as soft drinks, Kool Aide type beverages, sweetened tea, etc.

2. Associated Institution Types

- 1862 Extension
- 1890 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2011	2708

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done

Results

4. Associated Knowledge Areas

KA Code	Knowledge Area
703	Nutrition Education and Behavior

Outcome #3

1. Outcome Measures

Tennessee Shapes Up: Number of participants who increased consumption of dairy foods.

2. Associated Institution Types

- 1862 Extension
- 1890 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2011	20841

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done

Results

4. Associated Knowledge Areas

KA Code	Knowledge Area
703	Nutrition Education and Behavior

Outcome #4

1. Outcome Measures

Tennessee Shapes Up: Number of participants who increased consumption of fruits.

2. Associated Institution Types

- 1862 Extension
- 1890 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2011	26391

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done

Results

4. Associated Knowledge Areas

KA Code	Knowledge Area
703	Nutrition Education and Behavior

Outcome #5

1. Outcome Measures

Tennessee Shapes Up: Number of participants who increased consumption of vegetables.

2. Associated Institution Types

- 1862 Extension
- 1890 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2011	25444

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done

Results

4. Associated Knowledge Areas

KA Code	Knowledge Area
703	Nutrition Education and Behavior

Outcome #6

1. Outcome Measures

Tennessee Shapes Up: Number of participants increased consumption of whole grains.

2. Associated Institution Types

- 1862 Extension
- 1890 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2011	19196

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done

Results

4. Associated Knowledge Areas

KA Code	Knowledge Area
703	Nutrition Education and Behavior

Outcome #7

1. Outcome Measures

Tennessee Shapes Up: Number of participants who improved their blood sugar.

2. Associated Institution Types

- 1862 Extension
- 1890 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2011	162

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done

Results

4. Associated Knowledge Areas

KA Code	Knowledge Area
703	Nutrition Education and Behavior

Outcome #8

1. Outcome Measures

Tennessee Shapes Up: Number of participants who improved their cholesterol levels.

2. Associated Institution Types

- 1862 Extension
- 1890 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2011	184

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done

Results

4. Associated Knowledge Areas

KA Code	Knowledge Area
703	Nutrition Education and Behavior

V(H). Planned Program (External Factors)

External factors which affected outcomes

- Appropriations changes
- Public Policy changes
- Government Regulations
- Competing Programmatic Challenges

Brief Explanation

{No Data Entered}

V(I). Planned Program (Evaluation Studies)

Evaluation Results

Nutrition Education

UT Extension Nutrition Education Programs reach approximately two million annually through group meetings, worksite sessions, direct mail, television, and radio programs. Nutrition education studies have found cost/benefit ratio of $1.00/$10.64. This translates to a return of over $190.9 million for the investment in UT Extension's nutrition education programs for the state of Tennessee.

Key Items of Evaluation

Nutrition Education

UT Extension Nutrition Education Programs reach approximately two million annually through group meetings, worksite sessions, direct mail, television, and radio programs. Nutrition education studies have found cost/benefit ratio of $1.00/$10.64. This translates to a return of over $190.9 million for the investment in UT Extension's nutrition education programs for the state of Tennessee.

V(A). Planned Program (Summary)

Program # 5

1. Name of the Planned Program

Economic Infrastructure and Commerce

V(B). Program Knowledge Area(s)

1. Program Knowledge Areas and Percentage

KA Code	Knowledge Area	%1862 Extension	%1890 Extension	%1862 Research	%1890 Research
201	Plant Genome, Genetics, and Genetic Mechanisms	0%	0%	6%	
202	Plant Genetic Resources	0%	0%	4%	
601	Economics of Agricultural Production and Farm Management	30%	30%	16%	
602	Business Management, Finance, and Taxation	5%	5%	5%	
603	Market Economics	5%	5%	14%	
604	Marketing and Distribution Practices	30%	30%	12%	
606	International Trade and Development	5%	5%	2%	
607	Consumer Economics	10%	10%	1%	
608	Community Resource Planning and Development	15%	15%	28%	
901	Program and Project Design, and Statistics	0%	0%	12%	
	Total	100%	100%	100%	

V(C). Planned Program (Inputs)

1. Actual amount of FTE/SYs expended this Program

Year: 2011	Extension		Research	
	1862	1890	1862	1890
Plan	26.0	2.5	19.0	0.0
Actual Paid Professional	27.0	3.0	29.1	0.0
Actual Volunteer	20.0	1.0	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**
512193	168109	663303	0
1862 Matching	**1890 Matching**	**1862 Matching**	**1890 Matching**
2226128	168109	2126021	0
1862 All Other	**1890 All Other**	**1862 All Other**	**1890 All Other**
77140	0	324480	0

V(D). Planned Program (Activity)

1. Brief description of the Activity

Research analysis includes assessment of market potential, market feasibility studies for new agri-industry ventures, buyer and consumer preferences studies, market segmentation analysis and buyer profiling, analysis of new product acceptance, analysis of marketing alternatives, and analysis of valuation of product attributes. To evaluate the impacts of various policies, management strategies, or economic conditions on a farm's bottom line and financial strength, we are developing a set of representative farms that encompass major segments of agriculture in Tennessee. Methods for evaluating risk include risk-based econometric models, risk-based mathematical programming models, generalized stochastic dominance criteria, dynamic optimization, and subjective probability assessment criteria.

The Extension MANAGE program helped families analyze their total farming business so they could make informed decisions regarding their future. Extension staff trained in farm and financial management help families to:

- review their current financial situation
- capitalize on strengths and reduce weaknesses in the farm business
- develop individualized farm and financial plans
- explore alternatives both on and off the farm
- evaluate capital investment opportunities including land and/or machinery purchases
- analyze likely consequences of changing the scope of enterprises
- determine appropriate production practices

In addition to individualized farm and financial planning assistance, Extension offered hundreds of workshops to help farmers improve their financial situation. For example, workshops were offered in improved marketing, goal-setting, and strategic planning.

Although the MANAGE program does not remove uncertainty of the future, it provides farm families with a clear understanding of their current financial situation and helps them evaluate their alternatives for the future. Making informed decisions today may be the best way to prepare for tomorrow's opportunities. The educational program was offered at no cost to participating farm families in all 95 Tennessee counties.

Land is a great source of wealth in the African-American community. In addition to providing economic stability, land ownership is highly correlated to one's social and economic well-being. Many urban residents who desire to return to the land of their origin find themselves confronted by various obstacles in terms of retaining rightful land ownership. In addition to problems they face of landownership retention are efforts to engage in profitable land use development, and operate viable farming enterprises.

Production inputs have changed over the past two decades. As a result of this, there was a reduction in the number of crops produced. In-service training on "Small Farm Outlook" was conducted to make landowners aware of resources that are available to them for land retention and crop production. The training provided information on ways to keep land through estate planning, lessening heir property, and legal issues for seniors (the aging population).

2. Brief description of the target audience

- Limited-resource and small farmers
- Farmers transitioning from tobacco to other crops
- Policy-makers at the state, federal, and municipal level
- Businesses looking to expand or relocate to Tennessee

3. How was eXtension used?

Tennessee is represented by 108 eXtension members in 42 of the 59 approved Communities of Practice (CoP). Tennessee Extension personnel have addressed over 800 Frequently Asked Questions through eXtension.

This Economic Infrastructure and Commerce Planned Program was enhanced through the service of

- 10 Tennessee Extension personnel on the "Entrepreneurs and Their Communities" CoP, and
- four Tennessee Extension personnel on the "Network Literacy" CoP.

Tennessee Extension personnel shared implementation strategies, outcome measurement, and evaluation protocols with their CoP colleagues.

V(E). Planned Program (Outputs)

1. Standard output measures

2011	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Actual	62004	434768	4599	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	5	28	33

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

- Number of exhibits displayed to promote program awareness and participation.

Year	Actual
2011	266

Output #2

Output Measure

- Numer of research-based publications distributed as part of this program.

Year	Actual
2011	7915

Output #3

Output Measure

- Irrigated cotton produced equivalently high net returns at seeding rates above 7.2 per square meter, with any combination of row spacing, configuration, and number of seeds per meter of row. Under nonirrigated conditions, net returns were maximized at seeding rates between 5.4 and 14.3 square meter, except in solid planted 38-cm rows. Planting in a 2x1 skiprow pattern generated savings of seed and technology costs, and of harvest labor and machinery costs, that shift profit potential away from solid plantings. (Larson)

Year	Actual
2011	1

Output #4

Output Measure

- Soil and climate factors impact no-tillage yields relative to tillage yields and thus profitability and risk. No-tillage tends to produce similar or higher mean yields than tillage for crops grown on loamy soils in the Southern Seaboard and Mississippi Portal regions of the United States. A warmer and more humid climate and warmer soils in these regions relative to the Heartland, Basin and Range, and Fruitful Rim regions of the United States appear to favor no-tillage on loamy soils. With the exception of corn and cotton in the Southern Seaboard region, no tillage performed poorly on sandy soils in the United States. (Larson)

Year	Actual
2011	1

Output #5

Output Measure

- Taxes on land value, as opposed to taxes on private structures, increase housing density, which decreases urban sprawl and congestion. (Lambert)

Year	Actual
2011	1

Output #6

Output Measure

- A UT AgResearch study showed that the implementation of a grain reserve would stabilize prices, increase farm income, reduce dependence on government payments, and reduce government expenditures, freeing up money for other needs like conservation and nutrition programs. (Schaffer)

Year	Actual
2011	1

V(G). State Defined Outcomes

V. State Defined Outcomes Table of Content

O. No.	OUTCOME NAME
1	Land Ownership Information Program: Number of African-American landowners who increased their knowledge of property rights and responsibilities.
2	Land Ownership Information Program: Number of African-American landowners who developed farm management plans.
3	Land Ownership Information Program: Number of African-American landowners who developed estate plans to reduce the financial and legal risks farm family businesses face as they transition betwen generations.
4	Farm Financial Analysis and Planning: Number of farm families and rural business operators who implemented partial budgeting decisions (examples include sell calves now or later, evaluating equitable leasing arrangements and mach
5	Farm Financial Analysis and Planning: Number of farm families and rural business operators implementing improved record systems.
6	Farm Financial Analysis and Planning: Number of farm families who developed whole farm plans to improve their farm financial performance.
7	Tennessee Extension Leadership Development: Small businesses or non-profits developed by limited resource leaders.
8	Predicting Cellulosic Biofuel Economics

Outcome #1

1. Outcome Measures

Land Ownership Information Program: Number of African-American landowners who increased their knowledge of property rights and responsibilities.

2. Associated Institution Types

- 1890 Extension

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2011	305

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done

Results

4. Associated Knowledge Areas

KA Code	Knowledge Area
601	Economics of Agricultural Production and Farm Management
607	Consumer Economics

Outcome #2

1. Outcome Measures

Land Ownership Information Program: Number of African-American landowners who developed farm management plans.

2. Associated Institution Types

- 1890 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2011	40

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done

Results

4. Associated Knowledge Areas

KA Code	Knowledge Area
601	Economics of Agricultural Production and Farm Management
607	Consumer Economics

Outcome #3

1. Outcome Measures

Land Ownership Information Program: Number of African-American landowners who developed estate plans to reduce the financial and legal risks farm family businesses face as they transition betwen generations.

2. Associated Institution Types

- 1890 Extension

3a. Outcome Type:

Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Actual
2011	58

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done

Results

4. Associated Knowledge Areas

KA Code	Knowledge Area
601	Economics of Agricultural Production and Farm Management
607	Consumer Economics

Outcome #4

1. Outcome Measures

Farm Financial Analysis and Planning: Number of farm families and rural business operators who implemented partial budgeting decisions (examples include sell calves now or later, evaluating equitable leasing arrangements and mach

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2011	890

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done

Results

4. Associated Knowledge Areas

KA Code	Knowledge Area
601	Economics of Agricultural Production and Farm Management

Outcome #5

1. Outcome Measures

Farm Financial Analysis and Planning: Number of farm families and rural business operators implementing improved record systems.

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2011	540

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done

Results

4. Associated Knowledge Areas

KA Code	Knowledge Area
601	Economics of Agricultural Production and Farm Management

Outcome #6

1. Outcome Measures

Farm Financial Analysis and Planning: Number of farm families who developed whole farm plans to improve their farm financial performance.

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2011	341

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done

Results

4. Associated Knowledge Areas

KA Code	Knowledge Area
601	Economics of Agricultural Production and Farm Management

Outcome #7

1. Outcome Measures

Tennessee Extension Leadership Development: Small businesses or non-profits developed by limited resource leaders.

2. Associated Institution Types

- 1890 Extension

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2011	32

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
TSU programs for small business owners and non-profits targeted limited resource audiences. The key needs of limited resource audiences are community leadership, entrepreneurship and technology training.

What has been done
TSU Extension conducted a series at the middle school and vocational school level in Hardeman County, Tennessee and Clay County, Mississippi and and in faith and community settings. 33 volunteers provided leadership programming to adults.

Results
Impact data was collected using surveys and through extension educator and stakeholder comments. At least 90% of the 180 adult participants in the programs offered during 2011 learned more about leadership and personal development. Additional impacts included:
*78 new networking, mentoring and coaching outlets available to entrepreneurs.
*78 of 78 participants surveyed increased understanding of and level of competency using business management concepts and tools.
*10 individuals started a small business operation after participating in Extension entrepreneurial/small business programs.
*20 existing small businesses who are now operating with a business plan.
*50 small business owners who increased income and quality of living.
*100 individuals who increased their entrepreneurial/business skills.

4. Associated Knowledge Areas

KA Code	Knowledge Area
608	Community Resource Planning and Development

Outcome #8

1. Outcome Measures

Predicting Cellulosic Biofuel Economics

2. Associated Institution Types

- 1862 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)
The economics of biofuels must be predicted to help producers and policymakers evaluate various alternatives.

What has been done
A national study of how meeting potential energy and carbon policies might impact the U.S. agriculture and forestry sectors as well as the economy was conducted.

Results
The study finds that agriculture and forestry in Tennessee could see $5.7 billion in additional revenues by achieving the 25x25 goal. In the near term, Tennessee could realize over $2.3 billion in total economic activity and over 21,500 new jobs by 2015 by taking positive steps to do its part to help reach the national goal of 25% renewable energy by 2025. In addition, the total economic impacts to the state of Tennessee could be $12.4 billion and 155,700 new jobs created by 2025. Nationally, achieving the 25x?f25 goal has the potential to spark $646 billion in additional economic activity, the creation of more than 4.7 million jobs, and up to $37 billion in additional revenues for agriculture and forestry. (English, Clark, Jensen)

4. Associated Knowledge Areas

KA Code	Knowledge Area
601	Economics of Agricultural Production and Farm Management
603	Market Economics
608	Community Resource Planning and Development

V(H). Planned Program (External Factors)

External factors which affected outcomes

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

Brief Explanation

V(I). Planned Program (Evaluation Studies)

Evaluation Results

Creating a Rural Entrepreneurial System in Tennessee (CREST)

Issue: The current economic downturn has touched Tennesseans throughout the state and from all walks of life. However, rural Tennessee has been hit particularly hard. Despite the trends and given the immediate desire to create jobs, some counties have tried to intensify their industrial recruitment efforts. Unfortunately, trying to land the "big fish" has become ever more difficult and the cost of luring such jobs quite expensive. In reality, the vast majority of job creation originates from small businesses and the pursuits of

entrepreneurs. CREST is designed to play an integral role in the process as community members, local officials, economic development professionals and entrepreneurs collaborate to transform their local economies through the development of key components required for entrepreneurship and small business development.

What has been done: UT Extension has developed a strong partnership with the University of Tennessee's Institute for Public Service and the Tennessee Department of Economic and Community Development's Business Resource Enterprise Office to address the needs of small businesses and entrepreneurs, especially in rural Tennessee. Led by Dr. Michael Wilcox, an assistant professor and Extension Specialist in the Department, CREST takes a community-oriented approach to help the pilot communities become more 'entrepreneur friendly'. In 2011, eight pilot communities built on the training delivered in 2010, to design, implement and evaluate pilot -scale entrepreneurship programs locally.

Impact: CREST has helped each community understand the impact and importance of small business development to the long term sustainable development of their local economies. CREST also provided a framework to identify components that should be in place in the community to support small business development and entrepreneurship. Through the CREST Committee, an effective organization focused on small business and entrepreneurship development was initiated in each pilot community.

Key Items of Evaluation

Creating a Rural Entrepreneurial System in Tennessee (CREST)

UT Extension has developed a strong partnership with the University of Tennessee's Institute for Public Service and the Tennessee Department of Economic and Community Development's Business Resource Enterprise Office to address the needs of small businesses and entrepreneurs, especially in rural Tennessee. Led by Dr. Michael Wilcox, an assistant professor and Extension Specialist in the Department, CREST takes a community-oriented approach to help the pilot communities become more 'entrepreneur friendly'. In 2011, eight pilot communities built on the training delivered in 2010, to design, implement and evaluate pilot -scale entrepreneurship programs locally.

V(A). Planned Program (Summary)

Program # 6

1. Name of the Planned Program

Environmental and Water Quality Impacts

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	0%	0%	20%	
112	Watershed Protection and Management	0%	0%	23%	
123	Management and Sustainability of Forest Resources	0%	0%	7%	
133	Pollution Prevention and Mitigation	0%	0%	13%	
135	Aquatic and Terrestrial Wildlife	0%	0%	11%	
205	Plant Management Systems	0%	0%	2%	
212	Pathogens and Nematodes Affecting Plants	0%	0%	6%	
213	Weeds Affecting Plants	0%	0%	3%	
402	Engineering Systems and Equipment	0%	0%	7%	
404	Instrumentation and Control Systems	0%	0%	4%	
721	Insects and Other Pests Affecting Humans	0%	0%	4%	
	Total	0%	0%	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	27.0	0.0
Actual Paid Professional	0.0	0.0	26.7	0.0
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	605807	0
1862 Matching	**1890 Matching**	**1862 Matching**	**1890 Matching**
0	0	2351317	0
1862 All Other	**1890 All Other**	**1862 All Other**	**1890 All Other**
0	0	475741	0

V(D). Planned Program (Activity)

1. Brief description of the Activity

We are developing economic and policy data by accessing existing sources, generating data from computer models, and surveying market participants. This data is analyzed using appropriate statistical and econometric methods.

Watershed-scale model assessments are conducted utilizing field-level estimates of alternative management practices (AMPs). Changes in water quality in impaired watersheds are measured. The cost of meeting different water quality standards at different points within a watershed and the potential impact of different environmental policies on Tennessee's agriculture are evaluated.

Soil research is fundamental to our environmental program. Erosion, sediment transport, and contaminant transport capabilities are modeled and evaluated. Soil samples are characterized in terms of elemental composition, particle size, mineralogy, and other soil chemical and flow characteristics using standard techniques. New methods for decreasing the expense of measuring soil properties are developed.

As new waste treatment approaches are introduced, we provide research-based evaluation of appropriate technologies for Tennessee. Background information on the water quality is collected in various watershed areas, including one where baseline environmental data is being used to evaluate the impact of a dairy production unit on the area.

2. Brief description of the target audience

This is currently a research-only targeted program, so the target audience is weighted toward basic/applied research clients.

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	0	0	0	0

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

Patent Applications Submitted

Year: 2011

Actual: 1

Patents listed

Sediment and Detention Basin Drainage System and Method

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

2011	Extension	Research	Total
Actual	0	42	42

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

- Field validation of remotely-controlled acoustic monitoring system for monitoring grassland birds on no-entry zones in military installations (Buehler).
  Not reporting on this Output for this Annual Report

Output #2

Output Measure

- Preliminary understanding of processes that change soil properties such as moisture content, soil temp, fertilizers (Lee).
  Not reporting on this Output for this Annual Report

Output #3

Output Measure

- Our research has contributed to a better understanding of the spatial and temporal dynamics of soil microorganisms under different land management and environmental changes. In particular, we have a better idea of the ecology and biogeography of a relatively unknown group of common soil bacteria. (Radosevich, DeBruyn)

Year	Actual
2011	1

Output #4

Output Measure

- Our research established effective population size and quantified relative extinction risk to the Sequatchie caddisfly, a Tennessee endemic species of concern. (Moulton)

Year	Actual
2011	1

Output #5

Output Measure

- Analysis of the effects of switchgrass production on water quality provide policymakers with a gauge of the possible extent of the effects of wide-scale switchgrass adoption on water quality relative to existing water quality impairments. This information will help policymakers evaluate whether subsidizing switchgrass production would be a cost-effective tool for improving water quality. (Clark)

Year	Actual
2011	1

Output #6

Output Measure

- ough work from my program in habitat management and conservation, conservation practitioners have been forced to re-evaluate negative perceptions of goats in island systems. My work has shown that managed grazing by goats can indeed sustain the endangered Kirtland?s Warbler?s winter habitat in the Bahamas. (Kwit)

Year	Actual
2011	1

Output #7

Output Measure

- Our research produced several insights into hardwood bottomland restoration: (1) drawing down Tennessee River Valley (TRV) reservoirs after Labor Day can negatively impact migratory shorebirds, (2) TRV reservoirs are used by at least seven shorebird species of high conservation concern and one federally listed shorebird species, (3) randomly planting oak seedlings in a bottomland is not a prudent conservation strategy, (4) bird community structure is a reliable metric to monitor the state of ecological restoration in hardwood bottomlands, and (5) the federally-listed plant species Scutellaria montana may benefit from moderate thinning of the forest canopy. (Gray)

Year	Actual
2011	1

Output #8

Output Measure

- Land application of lignocellulostic biochar derived from fast pyrolysis provides the potential to sequester carbon in soils resulting in a carbon-negative bioenergy process and improvement of the physico-chemical properties of soils. (Radosevich)

Year	Actual
2011	1

Output #9

Output Measure

- Effective mobile machine control requires sufficient positioning satellites. We found the options available to agricultural producers depend upon: 1) the operator's brand, model, and legacy of RTK equipment, 2) the brand, topology, and availability of a CORS network, and 3) the spatial location of the producer's fields within a networked CORS topology. When available, a stable VRS solution using cellular broadband was found preferable when accessing a CORS network; however, producer options are often limited by noted RTK equipment manufacturers taking strict proprietary and protectionist stances within their agricultural product lines. A GIS toolset was developed to aid extension specialists in advising producers about options for their specific field locales. (Freeland)

Year	Actual
2011	1

Output #10

Output Measure

- We designed and fabricated a research tool to evaluate turf grass damage. (Hart)

Year	Actual
2011	1

Output #11

Output Measure

- A new mobility power model has been developed using GPS to predict the power required by military vehicles. (Ayers)

Year	Actual
2011	1

Output #12

Output Measure

- We have four major findings regarding cattle access to farm ponds: (1) periphyton species richness was greater in farm ponds with no cattle access, (2) mean biovolume of pollution-sensitive taxa (e.g., Achnanthidium minutissimum, Cymbella sp.) was greater in no-access ponds, (3) pollution-tolerant taxa (e.g., Gomphonema sp, Navicula sp.) were more abundant in

cattle-access ponds, and (4) differences in several water quality parameters (e.g.., turbidity, Kjeldahl nitrogen) likely drove periphyton community responses. These results provide evidence that periphyton can be used to monitor changes in water quality associated with livestock operations. Additionally, if improvement in water quality is a goal, cattle farmers should take advantage of USDA conservation programs that provide funds for fencing cattle from watersheds and developing alternative water sources. (Gray)

Year	Actual
2011	1

V(G). State Defined Outcomes

V. State Defined Outcomes Table of Content

O. No.	OUTCOME NAME
1	Percent of Tennessee major row-crop acreage under some form of no-till or conservation tillage (Tennessee Agriculture 2007).
2	Greenhouse and nursery crop use of bioactive natural products in place of conventional pesticide on tomato, percent of operators adopting (Gwinn).
3	China-U.S. Joint Research Center

Outcome #1

1. Outcome Measures

Percent of Tennessee major row-crop acreage under some form of no-till or conservation tillage (Tennessee Agriculture 2007).

Not Reporting on this Outcome Measure

Outcome #2

1. Outcome Measures

Greenhouse and nursery crop use of bioactive natural products in place of conventional pesticide on tomato, percent of operators adopting (Gwinn).

Not Reporting on this Outcome Measure

Outcome #3

1. Outcome Measures

China-U.S. Joint Research Center

2. Associated Institution Types

- 1862 Research

3a. Outcome Type:

Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Actual
2011	1

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
There is a need for Chinese-American cooperation and knowledge exchange on environmental issues.

What has been done
We helped establish the China-U.S. Joint Research Center for Ecosystem and Environmental Change (JRCEEC), including launching of two research networks among UT, Purdue University and China: Biotechnology of Bioenergy Plants (UT leader Dr. Neal Stewart) and Joint Lab of Soil and Water (UT Leader Jack Parker).

Results

JRCEEC was accepted into the China-US Eco-Partnership program established by the U.S. Department of State and the Chinese National Development and Reform Commission. This eco-partnership program allows submitting white papers to the highest level of governments of China and the United States. Eight Chinese visiting scientists financially supported by Chinese government were brought to UT for research collaboration with UT faculty. Their visits are benefiting UT scientists for long-term global development.

4. Associated Knowledge Areas

KA Code	Knowledge Area
112	Watershed Protection and Management
123	Management and Sustainability of Forest Resources
133	Pollution Prevention and Mitigation
135	Aquatic and Terrestrial Wildlife

V(H). Planned Program (External Factors)

External factors which affected outcomes

- Public Policy changes
- Competing Public priorities
- Competing Programmatic Challenges

Brief Explanation

V(I). Planned Program (Evaluation Studies)

Evaluation Results

Our research programs are evaluated by acceptance of publications in peer-reviewed, archival journals, grant proposals that receive funding from government, industry, and foundation sources, and our ability to attract promising graduate and post-doctoral students.

Key Items of Evaluation

V(A). Planned Program (Summary)

Program # 7

1. Name of the Planned Program

Family Economics

V(B). Program Knowledge Area(s)

1. Program Knowledge Areas and Percentage

KA Code	Knowledge Area	%1862 Extension	%1890 Extension	%1862 Research	%1890 Research
801	Individual and Family Resource Management	100%	100%	0%	
	Total	100%	100%	0%	

V(C). Planned Program (Inputs)

1. Actual amount of FTE/SYs expended this Program

Year: 2011	Extension		Research	
	1862	1890	1862	1890
Plan	20.0	2.0	0.0	0.0
Actual Paid Professional	13.0	2.0	0.0	0.0
Actual Volunteer	10.0	1.0	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
256096	84054	0	0
1862 Matching	**1890 Matching**	**1862 Matching**	**1890 Matching**
1113064	84054	0	0
1862 All Other	**1890 All Other**	**1862 All Other**	**1890 All Other**
623683	0	0	0

V(D). Planned Program (Activity)

1. Brief description of the Activity

Extension will support at least 10 regional and local social marketing campaigns organized by UT and TSU Extension and supported by coalitions of volunteers across Tennessee. The Tennessee toolkit for savings lesson plans and activities for teaching financial and savings education will be used in schools, workplaces, community centers and other locations to teach youth and adults. Extension will maintain a

partnership with national Extension "Finanacial Security in Later Life" initiative and with the "America Saves" national organization and other national and state partners with the TN Jumpstart Coalition. Extension will host a bi-annual partnership training conferences to strengthen the capacity of educators to teach financial and savings education. Extension will deploy its On My Own curriculum and youth TN Saves in over 100 financial education simulations annually throughout the state to reach 30,000 youth with savings and financial education. Additional classes, newletters, news releases and community events will be conducted for adult audiences.

2. Brief description of the target audience

Youth and adults will be targeted for this program. UT Extension is a national leader in creating, testing and validating family economic programs for reaching different target audiences, such as youth ages 9-18, young adults, coalition members and consumers.

3. How was eXtension used?

Tennessee is represented by 108 eXtension members in 42 of the 59 approved Communities of Practice (CoP). Tennessee Extension personnel have addressed over 800 Frequently Asked Questions through eXtension.

This Family Economics Planned Program was enhanced through the service of 11 Tennessee Extension personnel on the "Financial Security for All" CoP. Tennessee Extension personnel shared implementation strategies, outcome measurement, and evaluation protocols with their CoP colleagues.

V(E). Planned Program (Outputs)

1. Standard output measures

2011	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Actual	55729	9592761	67919	622238

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	0	1

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

- Number of exhibits displayed to promote program awareness and participation.

Year	Actual
2011	6944

Output #2

Output Measure

- Number of research-based publications distributed as part of this program.

Year	Actual
2011	97263

V(G). State Defined Outcomes

V. State Defined Outcomes Table of Content

O. No.	OUTCOME NAME
1	TN Saves: Number of participants who estimated their retirement income needs.
2	TN Saves: Number of participants identified ways to reduce debt.
3	TN Saves: Number of participants who set financial or retirement goals.
4	Youth Finanacial Education Simluation: Number of participants who felt more strongly that they needed to get a good education.
5	TN Saves: Number of participants who followed a spending plan.
6	TN Saves: Number of participants who initiated or increased savings.
7	TN Saves: Number of participants who reduced debt.
8	TN Saves: Statewide economic impact from reduced debt, increased savings and increased investment. (This outcome target is expressed in millions of dollars.)

Outcome #1

1. Outcome Measures

TN Saves: Number of participants who estimated their retirement income needs.

2. Associated Institution Types

- 1862 Extension
- 1890 Extension

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2011	1356

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done

Results

4. Associated Knowledge Areas

KA Code	Knowledge Area
801	Individual and Family Resource Management

Outcome #2

1. Outcome Measures

TN Saves: Number of participants identified ways to reduce debt.

2. Associated Institution Types

- 1862 Extension
- 1890 Extension

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2011	2800

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done

Results

4. Associated Knowledge Areas

KA Code	Knowledge Area
801	Individual and Family Resource Management

Outcome #3

1. Outcome Measures

TN Saves: Number of participants who set financial or retirement goals.

2. Associated Institution Types

- 1862 Extension
- 1890 Extension

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2011	3728

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done

Results

4. Associated Knowledge Areas

KA Code	Knowledge Area
801	Individual and Family Resource Management

Outcome #4

1. Outcome Measures

Youth Finanacial Education Simluation: Number of participants who felt more strongly that they needed to get a good education.

2. Associated Institution Types

- 1862 Extension
- 1890 Extension

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2011	18804

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done

Results

4. Associated Knowledge Areas

KA Code	Knowledge Area
801	Individual and Family Resource Management

Outcome #5

1. Outcome Measures

TN Saves: Number of participants who followed a spending plan.

2. Associated Institution Types

- 1862 Extension
- 1890 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2011	6757

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done

Results

4. Associated Knowledge Areas

KA Code	Knowledge Area
801	Individual and Family Resource Management

Outcome #6

1. Outcome Measures

TN Saves: Number of participants who initiated or increased savings.

2. Associated Institution Types

- 1862 Extension
- 1890 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2011	9587

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done

Results

4. Associated Knowledge Areas

KA Code	Knowledge Area
801	Individual and Family Resource Management

Outcome #7

1. Outcome Measures

TN Saves: Number of participants who reduced debt.

2. Associated Institution Types

- 1862 Extension
- 1890 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2011	2326

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done

Results

4. Associated Knowledge Areas

KA Code	Knowledge Area
801	Individual and Family Resource Management

Outcome #8

1. Outcome Measures

TN Saves: Statewide economic impact from reduced debt, increased savings and increased investment. (This outcome target is expressed in millions of dollars.)

2. Associated Institution Types

- 1862 Extension
- 1890 Extension

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2011	5500000

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done

Results

4. Associated Knowledge Areas

KA Code	Knowledge Area
801	Individual and Family Resource Management

V(H). Planned Program (External Factors)

External factors which affected outcomes

- Competing Public priorities
- Competing Programmatic Challenges

Brief Explanation

{No Data Entered}

V(I). Planned Program (Evaluation Studies)

Evaluation Results

The UT Extension Tennessee Saves program teaches personal savings and financial management. 50% of participants increased their savings or investment, generating an annual estimated savings/investment of $4.4 million. In addition, 33% reduced debt an average of $208 per month, for a total estimated debt reduction of more than $1.1 million annually.

Key Items of Evaluation

The UT Extension Tennessee Saves program teaches personal savings and financial management. 50% of participants increased their savings or investment, generating an annual estimated savings/investment of $4.4 million. In addition, 33% reduced debt an average of $208 per month, for a total estimated debt reduction of more than $1.1 million annually.

V(A). Planned Program (Summary)

Program # 8

1. Name of the Planned Program

Food Safety

V(B). Program Knowledge Area(s)

1. Program Knowledge Areas and Percentage

KA Code	Knowledge Area	%1862 Extension	%1890 Extension	%1862 Research	%1890 Research
205	Plant Management Systems	0%	0%	9%	
308	Improved Animal Products (Before Harvest)	0%	0%	5%	
311	Animal Diseases	0%	0%	9%	
312	External Parasites and Pests of Animals	0%	0%	3%	
315	Animal Welfare/Well-Being and Protection	0%	0%	2%	
403	Waste Disposal, Recycling, and Reuse	0%	0%	2%	
501	New and Improved Food Processing Technologies	0%	0%	20%	
502	New and Improved Food Products	0%	0%	8%	
503	Quality Maintenance in Storing and Marketing Food Products	0%	0%	1%	
504	Home and Commercial Food Service	0%	0%	1%	
711	Ensure Food Products Free of Harmful Chemicals, Including Residues from Agricultural and Other Sources	0%	0%	1%	
712	Protect Food from Contamination by Pathogenic Microorganisms, Parasites, and Naturally Occurring Toxins	100%	100%	23%	
722	Zoonotic Diseases and Parasites Affecting Humans	0%	0%	4%	
806	Youth Development	0%	0%	7%	
901	Program and Project Design, and Statistics	0%	0%	5%	
	Total	100%	100%	100%	

V(C). Planned Program (Inputs)

1. Actual amount of FTE/SYs expended this Program

Year: 2011	Extension		Research	
	1862	1890	1862	1890
Plan	9.0	1.0	39.0	0.0

Actual Paid Professional	4.0	0.5	27.6	0.0
Actual Volunteer	3.0	1.0	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**
85366	0	476627	0
1862 Matching	**1890 Matching**	**1862 Matching**	**1890 Matching**
371021	0	3338557	0
1862 All Other	**1890 All Other**	**1862 All Other**	**1890 All Other**
46336	0	263072	0

V(D). Planned Program (Activity)

1. Brief description of the Activity

In the Safe Food for Tennessee initiative, UT and TSU Extension taught lessons in homes, schools, community centers, churches, and other accessible locations to consumers. The lessons in "Cook's Corner" and "Safe Food for You" were designed to change attitudes, skills and behaviors in regards to safe food handling practices.

Youth participants received food safety education using Fight BAC and other curricula through their school classroom, community center, after-school program, and other locations. Direct methods (group meetings, classes, demonstrations, and on-site visits) and indirect methods (newsletters, TV media programs, web sites, newspaper articles and radio programs) emphasized safe food practices:

- using a thermometer to check the internal temperature of food.
- using a thermometer to check the internal temperature of the refrigerator.

We conduct applied and basic research in food-borne risks and nutrition to address high priority issues for consumers of food products. We disseminate information gained from these studies to food industries and consumers through outreach programs, including workshops and educational events at the county level, and through a variety of publications.

Studies are underway on how non-thermal processing (high pressure, ultrasound, solvents) affect the functional properties of proteins for food and non-food applications. Supercritical carbon dioxide will be used to produce biopolymers encapsulation systems for flavors and nutraceuticals and to modify functional properties of proteins.

Research projects in food safety are multi-pronged in their objectives. A major thrust is characterization of the antimicrobial activity of novel natural (i.e., plant-, animal- or microbial-based) compounds and better targeting through controlled-delivery encapsulation systems and incorporation into nanofibers and packaging films. Encapsulation strategies include micelles, liposomes, chitosans, supercritical carbon dioxide, high pressure homogenization and ultrasound. Novel molecular biology strategies are used to identify stress mechanisms in bacteria that allow them to resist interventions.

2. Brief description of the target audience

- Consumers
- Employees of Child Care Centers
- SNAP and WIC clients

3. How was eXtension used?

Tennessee is represented by 108 eXtension members in 42 of the 59 approved Communities of Practice (CoP). Tennessee Extension personnel have addressed over 800 Frequently Asked Questions through eXtension.

This Food Safety Planned Program was enhanced through the service of four Tennessee Extension personnel on the "Food Safety" CoP, including the CoP leader who serves as a specialist in the UT Extension Department of Family and Consumer Sciences. Tennessee Extension personnel shared implementation strategies, outcome measurement, and evaluation protocols with their CoP colleagues.

V(E). Planned Program (Outputs)

1. Standard output measures

2011	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Actual	204765	1638465	690018	0

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

Patent Applications Submitted

Year: 2011

Actual: 1

Patents listed

Novel Heat Stable Protein Ingredients

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

2011	Extension	Research	Total
Actual	2	39	41

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

- Number of exhibits displayed to promote safe food handling practices.

Year	Actual
2011	1836

Output #2

Output Measure

- Number of research-based publications distributed by Extension to educate producers, processors, and consumers.

Year	Actual
2011	196563

Output #3

Output Measure

- A. acidoterrestris is a bacterium which has been found in pasteurized fruit juices. High pressure homogenization and dimethyl dicarbonate show promise for aiding in control of growth of vegetative cells of A. acidoterrestris. However, neither treatment, alone or in combination, is very effective against spores. (Golden)

Year	Actual
2011	1

Output #4

Output Measure

- The phosphate specific transport system in E. coli O157:H7 may act as an efflux pump under stress-adapted conditions and plays a role in phospholipid production. Both of these functions could serve to reduce the effectiveness of antimicrobial compounds. Understanding adaptations of E. coli O157:H7 under antimicrobial exposure is essential to better understand and implement methods to inhibit or control its survival in foods. (Golden)

Year	Actual
2011	1

Output #5

Output Measure

- The protein polymers lab continues its effort on developing new functional properties for protein quaternary structures. It was found that vitamin A in milk primarily binds to casein micelles. A novel microscopy technique was used to study the nano-structure of casein micelles in bovine milk. (Harte)

Year	Actual

2011	1

Output #6

Output Measure

- While InFresh film is effective at reducing pathogen populations directly inoculated onto the film, components of meat products (heme proteins, etc) may adversely affect the antimicrobial components in InFresh film. These results suggest that InFresh film may be more appropriate on other food products, such as fresh produce. (Golden)

Year	Actual
2011	1

V(G). State Defined Outcomes

V. State Defined Outcomes Table of Content

O. No.	OUTCOME NAME
1	Safe Food Handling for Consumers: Number of consumers who more often washed their hands with soap and warm running water before preparing food.
2	Safe Food Handling for Consumers: Number of consumers who now separate raw, cooked, and ready-to-eat foods while storing and preparing.
3	Safe Food Handling for Consumers: Number of consumers who now use a thermometer to check the internal temperature of food.
4	Safe Food Handling for Consumers: Number of consumers who canned vegetables following a tested recipe.
5	Adoption of a homogenization pasteurization process as an alternative to thermal processing by small or mid-sized juice processors (Davidson).
6	If petroleum prices continue to increase, we may identify several applications for chitosan to replace cellulose in the pharmaceutical or plastics industries (Zivanovic).
7	Pending chitosan being granted GRAS (Generally Recognized As Safe) status, our research will lead to applications in edible films and food additives with anti-microbial and thickening properties (Zivanovic).
8	New Approaches in Fruit, Vegetable Preservation (Zivanovic)

Outcome #1

1. Outcome Measures

Safe Food Handling for Consumers: Number of consumers who more often washed their hands with soap and warm running water before preparing food.

2. Associated Institution Types

- 1862 Extension
- 1890 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2011	32913

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done

Results

4. Associated Knowledge Areas

KA Code	Knowledge Area
504	Home and Commercial Food Service
712	Protect Food from Contamination by Pathogenic Microorganisms, Parasites, and Naturally Occurring Toxins

Outcome #2

1. Outcome Measures

Safe Food Handling for Consumers: Number of consumers who now separate raw, cooked, and ready-to-eat foods while storing and preparing.

2. Associated Institution Types

- 1862 Extension
- 1890 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2011	8171

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done

Results

4. Associated Knowledge Areas

KA Code	Knowledge Area
504	Home and Commercial Food Service
712	Protect Food from Contamination by Pathogenic Microorganisms, Parasites, and Naturally Occurring Toxins

Outcome #3

1. Outcome Measures

Safe Food Handling for Consumers: Number of consumers who now use a thermometer to check the internal temperature of food.

2. Associated Institution Types

- 1862 Extension
- 1890 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual

2011 7173

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done

Results

4. Associated Knowledge Areas

KA Code	Knowledge Area
503	Quality Maintenance in Storing and Marketing Food Products
504	Home and Commercial Food Service

Outcome #4

1. Outcome Measures

Safe Food Handling for Consumers: Number of consumers who canned vegetables following a tested recipe.

Not Reporting on this Outcome Measure

Outcome #5

1. Outcome Measures

Adoption of a homogenization pasteurization process as an alternative to thermal processing by small or mid-sized juice processors (Davidson).

Not Reporting on this Outcome Measure

Outcome #6

1. Outcome Measures

If petroleum prices continue to increase, we may identify several applications for chitosan to replace cellulose in the pharmaceutical or plastics industries (Zivanovic).

Not Reporting on this Outcome Measure

Outcome #7

1. Outcome Measures

Pending chitosan being granted GRAS (Generally Recognized As Safe) status, our research will lead to applications in edible films and food additives with anti-microbial and thickening properties (Zivanovic).

2. Associated Institution Types

- 1862 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)

What has been done

Results
We created and applied chitosan-gallic acid multifunctional packaging for reduction of oxidation and extension of shelf life of peanuts and potato chips.

4. Associated Knowledge Areas

KA Code	Knowledge Area
501	New and Improved Food Processing Technologies
502	New and Improved Food Products

Outcome #8

1. Outcome Measures

New Approaches in Fruit, Vegetable Preservation (Zivanovic)

2. Associated Institution Types

- 1862 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)
Advances are needed in nutritional quality and shelf-life of rations for the U.S. military.

What has been done
We evaluated a military database with over ten thousand MRE items with various quality deteriorations.

Results
The results will be used to reduce amount of discarded product, save money, and have an impact on better moral of troops that consume the product during deployment.

4. Associated Knowledge Areas

KA Code	Knowledge Area
501	New and Improved Food Processing Technologies
502	New and Improved Food Products
503	Quality Maintenance in Storing and Marketing Food Products
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

- Competing Public priorities
- Competing Programmatic Challenges

Brief Explanation

{No Data Entered}

V(I). Planned Program (Evaluation Studies)

Evaluation Results

Expanded Food and Nutrition Education Program: Food Safety Education

Over 15% of Tennessee's population lived below the poverty level. (US Census, 2008.) Impoverished families frequently do not have consistent access to enough food to live healthy, active lives. Children from these families are at greater risk for health and developmental problems than children from households with adequate nutritious foods.

The Expanded Food and Nutrition Education Program (EFNEP) targets low-income families with children and operated in 10 of the most impoverished counties in Tennessee. Over 15,000 youth were enrolled in EFNEP in afterschool and school-enrichment sessions. Eighty-five percent of families lived at 100% of the poverty level or below. The majority (86%) of adults were taught in groups and participated in an average of eight lessons. Almost 80% of children were in enrolled in grades K through 5. All education was delivered by 44 paraprofessionals supervised and trained by three area EFNEP specialists.

Adults who graduated from EFNEP completed pre- and post-24-hour dietary recalls and behavior surveys. A summary of 24-hour dietary recalls showed that:

- 31% (596 of 1938 participants) more often followed the recommended practices of not allowing meat and dairy foods to sit out for more than two hours. Furthermore, 26% (499 participants) ALWAYS follow the recommended practice.
- 53% (1019 of 1937 participants) more often followed the recommended practice of not thawing foods at room temperature. Furthermore, 35% (681 participants) ALWAYS follow the recommended practice.
- 54% (1010 of 1867) made an improvement in how frequently they used a meat thermometer to check that food was cooked to a safe temperature.
- 57% (1074 of 1871) made an improvement in how frequently they used a refrigerator to determine that their refrigerator was maintaining a safe temperature.

Key Items of Evaluation

Expanded Food and Nutrition Education Program: Food Safety Education

Over 15% of Tennessee's population lived below the poverty level. (US Census, 2008.) Impoverished families frequently do not have consistent access to enough food to live healthy, active lives. Children from these families are at greater risk for health and developmental problems than children from households with adequate nutritious foods.

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- 54% (1010 of 1867) made an improvement in how frequently they used a meat thermometer to check that food was cooked to a safe temperature.
- 57% (1074 of 1871) made an improvement in how frequently they used a refrigerator to determine that their refrigerator was maintaining a safe temperature.

V(A). Planned Program (Summary)

Program # 9

1. Name of the Planned Program

Forestry, Wildlife, and Fishery Systems

V(B). Program Knowledge Area(s)

1. Program Knowledge Areas and Percentage

KA Code	Knowledge Area	%1862 Extension	%1890 Extension	%1862 Research	%1890 Research
123	Management and Sustainability of Forest Resources	75%	75%	33%	
125	Agroforestry	10%	10%	0%	
133	Pollution Prevention and Mitigation	0%	0%	17%	
135	Aquatic and Terrestrial Wildlife	10%	10%	32%	
301	Reproductive Performance of Animals	0%	0%	7%	
605	Natural Resource and Environmental Economics	5%	5%	11%	
	Total	100%	100%	100%	

V(C). Planned Program (Inputs)

1. Actual amount of FTE/SYs expended this Program

Year: 2011	Extension		Research	
	1862	1890	1862	1890
Plan	8.0	1.0	22.0	0.0
Actual Paid Professional	4.0	0.5	47.1	0.0
Actual Volunteer	3.0	1.0	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**
85366	28018	239543	0
1862 Matching	**1890 Matching**	**1862 Matching**	**1890 Matching**
371021	28018	4004285	0
1862 All Other	**1890 All Other**	**1862 All Other**	**1890 All Other**
75225	13200	2433801	0

V(D). Planned Program (Activity)

1. Brief description of the Activity

UT and TSU Extension will partner with the Tennessee Forestry Association to plan and conduct group meetings to inform forest landowners of issues pertaining to forestry and wildlife. Topics will include management and marketing. Volunteers will be recruited and trained to present at group meetings, provide information, demonstrate equipment and provide materials for demonstrations. UT and TSU Extension will provide education at local, regional and statewide events, such as the Tennessee Forest Festival to inform the general public about forest management issues. Demonstartions will be provide for landowners and forestry workers. Extension Agents and Specialists will educate attendees at County Forestry Landowners Association. UT and TSU Extension will work closely with private consultants, Tennessee Wildlife Resources Agency employees, Tennessee Division of Forestry and others in forestry related industries to develop educational programs and activities for professionals and landowners.

UT and TSU Extension will continue one-on-one contacts with landowners throughout the year and use mass media and newsletters to inform the general public on issues and educational opportunities related to natural resources. Both UT and TSU Extension will provide leadership for conducting programs that target limited resource landowners with TSU providing specialist leadership for this effort.

For Tennessee's forestry sector, UT AgResearch continues biological control of Hemlock Woolly Adelgid by known predators and new species and release technologies.We evaluate methods of increasing seedling success, and techniques for improving reforestation.We exploit genetic variation in nursery and field characteristics of native hardwood and coniferous forest tree species.We try novel strategies to address exotic forest tree pests and corresponding forest restoration. We establish collections of woody plants, including species and cultivars, and plants having potential commercial value as forest species or for landscape development, from which materials may be obtained for breeding/propagation.

For wood products manufacturing, we characterize key parameters associated with the formation of durable, high-performance composite materials, and establish new statistical methods to advance intelligent manufacturing practices. We explore new methods to produce carbon fibers from low-quality raw materials and are developing a process for bonding plastic or polymer to lignocellulosic fibers (using ultrasonic vibration) as a replacement for toxic wood preservatives.

We identify approaches and services to landowners that would enable them to realize a wide range of landownership benefits while fostering stewardship and sustainability of private forest lands in Tennessee. Both qualitative (e.g., personal interviews and focus groups) and quantitative (e.g., survey responses) data are collected and analyzed to better understand landowners understanding of management.

Although manipulative studies of tree seedlings and saplings are cost effective and quick, recent research has shown that they may not allow for valid predictions on mature trees. Therefore, direct experiments on large trees or forested catchments have been developed. Experiments are being conducted on local forest research sites developed by the Department of Energy (DOE). Each are large-scale, multi-year, multi-investigator experiments.

UT AgResearch wildlife and fisheries research evaluates and quantifies the effects of deer on agricultural production and identifies associated land-use patterns and biological and ecological factors that could be used for reducing that impact.We monitor target avian species and relate specific population parameters to factors affecting forest health and sustainability, and develop new forest management prescriptions that promote sustainability.We develop prediction methods and evaluate selected aquatic species in existing and new production systems adapted to Tennessee's climate and geography.

2. Brief description of the target audience

The target audiences for this program are forest landowners, the professionals and volunteers who serve them, as well as those who enjoy the state's wildlife resources.

3. How was eXtension used?

Tennessee is represented by 108 eXtension members in 42 of the 59 approved Communities of Practice (CoP). Tennessee Extension personnel have addressed over 800 Frequently Asked Questions through eXtension. This Forestry, Wildlife, and Fisheries Planned Program was enhanced through the service of:

- one Tennessee Extension personnel on the "Climates, Forests and Woodlands" CoP,
- one Tennessee Extension personnel on the "Extension Wildfire Information Network" CoP,
- one Tennessee Extension personnel on the "Feral Hogs" CoP, and
- one Tennessee Extension personnel on the "Wildlife Damage Management" CoP.

Tennessee Extension personnel shared implementation strategies, outcome measurement, and evaluation protocols with their CoP colleagues.

V(E). Planned Program (Outputs)

1. Standard output measures

2011	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Actual	24464	1331125	8563	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	10	32	42

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

- Release of Hemlock Woolly Adelgid predators reared in Tennessee (Parkman).

Year	Actual
2011	249000

Output #2

Output Measure

- Golden-winged warbler conservation strategy in place for the Cumberland Mountains of Tennessee (Buehler).

Year	Actual
2011	0

Output #3

Output Measure

- A novel wood treatment process was developed that provides better quality railway ties. A collaborative effort between UT and a local company has resulted in a commercial product and treatment system that has already secured orders with large railways valued at over $2 million. (Taylor)

Year	Actual
2011	1

Output #4

Output Measure

- Human disturbance can have a great impact on the health of forested land through altered soil properties and climate, and attempts to repair damage can be costly. We showed that the selection of ground cover species is important for the success of reforestation, that high elevation forests show signs of recovery after insect attack, and that mercury contamination had no long-term impacts on the capability of land to support forest growth in Tennessee. (Franklin)

Year	Actual
2011	1

Output #5

Output Measure

- Northern Bobwhite and other grassland bird populations are declining rapidly throughout the region primarily because of loss of native grassland habitat. Documenting the extent of the decline and population responses to restoration efforts is needed. We developed a monitoring protocol that meets the needs of the National Bobwhite Conservation Initiative and has been implemented across the 7-state Central Hardwoods Bird Conservation Region. Four years of data have been collected under this monitoring protocol. Analyses of these data will determine how much conservation action is needed to reverse the declines of bobwhites and other priority

species. (Buehler)

Year	Actual
2011	1

Output #6

Output Measure

- We have completed a 2-year field study demonstrating that Lonestar tick populations in a middle Tennessee retirement community are infested with three species of Ehrlichia, and that current tick mitigation measures in the community are insufficient to protect residents from the risk of tick-borne disease. (Hickling)

Year	Actual
2011	1

Output #7

Output Measure

- We are working to improve trap designs and success in monitoring the walnut twig beetle, which vectors Thousand Cankers Disease in walnut trees. (Klingeman)

Year	Actual
2011	1

V(G). State Defined Outcomes

V. State Defined Outcomes Table of Content

O. No.	OUTCOME NAME
1	Forest Landowner Education: Number of landowners who now understand the ecology of forest development and succession (using forest management plans or contacting a professional forester.)
2	Forest Landowner Education: Number of landowners who improved profitability (marketing) of forest ownership.
3	Acres of production of freshwater prawn in Tennessee as an alternative income source (Wilson).
4	Extension Master Logger Program
5	Extension Educates Natural Resource Professionals on Restoring Bottomland Ecosystems
6	Post-Harvest Fields Limit Migratory Waterfowl Food (Gray)
7	Protecting amphibians from ranavirus (Gray)
8	Thousand Cankers disease on black Walnut (Grant, Lambdin)
9	Propagating Marine Species for Reintroduction (Wilson)

Outcome #1

1. Outcome Measures

Forest Landowner Education: Number of landowners who now understand the ecology of forest development and succession (using forest management plans or contacting a professional forester.)

2. Associated Institution Types

- 1862 Extension
- 1890 Extension

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2011	466

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done

Results

4. Associated Knowledge Areas

KA Code	Knowledge Area
123	Management and Sustainability of Forest Resources

Outcome #2

1. Outcome Measures

Forest Landowner Education: Number of landowners who improved profitability (marketing) of forest ownership.

2. Associated Institution Types

- 1862 Extension
- 1890 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2011	220

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done

Results

4. Associated Knowledge Areas

KA Code	Knowledge Area
123	Management and Sustainability of Forest Resources

Outcome #3

1. Outcome Measures

Acres of production of freshwater prawn in Tennessee as an alternative income source (Wilson).

2. Associated Institution Types

- 1862 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)
{No Data Entered}

What has been done
{No Data Entered}

Results
{No Data Entered}

4. Associated Knowledge Areas

KA Code	Knowledge Area
135	Aquatic and Terrestrial Wildlife
301	Reproductive Performance of Animals

Outcome #4

1. Outcome Measures

Extension Master Logger Program

2. Associated Institution Types

- 1862 Extension

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)
During forest harvesting operations, Tennessee water quality is often compromised.

What has been done
UT Extension conducted 4 logger workshops of 5 days each (basic training) and 21 continuing education logger workshops (8 hours each).

Results

57 loggers increased their knowledge on best management practices (BMPs) to protect water quality during harvesting operations. These loggers impact approximately 17,000 acres of forest land consisting of 42 million board feet of timber harvested with a value of $6.5 million to landowners on an annual basis. The Tennessee Master Logger educational program has reached more than 2,500 loggers since 1983 or about 90 percent of the state logging workforce. 458 loggers attended and increased their knowledge about BMPs in a 1-day continuing education course (various subjects). A statewide BMP survey was initiated in 2011 collecting data from 205 logging sites statewide to determine BMP implementation rates/compliance. Our survey showed an 89% compliance rate, indicating that loggers were implementing BMPs. 18 of the 24 sites (75%) that were not in compliance were harvested by loggers who had not received the Master Logger training.

4. Associated Knowledge Areas

KA Code	Knowledge Area
123	Management and Sustainability of Forest Resources
605	Natural Resource and Environmental Economics

Outcome #5

1. Outcome Measures

Extension Educates Natural Resource Professionals on Restoring Bottomland Ecosystems

2. Associated Institution Types

- 1862 Extension

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)
Over the past several decades, federal incentive programs have encouraged the restoration of bottomland hardwood forests. Restoration efforts have been marginally successful, mostly because of a lack of knowledge regarding soil conditions on these sites.

What has been done
In 2004 a major bottomland hardwood restoration project was installed at the West Tennessee Research and Education Center involving over 51,000 seedlings on 120 acres. A field day was delivered in 2011 to present the results of survival and growth of 10 different bottomland oak species on this site.

Results
The field day reached across five agencies, targeting natural resource professionals who advise landowners on bottomland restoration. Collectively the 60 participants advise on 43,000 acres annually. Of the participants, 100% indicated they had received valuable information from the program, 93% will adopt new practices and 83% felt financial resources spent on bottomland restoration will be more efficiently used as a result of the program.

4. Associated Knowledge Areas

KA Code	Knowledge Area
123	Management and Sustainability of Forest Resources
605	Natural Resource and Environmental Economics

Outcome #6

1. Outcome Measures

Post-Harvest Fields Limit Migratory Waterfowl Food (Gray)

2. Associated Institution Types

- 1862 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)
Biologists and hunters that manage land for waterfowl are concerned that post-harvest, agricultural fields provide little food for migratory waterfowl.

What has been done
There were six major findings: (1) seed mass of grain sorghum, corn, and soybean left behind combines immediately following harvest has decreased approximately 33% since the 1980s, (2) continuous monthly rates of decline from harvest to January were 64% for corn, 84% for soybean, and 74% for grain sorghum, (3) 70 ? 90% of harvested fields had little to no seed available for waterfowl by January, (4) corn seed was lost primarily to depredation whereas soybean and grain sorghum seed were lost mostly to decomposition and germination, (5) very little seed was lost in unharvested fields, and (6) loss of submersed seed in flooded fields was 40−300% greater than on dry land.

Results
These findings indicate that waterfowl biologists should provide unharvested food plots for waterfowl because seed resources are low in winter in harvested agricultural fields. Given rapid seed loss in harvested and flooded fields, managers should delay harvesting and flooding until immediately prior to the arrival of waterfowl.

4. Associated Knowledge Areas

KA Code	Knowledge Area
123	Management and Sustainability of Forest Resources
135	Aquatic and Terrestrial Wildlife
605	Natural Resource and Environmental Economics

Outcome #7

1. Outcome Measures

Protecting amphibians from ranavirus (Gray)

2. Associated Institution Types

- 1862 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)
Ranaviruses may be a significant risk to ranid frogs.

What has been done
We found that (1) high susceptibility to ranavirus in amphibian hosts is associated with small geographic range, fast development in the larval stage, and breeding in semi-permanent wetlands, (2) amphibians in the family Ranidae tend to have high susceptibility to ranavirus, and (3) susceptibility to ranavirus differs among pre-metamorphic developmental stages, with the egg stage least susceptible.

Results
These findings indicate that ranaviruses may be a significant risk to ranid frogs and contribute to population declines. Translocation of egg masses to ranavirus-free breeding sites can be an

effective strategy to reestablish amphibian populations.

4. Associated Knowledge Areas

KA Code	Knowledge Area
133	Pollution Prevention and Mitigation
135	Aquatic and Terrestrial Wildlife
301	Reproductive Performance of Animals

Outcome #8

1. Outcome Measures

Thousand Cankers disease on black Walnut (Grant, Lambdin)

2. Associated Institution Types

- 1862 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)
We need to preserve the 1.64 million black walnut trees with a value of $430 million annually in urban and forest environments.

What has been done
Since we initiated studies on the invasive pest, walnut twig beetle, that is responsible for transmitting the thousand cankers disease, we have documented the life history of this pest with data providing information that could be used to manage pest populations on black walnut. Our preliminary data infers that the various chemicals available have limited, to no effect on the beetle once it bores into the cambial tissue of its host tree.

Results
We have observed predaceous beetles that feed on the pest in lab studies which may lead to the development of biological control agents that can be used to suppress and stabilize the population of this pest and prevent serious damage to the trees. Techniques are being developed that can be used to mass rear populations of these predators for release in pest infested areas for control.

4. Associated Knowledge Areas

KA Code	Knowledge Area
123	Management and Sustainability of Forest Resources
125	Agroforestry
605	Natural Resource and Environmental Economics

Outcome #9

1. Outcome Measures

Propagating Marine Species for Reintroduction (Wilson)

2. Associated Institution Types

- 1862 Research

3a. Outcome Type:

Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Actual
2011	20

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Stream health and water quality caused the loss of aquatic species in Tennessee and North Carolina rivers.

What has been done
Five species have re-established reproducing populations, and successful recruitment has been observed in four additional species. For the first time since 2000, mussels have been translocated into the Pigeon River in both TN and NC. In June 2011, fifty-eight (58) tagged wavy-rayed lampmussel were released. In October 2011, TWRA reintroduced 6 species of mussels (755 individuals) into the Pigeon River.

Results
Since its inception in 2001, the PRRP has re-introduced 20 species of fish, including more than 29,000 individuals, into TN & NC portions of the Pigeon River. It appears stream health and water quality has improved sufficiently to support many of the aquatic species that were previously extirpated from the river.

4. Associated Knowledge Areas

KA Code	Knowledge Area

123	Management and Sustainability of Forest Resources
133	Pollution Prevention and Mitigation
135	Aquatic and Terrestrial Wildlife
301	Reproductive Performance of Animals

V(H). Planned Program (External Factors)

External factors which affected outcomes

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

Brief Explanation

V(I). Planned Program (Evaluation Studies)

Evaluation Results

In 2011, evaluation efforts for forestry, wildife and fisheries focused on the Tennessee Healthy Hardwoods (THH) Program. UT Extension has been instrumental in formation and support of County Forestry Associations (CFAs) involving 48 counties since 1999. Members of these associations have expressed desire and need in joining with other associations to hold regional forestry field days to view and learn first-hand about sustainable forest management practices.

During 2011, four regional forestry field days were held at Tennessee State Forests. The 2011 theme was "Restoration of Hardwood Forests," and included both state agency and private partners.

The 222 participants at the four Tennessee Healthy Hardwoods field days owned 66,782 acres of forestland. Highlights include:98% indicated they would adopt new practices addressed at the events, 99% thought that their hardwood plantings will be more successful as a result of attending, 96% agreed that financial and physical resources will be more efficiently used in tree planting projects, 30% had never attended an Extension program before, and collectively the attendees agreed to restore 1,076 acres (or approximately 586,000 seedlings) to hardwood forest.

Key Items of Evaluation

V(A). Planned Program (Summary)

Program # 10

1. Name of the Planned Program

Global Food Security and Hunger

V(B). Program Knowledge Area(s)

1. Program Knowledge Areas and Percentage

KA Code	Knowledge Area	%1862 Extension	%1890 Extension	%1862 Research	%1890 Research
102	Soil, Plant, Water, Nutrient Relationships	0%	0%	7%	
133	Pollution Prevention and Mitigation	0%	0%	2%	
201	Plant Genome, Genetics, and Genetic Mechanisms	0%	0%	3%	
202	Plant Genetic Resources	0%	0%	4%	
203	Plant Biological Efficiency and Abiotic Stresses Affecting Plants	0%	0%	6%	
204	Plant Product Quality and Utility (Preharvest)	0%	0%	2%	
205	Plant Management Systems	50%	50%	11%	
206	Basic Plant Biology	0%	0%	7%	
211	Insects, Mites, and Other Arthropods Affecting Plants	5%	5%	10%	
212	Pathogens and Nematodes Affecting Plants	5%	5%	14%	
215	Biological Control of Pests Affecting Plants	0%	0%	3%	
216	Integrated Pest Management Systems	0%	0%	5%	
301	Reproductive Performance of Animals	0%	0%	3%	
302	Nutrient Utilization in Animals	0%	0%	2%	
303	Genetic Improvement of Animals	0%	0%	3%	
304	Animal Genome	0%	0%	2%	
305	Animal Physiological Processes	0%	0%	5%	
306	Environmental Stress in Animals	0%	0%	2%	
311	Animal Diseases	0%	0%	8%	
601	Economics of Agricultural Production and Farm Management	40%	40%	1%	
	Total	100%	100%	100%	

V(C). Planned Program (Inputs)

1. Actual amount of FTE/SYs expended this Program

Extension	Research

Year: 2011	1862	1890	1862	1890
Plan	27.0	2.0	98.0	0.0
Actual Paid Professional	23.0	2.0	101.6	0.0
Actual Volunteer	17.0	2.0	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**
426828	140090	1887016	0
1862 Matching	**1890 Matching**	**1862 Matching**	**1890 Matching**
1855107	140090	12207942	0
1862 All Other	**1890 All Other**	**1862 All Other**	**1890 All Other**
317738	0	1519304	0

V(D). Planned Program (Activity)

1. Brief description of the Activity

In 2011, Extension agents and specialists taught Tennessee row crop farmers the following:

- conservation tillage;
- planting insect-tolerant crops;
- planting herbicide-tolerant crops;
- spraying with foliar fungicide to manage disease;
- using recommended varieties.

Producers of corn, soybeans, wheat, and commercial vegetables are challenged each year with high costs of production, relatively low profit margins, and a host of other issues such as plant diseases, weather, and competition from other countries in world markets. Because farmers often operate with a relatively low profit margin, economic feasibility as well as efficacy of new genetics or technology for pest and disease control is of paramount importance. Farmers need to be aware of the comparative performance of new technologies in order to make appropriate decisions on pest and disease management. Little information exists about the economics of those technologies and systems under differing production conditions. In addition, the economics of systems vary as the combination of system and production environment change, and as relative prices and costs change.

We conduct applied and basic research in animal health, nutrition, physiology, and genomics to address high priority problems of the livestock industries. We disseminate information gained from these studies to producers, veterinarians, and others associated with the animal industries through outreach programs and publications.

Surveillance of possible disease vectors is maintained throughout the insect season; suspected vectors are tested for appropriate viruses. Risk factor analysis test results are compared between sites where disease risk is high vs. those where disease risk is low. Mastitis susceptible and resistant dairy cows are used to identify potential genes, immune components, and other factors associated with and

responsible for mastitis resistance. A series of trials uses pigs to test various feeding regimens and feed additives to determine effects on the number of antibiotic resistant foodborne pathogens occurring in those animals and their environment. Additional studies are detecting the prevalence of antibiotic resistant bacteria associated with cattle and surrounding environments. These studies should help determine strategies to limit such foodborne risks.

2. Brief description of the target audience

The program was targeted to all Tennessee corn, soybeans, wheat and commercial vegetable producers.

3. How was eXtension used?

Tennessee is represented by 108 eXtension members in 42 of the 59 approved Communities of Practice (CoP). Tennessee Extension personnel have addressed over 800 Frequently Asked Questions through eXtension. This Global Food Security and Hunger Planned Program was enhanced through the service of

- four Tennessee Extension personnel on the "Bee Health" CoP, including the leader of the CoP.
- two Tennessee Extension personnel on the "Corn and Soybean" CoP.
- one Tennessee Extension personnel on the "eOrganic" CoP.
- three Tennessee Extension professionals on the "Grapes" CoP.

Tennessee Extension personnel shared implementation strategies, outcome measurement, and evaluation protocols with their CoP colleagues.

Agriculture depends on healthy honey bees. UT Extension was part of a 21-member national coalition representing 17 institutions that formed the eXtension Bee Health CoP. The group provided 544 pages of content and used the YouTube Bee Health channel to provide 31 videos for stakeholders and the general public. This program now has more than 2,100 enrolled. In addition, use of the bee health eXtension resources increased 44%.

V(E). Planned Program (Outputs)

1. Standard output measures

2011	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Actual	71082	6584749	3428	0

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

Patent Applications Submitted

Year: 2011

Actual: 2

Patents listed

Increasing Soybean Defense Against Pathogens
Engineering Male Sterility or Non-Transgenic Pollen

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

2011	Extension	Research	Total
Actual	5	117	122

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

- Number of exhibits displayed to educate producers.

Year	Actual
2011	3454

Output #2

Output Measure

- Number of research-based publications distributed to educate producers.

Year	Actual
2011	203242

Output #3

Output Measure

- Development of a 'hand-held' diagnostic device for Johne's disease by merging our diagnostic method and microfluidic technology. (Eda)
  Not reporting on this Output for this Annual Report

Output #4

Output Measure

- Exploitation of the strong resistance mechanism in epazote to the plant parasitic nematode, Meloidogyne incognita (Bernard)
  Not reporting on this Output for this Annual Report

Output #5

Output Measure

- Exploit pesticides not only for their weed-killing potential, but also for their nutritional enhancement potential (Kopsell).

Year	Actual
2011	1

Output #6

Output Measure

- Release a new soybean variety tailored to Tennessee needs (Pantalone).
  Not reporting on this Output for this Annual Report

Output #7

Output Measure

- Providing a high fiber supplement prior to weaning (beef cattle) may temper the animals? stress response due to weaning when total separation is employed. (Kattesh)

Year	Actual
2011	1

Output #8

Output Measure

- We have identified enhanced gut healing as a resistance mechanism to biopesticides. Characterization of this process is allowing us to better understand how the gut epithelium heals after intoxication and to identify steps in this process that we can inhibit using novel pesticides. (Jurat-Fuentes)

Year	Actual
2011	1

Output #9

Output Measure

- Prediction of corn yield would be beneficial in determining the most efficient fertilization requirements for corn in different areas of a field. It was determined that yield could be reasonably estimated before corn harvest using plant height and that this might allow some in-season nitrogen fertilizer adjustments and could also be used for more efficient future nitrogen fertilization management. (Tyler)

Year	Actual
2011	1

Output #10

Output Measure

- Wheat line TN902 produced 5 bushels/acre more than the average of 44 varieties in the Tennessee State Wheat Variety trial in 2010 and 2011. If this variety replaced an average variety on one-fourth of the wheat acres in Tennessee it would add approximately one-half million bushels of production and three million dollars of income for Tennessee's farmers. (West)

Year	Actual
2011	1

Output #11

Output Measure

- We developed a diagnostic method for bovine tuberculosis, a re-emerging infectious disease in livestock and wild animals. (Eda)

Year	Actual
2011	1

Output #12

Output Measure

- Matching calving seasons so cows are not bred during periods of high toxin levels and added heat stress should result in improved efficiency and profitability of beef herds in the fescue belt. (Waller)

Year	Actual
2011	1

Output #13

Output Measure

- Recognition and publication of the description of a new genus and species of cyst nematode, Vittatidera zeaphila makes it possible for growers, extension agents, and ag scientists to identify this potentially serious pathogen of corn in the mid-South. Scientists are already testing available corn lines for sources of resistance. (Bernard)

Year	Actual
2011	1

Output #14

Output Measure

- We have identified a receptor for a toxin used in biopesticides. A fragment of this receptor enhances the activity of the toxin. Understanding how the receptor and toxin interact is expected to advance development of novel biopesticides currently unavailable to control damaging beetle pests. (Jurat-Fuentes)

Year	Actual
2011	1

Output #15

Output Measure

- Through applied research, the Center for Native Grasslands Management has developed basic production guidelines for use of native grasses in forage systems in the region. This has included gaining experience and data on appropriate grazing periods, stocking rates, grazing strategies, and integration with biofuels production. We have also made important advances in our understanding and experience relating to establishment native grasses and harvesting them for hay. (Keyser)

Year	Actual
2011	1

Output #16

Output Measure

- Developed a high density genetic linkage map (think road map) for the vegetable pathogen Phytophthora capsici. The map, like any map, is necessary to know where we've been and where we are going. This map will support the development of new, disease resistant vegetables. (Lamour)

Year	Actual
2011	1

Output #17

Output Measure

- Developed an application of novel molecular markers to understand the biology of the taro pathogen, Phytophthora colocasiae. Prior to this, there were none. This work directly supports the efforts of breeders to make new, disease resistant taro. (Lamour)

Year	Actual
2011	1

Output #18

Output Measure

- X-ray technology for observing root systems without digging up and killing plants has at least two major benefits. First is a huge savings in labor costs and consumption of pots, soil, and greenhouse space, since a few plants can take the place of many. Second and more important, this imaging technology provides new ways of looking at how plants and pathogens interact, and will allow us to determine the role root architecture plays in plant disease. (Bernard)

Year	Actual
2011	1

V(G). State Defined Outcomes

V. State Defined Outcomes Table of Content

O. No.	OUTCOME NAME
1	Wheat: Number of acres utilized precision agriculture technologies for varibale rate application of plant growth regulators, defoliants, or pesticides.
2	Wheat: NUmber of producers who adopted UT recommended resistance management strategies to control pests (weeds, insects, diseases).
3	Soybeans: Number of producers who learned soybean best management prcatices that can improve production potential (e.g., conservation tillage, winter covers, plant population, row spacing, planting dates, plant growth regulators, harvest, variety selection, irrigatin, fertility).
4	Soybeans: Percebtage increase in Tennessee soybean yield by using recommended crop management strategies for insects, weeds, or plant diseases.
5	Corn: Percentage increase in Tennessee corn yield by using recommended crop management strategies for insects, weeds, or plant diseases.
6	Corn: Number of producers who reported harvesting higher corn yields and/or better quality crops using university variety trials.
7	Additional income earned by Tennessee producers by using UT Extension crop variety research trial results (in millions of dollars).
8	Agronomic testing of corn, soybean, wheat, grain sorghum and oats, varieties tested. (Allen)
9	Target number of research laboratories using our reverse-genetic tool for Phytophthora gene function analysis (Lamour).
10	Extension Corn Production Program Economic Impact
11	Extension Soybean Production Program Economic Impact
12	Extension Commercial Fruits and Vegetables Production Program Ecomonic Impact
13	Percent of producers using pre-applied herbicide to combat glyphosate-resistant weeds (Steckel, Mueller)
14	Identifying alternative fertilizers (Walker)

Outcome #1

1. Outcome Measures

Wheat: Number of acres utilized precision agriculture technologies for varibale rate application of plant growth regulators, defoliants, or pesticides.

Not Reporting on this Outcome Measure

Outcome #2

1. Outcome Measures

Wheat: NUmber of producers who adopted UT recommended resistance management strategies to control pests (weeds, insects, diseases).

2. Associated Institution Types

- 1862 Extension
- 1890 Extension

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2011	993

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done

Results

4. Associated Knowledge Areas

KA Code	Knowledge Area
205	Plant Management Systems
211	Insects, Mites, and Other Arthropods Affecting Plants
212	Pathogens and Nematodes Affecting Plants
601	Economics of Agricultural Production and Farm Management

Outcome #3

1. Outcome Measures

Soybeans: Number of producers who learned soybean best management prcatices that can improve production potential (e.g., conservation tillage, winter covers, plant population, row spacing, planting dates, plant growth regulators, harvest, variety selection, irrigatin, fertility).

2. Associated Institution Types

- 1862 Extension
- 1890 Extension

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2011	1626

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done

Results

4. Associated Knowledge Areas

KA Code	Knowledge Area
205	Plant Management Systems
211	Insects, Mites, and Other Arthropods Affecting Plants
212	Pathogens and Nematodes Affecting Plants
601	Economics of Agricultural Production and Farm Management

Outcome #4

1. Outcome Measures

Soybeans: Percebtage increase in Tennessee soybean yield by using recommended crop management strategies for insects, weeds, or plant diseases.

Not Reporting on this Outcome Measure

Outcome #5

1. Outcome Measures

Corn: Percentage increase in Tennessee corn yield by using recommended crop management strategies for insects, weeds, or plant diseases.

Not Reporting on this Outcome Measure

Outcome #6

1. Outcome Measures

Corn: Number of producers who reported harvesting higher corn yields and/or better quality crops using university variety trials.

2. Associated Institution Types

- 1862 Extension
- 1890 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2011	549

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done

Results

4. Associated Knowledge Areas

KA Code	Knowledge Area
205	Plant Management Systems
211	Insects, Mites, and Other Arthropods Affecting Plants
212	Pathogens and Nematodes Affecting Plants
601	Economics of Agricultural Production and Farm Management

Outcome #7

1. Outcome Measures

Additional income earned by Tennessee producers by using UT Extension crop variety research trial results (in millions of dollars).

2. Associated Institution Types

- 1862 Extension
- 1890 Extension

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2011	170

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done

Results

4. Associated Knowledge Areas

KA Code	Knowledge Area
205	Plant Management Systems
211	Insects, Mites, and Other Arthropods Affecting Plants
212	Pathogens and Nematodes Affecting Plants
601	Economics of Agricultural Production and Farm Management

Outcome #8

1. Outcome Measures

Agronomic testing of corn, soybean, wheat, grain sorghum and oats, varieties tested. (Allen)

Not Reporting on this Outcome Measure

Outcome #9

1. Outcome Measures

Target number of research laboratories using our reverse-genetic tool for Phytophthora gene function analysis (Lamour).

Not Reporting on this Outcome Measure

Outcome #10

1. Outcome Measures

Extension Corn Production Program Economic Impact

2. Associated Institution Types

- 1862 Extension

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)
Corn growers harvested more than 730,000 acres of corn for grain with a current state average yield of 136 bushels per acre in 2011. Average yields were the result of dry weather and heat during the growing season.

What has been done
Agents in 24 counties reported more than 13,000 contacts related to corn production made by direct methods. 179,665 acres of corn scouted by a UT-trained scout to help make crop management decisions.

Results
*Producers increased corn yield by 419,007 bushels/acre by selecting top yielding varieties on 1,393,676 acres of corn increasing their income by $47,384,984.
*549 corn producers report a $104,312 reduction in pest control costs by following recommended control strategies for insects, weeds or plant diseases.

4. Associated Knowledge Areas

KA Code	Knowledge Area
205	Plant Management Systems

Outcome #11

1. Outcome Measures

Extension Soybean Production Program Economic Impact

2. Associated Institution Types

- 1862 Extension

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)
Soybean growers harvested more than 1.25 million acres of soybean for seed with a current state average yield of 34 bushels per acre in 2011. Average yields were the result of dry weather and heat during the growing season.

What has been done
Agents in 23 counties reported more than 30,000 contacts related to soybean production. 209,782 acres of soybeans scouted by a UT-trained scout to help make crop management decisions.

Results
*Producers increased yield by 247,973 bushels by selecting top yielding varieties on 2598719 acres of soybeans, earning an extra $88,356,446.
*394 soybean producers report a $114014 reduction in pest control costs by following recommended control strategies for insects, weeds or plant diseases.

4. Associated Knowledge Areas

KA Code	Knowledge Area
205	Plant Management Systems

Outcome #12

1. Outcome Measures

Extension Commercial Fruits and Vegetables Production Program Ecomonic Impact

2. Associated Institution Types

- 1862 Extension

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)
UT extension increased emphasis on production techniques and food safety awareness for greater profitability for Tennessee producers and increased food safety for consumers.

What has been done
Programs by UT Extension in fruit and vegetable crops have resulted in over 24,800 direct educational contacts during 2011. Areas of emphasis included IPM, season extension, organic production, conservation practices, food safety training and value-added marketing strategies.

Results
151 fruit and/or vegetable producers realized an economic impact of $260,268 in savings, increased revenue and one-time capital purchases by adopting season extension or organic production practices.

4. Associated Knowledge Areas

KA Code	Knowledge Area
205	Plant Management Systems

Outcome #13

1. Outcome Measures

Percent of producers using pre-applied herbicide to combat glyphosate-resistant weeds (Steckel, Mueller)

2. Associated Institution Types

- 1862 Research

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2011	80

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
A conservative estimate of how much glyphosate-resistant (GR) weeds cost Tennessee growers is over $137,000,000 dollars annually. This cost includes use of additional herbicides, more application costs and loss of yield from weed competition. Of that additional expense over $75,000,000 is from the cost of additional herbicides.

What has been done
A large part of the research we have conducted is how to choose the right herbicides utilized the right way to become more efficient managing glyphosate-resistant (GR) weeds. One management strategy we stress based on our research is to use a pre-emergence-applied herbicide.

Results
In a recent survey of producers 80% now use a pre-applied herbicide to combat resistant weeds up from less than 40% in 2006.

4. Associated Knowledge Areas

KA Code	Knowledge Area
204	Plant Product Quality and Utility (Preharvest)
205	Plant Management Systems
601	Economics of Agricultural Production and Farm Management

Outcome #14

1. Outcome Measures

Identifying alternative fertilizers (Walker)

2. Associated Institution Types

- 1890 Extension
- 1862 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)
Due the rising cost of commercial fertilizers, some Tennessee producers are opting to reduce or even eliminate their use of fertilizers to maintain healthy and productive pastures. There is a need to identify and evaluate the use of locally available fertilizers such as broiler litter and biosolids that can be used as alternatives to commercial fertilizers.

What has been done
An integrated research, education, and outreach program has been established in Tennessee to assess the yield and forage quality response of fescue grass stands to two alternative fertilizers available in Tennessee: broiler litter and an exceptional quality (EQ) biosolid produced by Nashville Metro. A three year program of field research was established in 2009.

Results
Broiler litter and biosolids are being used at rates that improve yields without negatively impacting forage quality, replace the need for use phosphate fertilizers, and reduce the need for nitrogen fertilizers.

4. Associated Knowledge Areas

KA Code	Knowledge Area
102	Soil, Plant, Water, Nutrient Relationships
133	Pollution Prevention and Mitigation
205	Plant Management Systems
601	Economics of Agricultural Production and Farm Management

V(H). Planned Program (External Factors)

External factors which affected outcomes

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

Brief Explanation

Corn growers harvested more than 730,000 acres of corn for grain with a current state average yield of 136 bushels per acre in 2011. Average yields were the result of dry weather and heat during the growing season. Soybean growers harvested more than 1.25 million acres of soybean for seed with a current state average yield of 34 bushels per acre in 2011. Average yields were the result of dry weather and heat during the growing season.

V(I). Planned Program (Evaluation Studies)

Evaluation Results

Crop Variety Trials and Pest Control

Tennessee farmers produce about 2.85 million acres of oilseed, grain and cotton crops. UT Extension crop variety testing data is used extensively by 80% of these farmers to select the seed that they use to plant their crops. Results from the variety testing program have helped farmers increase yields by identifying the varieties that will perform best in their farming operations. The higher yields have resulted in approximately $170 million in additional income annually to Tennessee farmers. Farmers reported $7.8 million in reduced pest control costs by following Extension recommendations for controlling insects, weeds, or plant diseases.

Key Items of Evaluation

V(A). Planned Program (Summary)

Program # 11

1. Name of the Planned Program

Health and Safety

V(B). Program Knowledge Area(s)

1. Program Knowledge Areas and Percentage

KA Code	Knowledge Area	%1862 Extension	%1890 Extension	%1862 Research	%1890 Research
402	Engineering Systems and Equipment	5%	5%	0%	
724	Healthy Lifestyle	70%	70%	0%	
805	Community Institutions, Health, and Social Services	25%	25%	0%	
	Total	100%	100%	0%	

V(C). Planned Program (Inputs)

1. Actual amount of FTE/SYs expended this Program

Year: 2011	Extension		Research	
	1862	1890	1862	1890
Plan	15.0	2.0	0.0	0.0
Actual Paid Professional	23.0	23.0	0.0	0.0
Actual Volunteer	17.0	2.0	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
426828	140090	0	0
1862 Matching	**1890 Matching**	**1862 Matching**	**1890 Matching**
1855107	140090	0	0
1862 All Other	**1890 All Other**	**1862 All Other**	**1890 All Other**
185975	0	0	0

V(D). Planned Program (Activity)

1. Brief description of the Activity

Dining with Diabetes was a three-session course offered throughout the state. This course was taught by Extension Family and Consumer Sciences Agents who coordinated with local health officials to target people with diabetes and/or thier caregivers.

Arthritis Self-Help was delivered in six sessions. Each session was two-hours in length. Participants were provided with the book, The Arthritis Helpbook, written by Kate Lorig and James Fries. This evidence-based program was designed to increase the self-confidence of participants to manage their arthritis. It was deleivered by Extension, in partnership with the Tennessee Chapter of the Arthritis Foundation, the Tennessee Department of Health's Arthritis Control Program, and the University of Tennessee Medical Center's Department of Family Medicine. Specific efficacy-enhancing strategies used in this program included:

- Contracting: Weekly contracting helps participants master something new.
- Feedback: Opportunity is provided to report and record progress and explore different behaviors.
- Modeling: People learn more and try harder when they are motivated by people whom they perceive to be like themselves. Program participants and the trainer serve as models. The course has an emphasis on modeling.
- Reinterpreting Symptoms and Changing Beliefs: People are pretty rational. They act based on beliefs. If people believe arthritis is a wear and tear disease, then they may not think they can exercise. If they think that nothing can be done for their arthritis, they are probably right. Throughout this program, there is a great emphasis on changing such beliefs.
- Persuasion: By seeing others in the class contract and succeed, even the most reluctant participant will often choose to take part. It is hard not to go along with others. The facilitator urges participants to do a little more than they are doing now, such as walking four blocks instead of two.

Tai Chi also targeted arthritis sufferers. Extension offered this exercise instructional program to individuals throughout the state. Research indicates that this regimen builds strength and helps those with arthritis to reduce pain and increase mobility.

2. Brief description of the target audience

The target audience is inclusive of consumers and limited resource individuals and families. The Dining with Diabetes program targets individuals with this chronic disease and the caregivers, health profesionals and volunteers who serve them.

3. How was eXtension used?

Tennessee is represented by 108 eXtension members in 42 of the 59 approved Communities of Practice (CoP). Tennessee Extension personnel have addressed over 800 Frequently Asked Questions through eXtension.

This Health and Safety Planned Program was enhanced through the service of

- two Tennessee Extension personnel on the "Drinking Water and Human Health" CoP, and
- seven Tennessee Extension personnel on the "Extension Disaster Education Network" CoP.

Tennessee Extension personnel shared implementation strategies, outcome measurement, and evaluation protocols with their CoP colleagues.

V(E). Planned Program (Outputs)

1. Standard output measures

2011	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Actual	70405	4500000	20517	0

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

Patent Applications Submitted

Year: 2011

Actual: 2

Patents listed

Genetic Marker for Osteosarcoma

Clinical Evaluation and Use of a Conformal Ultra Wideband Multilayer Applicator (cumla) for Hyperthermia Treatment of Cancer

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

2011	Extension	Research	Total
Actual	1	0	1

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

- Number of exhibits built and displayed to promote program awareness and participation.

Year	Actual
2011	265

Output #2

Output Measure

- Number of research-based publications distributed as part of this program.

Year	Actual
2011	71076

V(G). State Defined Outcomes

V. State Defined Outcomes Table of Content

O. No.	OUTCOME NAME
1	Arthritis Self-Help Course: Number of participants surveyed who have less pain from their arthritis.
2	Arthritis Self-Help Course: Number of participants surveyed who take fewer medications for their arthritis pain.
3	Dining with Diabetes: Number of participants surveyed who reduced weight.
4	Dining with Diabetes: Number of participants surveyed who reduced A1c.
5	Dining with Diabetes: Number of participants surveyed who reduced blood cholesterol.
6	Dining with Diabetes: Number of participants surveyed who reduced blood pressure.
7	Dining with Diabetes: Number of participants surveyed who eat at least five servings of fruits and vegetables each day.
8	Dining with Diabetes: Number of participants surveyed who now use artificial sweeteners.
9	Dining with Diabetes: Number of participants surveyed who use spices and other seasonings to cut back on fat, sugar, and salt.
10	Tai Chi: Number of participants surveyed who continue doing the Tai Chi after the Tai Chi program ends.
11	Tai Chi: Number of participants surveyed who have no pain from arthritis.
12	Extension Chronic Disease Self-Management Programs

Outcome #1

1. Outcome Measures

Arthritis Self-Help Course: Number of participants surveyed who have less pain from their arthritis.

2. Associated Institution Types

- 1862 Extension
- 1890 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2011	44

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done

Results

4. Associated Knowledge Areas

KA Code	Knowledge Area
724	Healthy Lifestyle
805	Community Institutions, Health, and Social Services

Outcome #2

1. Outcome Measures

Arthritis Self-Help Course: Number of participants surveyed who take fewer medications for their arthritis pain.

2. Associated Institution Types

- 1862 Extension
- 1890 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2011	36

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done

Results

4. Associated Knowledge Areas

KA Code	Knowledge Area
724	Healthy Lifestyle
805	Community Institutions, Health, and Social Services

Outcome #3

1. Outcome Measures

Dining with Diabetes: Number of participants surveyed who reduced weight.

Not Reporting on this Outcome Measure

Outcome #4

1. Outcome Measures

Dining with Diabetes: Number of participants surveyed who reduced A1c.

2. Associated Institution Types

- 1862 Extension
- 1890 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2011	136

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done

Results

4. Associated Knowledge Areas

KA Code	Knowledge Area
724	Healthy Lifestyle
805	Community Institutions, Health, and Social Services

Outcome #5

1. Outcome Measures

Dining with Diabetes: Number of participants surveyed who reduced blood cholesterol.

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2011	448

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done

Results

4. Associated Knowledge Areas

KA Code	Knowledge Area
724	Healthy Lifestyle

Outcome #6

1. Outcome Measures

Dining with Diabetes: Number of participants surveyed who reduced blood pressure.

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2011	448

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done

Results

4. Associated Knowledge Areas

KA Code	Knowledge Area
724	Healthy Lifestyle

Outcome #7

1. Outcome Measures

Dining with Diabetes: Number of participants surveyed who eat at least five servings of fruits and vegetables each day.

Not Reporting on this Outcome Measure

Outcome #8

1. Outcome Measures

Dining with Diabetes: Number of participants surveyed who now use artificial sweeteners.

2. Associated Institution Types

- 1862 Extension
- 1890 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2011	430

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done

Results

4. Associated Knowledge Areas

KA Code	Knowledge Area
724	Healthy Lifestyle
805	Community Institutions, Health, and Social Services

Outcome #9

1. Outcome Measures

Dining with Diabetes: Number of participants surveyed who use spices and other seasonings to cut back on fat, sugar, and salt.

2. Associated Institution Types

- 1862 Extension
- 1890 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2011	430

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done

Results

4. Associated Knowledge Areas

KA Code	Knowledge Area
724	Healthy Lifestyle
805	Community Institutions, Health, and Social Services

Outcome #10

1. Outcome Measures

Tai Chi: Number of participants surveyed who continue doing the Tai Chi after the Tai Chi program ends.

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2011	312

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done

Results

4. Associated Knowledge Areas

KA Code	Knowledge Area
724	Healthy Lifestyle

Outcome #11

1. Outcome Measures

Tai Chi: Number of participants surveyed who have no pain from arthritis.

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2011	399

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done

Results

4. Associated Knowledge Areas

KA Code	Knowledge Area
724	Healthy Lifestyle

Outcome #12

1. Outcome Measures

Extension Chronic Disease Self-Management Programs

2. Associated Institution Types

- 1862 Extension

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)
Chronic illness is classified as an illness that recurs or persists for a long period and may last for a person's entire life. Such conditions are the principal cause of disability and the major reason for seeking health care. Chronic disease accounts for over 70% of all health care expenditures.

What has been done
UT Extension was licensed to offer the Stanford Universoty School of Medicine "Chronic Disease Self-Management Program," a workshop where people with different chronic diseases attend together. It teaches the skills needed in the day-to-day management of treatment and to maintain and/or increase life?s activities. In 2011, UT Extension made 16,583 direct contacts in 46 counties.

Results
1273 participants feel confident they can apply pain management techniques, such as muscle relaxation, bretahing and guided imagery.
1053 participants plan to exercise more often to help manage their chronic ocndition.
1001 participants will apply positive thinking as a technique for overcoming or avoiding depression caused from their chronic conditions.

4. Associated Knowledge Areas

KA Code	Knowledge Area
724	Healthy Lifestyle
805	Community Institutions, Health, and Social Services

V(H). Planned Program (External Factors)

External factors which affected outcomes

- Competing Public priorities
- Competing Programmatic Challenges

Brief Explanation

V(I). Planned Program (Evaluation Studies)

Evaluation Results

Health Literacy

Increasing health literacy and adopting healthy habits such as increasing exercise and participating in health screenings have shown to improve health and reduce the risk of many chronic diseases, such as diabetes and high blood pressure. For every dollar spent on UT Extension health education programs, $25 is saved on direct medical costs and indirect expenditures, resulting in a $57 million benefit to Tennessee.

Key Items of Evaluation

V(A). Planned Program (Summary)

Program # 12

1. Name of the Planned Program

Horticultural Systems

V(B). Program Knowledge Area(s)

1. Program Knowledge Areas and Percentage

KA Code	Knowledge Area	%1862 Extension	%1890 Extension	%1862 Research	%1890 Research
201	Plant Genome, Genetics, and Genetic Mechanisms	0%	0%	12%	
202	Plant Genetic Resources	0%	0%	8%	
203	Plant Biological Efficiency and Abiotic Stresses Affecting Plants	0%	0%	5%	
204	Plant Product Quality and Utility (Preharvest)	0%	0%	1%	
205	Plant Management Systems	60%	60%	1%	
211	Insects, Mites, and Other Arthropods Affecting Plants	10%	10%	12%	
212	Pathogens and Nematodes Affecting Plants	0%	0%	12%	
213	Weeds Affecting Plants	10%	10%	29%	
216	Integrated Pest Management Systems	10%	10%	12%	
312	External Parasites and Pests of Animals	10%	10%	0%	
607	Consumer Economics	0%	0%	8%	
	Total	100%	100%	100%	

V(C). Planned Program (Inputs)

1. Actual amount of FTE/SYs expended this Program

Year: 2011	Extension		Research	
	1862	1890	1862	1890
Plan	36.0	3.0	23.0	0.0
Actual Paid Professional	36.0	4.5	26.0	0.0
Actual Volunteer	28.0	2.0	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**
682926	224145	500977	0
1862 Matching	**1890 Matching**	**1862 Matching**	**1890 Matching**
2968171	224145	3046324	0
1862 All Other	**1890 All Other**	**1862 All Other**	**1890 All Other**
0	0	393235	0

V(D). Planned Program (Activity)

1. Brief description of the Activity

Variety evaluation of several different vegetable crops will be conducted to determine suitability to climate, soils and cultural practices for state producers. Yields, quality and market potential will be evaluated to assess potential production by growers seeking additional crops or alternative crops. Crops suitable for greenhouse production in farmers tobacco transplant greenhouses will be evaluated for profitability and product quality with respect to local and state markets.

UT AgResearch efforts determine the effectiveness of various control technologies, develop new genetic cultivars of plants from in-house breeding programs or, in some cases, find naturally resistant populations of plants by searching the southeast U.S. (i.e. for anthracnose resistant dogwoods).

Research is conducted at selected Research and Education Centers across Tennessee, and at several farmer-cooperator locations in key areas of horticultural production in Tennessee. Substantial investments have just been made in construction and renovation of greenhouse facilities on campus and at certain Research and Education Centers. These will be utilized extensively in the conduct of our research.

2. Brief description of the target audience

- Farmers/producers who have traditional livestock and tobacco operations, but are looking to improve income through the Green Industry.
- Master Gardeners who volunteer to provide community service through horticulture.
- Business owners who need research-based information to start, maintain or expand their greenhouse, landscaping, or nursery buisness.

3. How was eXtension used?

Tennessee is represented by 108 eXtension members in 42 of the 59 approved Communities of Practice (CoP). Tennessee Extension personnel have addressed over 800 Frequently Asked Questions through eXtension.

This Horticultural Systems Planned Program was enhanced through the service of 14 Tennessee Extension personnel on the "Consumer Horticulture" CoP. Tennessee Extension personnel shared implementation strategies, outcome measurement, and evaluation protocols with their CoP colleagues.

V(E). Planned Program (Outputs)

1. Standard output measures

2011	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Actual	790311	8175980	2816	0

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

Patent Applications Submitted

Year: 2011

Actual: 1

Patents listed

Fungicidal Extracts of Epazote

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

2011	Extension	Research	Total
Actual	2	14	16

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

- Horticultural workshops and conferences.

Year	Actual
2011	0

Output #2

Output Measure

- Number of exhibits displayed to teach best practices in horticultural systems.

Year	Actual
2011	46

Output #3

Output Measure

- Number of research-based publications distributed as part of this program.

Year	Actual
2011	46246

Output #4

Output Measure

- Resistance to dogwood anthracnose, Discula destructiva, was reported more than 10 years ago but the mechanisms of resistance has remained a mystery. The cuticle of foliage of the resistant dogwood culture Appalachian Spring was found to be thicker, more hydrophobic and containing compound(s) that reduce the germination rate of conidia of D. destructiva. This is the first report of a resistant mechanism (trait) for dogwood anthracnose in flowering dogwood. (M. Windham)

Year	Actual
2011	1

Output #5

Output Measure

- Population structure of two important downy mildew species can now be studied using Site-Specific Recombinase (SSR) technology. Information on the genetic structure of these populations is important for understanding the life history of the pathogens and developing control and management strategies for the diseases. (Trigiano)

Year	Actual
2011	1

Output #6

Output Measure

- We are publishing manuscripts that will help clarify relationships and seasonal flight activities among several economically important clearwing moth and metallic wood boring beetle species common in the eastern U.S. (Klingeman)

Year	Actual
2011	1

Output #7

Output Measure

- Mitigation of oxidative stress in turfgrass plants will make it possible to use less pesticide to manage difficult abiotic problems that turfgrass managers face trying to deliver the best possible playing surfaces. (Horvath)

Year	Actual
2011	1

V(G). State Defined Outcomes

V. State Defined Outcomes Table of Content

O. No.	OUTCOME NAME
1	Projected licenses for dogwood cultivars (M. Windham).
2	Annual Tennessee economic contribution of Encore azaleas based on TAES research, dollars (M. Windham).
3	Consumer Horticulture: Number of consumers who applied fewer fertilizers and pesticides due to a better understanding of landscape best management practices.
4	Consumer Horticulture: Number of consumers who learned about plant selection and proper planting to save money and time in the landscape.
5	Extension Commercial Ornamental Horticulture

Outcome #1

1. Outcome Measures

Projected licenses for dogwood cultivars (M. Windham).

Not Reporting on this Outcome Measure

Outcome #2

1. Outcome Measures

Annual Tennessee economic contribution of Encore azaleas based on TAES research, dollars (M. Windham).

Not Reporting on this Outcome Measure

Outcome #3

1. Outcome Measures

Consumer Horticulture: Number of consumers who applied fewer fertilizers and pesticides due to a better understanding of landscape best management practices.

2. Associated Institution Types

- 1862 Extension
- 1890 Extension

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2011	1315

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done

Results

4. Associated Knowledge Areas

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

Outcome #4

1. Outcome Measures

Consumer Horticulture: Number of consumers who learned about plant selection and proper planting to save money and time in the landscape.

2. Associated Institution Types

- 1862 Extension
- 1890 Extension

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2011	6171

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done

Results

4. Associated Knowledge Areas

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

Outcome #5

1. Outcome Measures

Extension Commercial Ornamental Horticulture

2. Associated Institution Types

- 1862 Extension
- 1890 Extension

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)
Nursery and greenhouse products are among Tennessee's top agricultural commodities. Tennessee has more than 700 nurseries, 300 greenhouses, 2,500 plant dealers and 400 landscapers certified across the state, producing 21.7 million containers of plants and 48,000 acres of growing area.

What has been done
Extension agents and area Extension specialists conducted commercial nursery and landscape educational programs reaching over 745,342 direct contacts during 2011. Best production and landscape management practices were taught at approximately 440 group meetings reaching over 9,000 Tennessee citizens and over 375 on-site visits.

Results
The total economic impact of Extension's commercial ornamental and landscape horticulture programming was estimated at $1.2 million in increased savings, increased income, and one-time capital purchases (Donaldson 2009). 518 professionals added additional services and/or marketing practices. 212 professionals developed or made adjustment to their business plans. 1501 professionals increased their knowledge of plant pests and pest control measures. 1472 professionals increased their knowledge of proper plant selection. 706 professionals practiced proper plant selection and installation practices. 894 professionals implemented recommended management practices for pest control.

4. Associated Knowledge Areas

KA Code	Knowledge Area
205	Plant Management Systems

211	Insects, Mites, and Other Arthropods Affecting Plants
607	Consumer Economics

V(H). Planned Program (External Factors)

External factors which affected outcomes

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

Brief Explanation

V(I). Planned Program (Evaluation Studies)

Evaluation Results

Our research programs are evaluated by acceptance of publications in peer-reviewed, archival journals, grant proposals that receive funding from government, industry, and foundation sources, and our ability to attract promising graduate and post-doctoral students.

The total economic impact of Extension's commercial ornamental and landscape horticulture programming was estimated at $1.2 million in increased savings, increased income, and one-time capital purchases.

Key Items of Evaluation

The total economic impact of Extension's commercial ornamental and landscape horticulture programming was estimated at $1.2 million in increased savings, increased income, and one-time capital purchases.

V(A). Planned Program (Summary)

Program # 13

1. Name of the Planned Program

Human Development

V(B). Program Knowledge Area(s)

1. Program Knowledge Areas and Percentage

KA Code	Knowledge Area	%1862 Extension	%1890 Extension	%1862 Research	%1890 Research
802	Human Development and Family Well-Being	100%	100%	0%	
	Total	100%	100%	0%	

V(C). Planned Program (Inputs)

1. Actual amount of FTE/SYs expended this Program

Year: 2011	Extension		Research	
	1862	1890	1862	1890
Plan	23.0	2.0	0.0	0.0
Actual Paid Professional	19.0	2.0	0.0	0.0
Actual Volunteer	14.0	2.0	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
341462	112072	0	0
1862 Matching	**1890 Matching**	**1862 Matching**	**1890 Matching**
1484085	112072	0	0
1862 All Other	**1890 All Other**	**1862 All Other**	**1890 All Other**
247500	0	0	0

V(D). Planned Program (Activity)

1. Brief description of the Activity

This program involved professionals, parents, child care providers, older adults, and community leaders. The target audiences were child care providers, adolescents, and parents who are divorced or incarcerated, court-orederd parents and relatives as caregivers.

The following were used to help the target audience gain awareness: displays, exhibits, community events, newspaper articles, radio programs, TV shows and newsletters. In addition, fact sheets and resource lists for parents, teachers and professionals were created and dissiminated. Extension FCS Agents in over 60 of Tennessee's 95 counties offered the four-hour class Parenting Apart: Effective Co-Parenting, an information and skills-based program that utilizes lecture, class discussion, videos, and handouts to inform parents about the potential effects of divorce on their children and provided them with strategies for minimizing those effects.

TSU Extension provided leadership for a "Caring for the Caregiver" Education Conference. This is a multi-state effort involving seven other Southern states. The goal was to help caregivers survive the multiple challenges they face.

TSU Extension Family and Community Health programs placed special emphasis on "Healthy Aging" for the mind, body and spirit. The ultimate goal was to increase knowledge and education relating to healthy aging. Tennessee is getting older. Various assessments have shown that the percentage of Tennessee's population over the age of 65 will grow to 20% by 2025 (up from about 12% at the beginning of the 21st Century). TSU Extension produced and distributed resource materials and educational programs on a variety of topics for interested individuals, caregivers, and professionals. Various methods were employed, including inter-generational connections.

2. Brief description of the target audience

The target audiences for this planned program were Tennessee child care providers, parents, and adolescents. While all parents of infants and young children are targeted for literacy programs, parents seeking a divorce were especially targeted for parenting instruction because of the added demands of co-parenting. Tennessee child care providers working full-time are required to have 18 hours and child care center directors are required to have 24 hours of instruction annually. Tennessee parents seeking a divorce are directed by the courts to a four-hour co-parenting class. In many communities in the state, Extension is the only provider of this instruction.

3. How was eXtension used?

Tennessee is represented by 108 eXtension members in 42 of the 59 approved Communities of Practice (CoP). Tennessee Extension personnel have addressed over 800 Frequently Asked Questions through eXtension.

This Human Development Planned Program was enhanced through the service of five Tennessee Extension personnel on the "Family Caregiving" CoP. Tennessee Extension personnel shared implementation strategies, outcome measurement, and evaluation protocols with their CoP colleagues.

V(E). Planned Program (Outputs)

1. Standard output measures

2011	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Actual	41340	10716231	13523	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	0	1

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

- Number of exhibits displayed to promote program awareness and participation.

Year	Actual
2011	59

Output #2

Output Measure

- Number of research-based publications distributed as part of this program.

Year	Actual
2011	16151

V(G). State Defined Outcomes

V. State Defined Outcomes Table of Content

O. No.	OUTCOME NAME
1	Parenting Skills for Incarcerated Inmates: Number of inmates who acquired knowledge about the importance of effective communication required to build parent/child relationships.
2	Parenting Skills for Incarcerated Inmates: Number of inmates who demonstrated their knowledge of positive parent/child relationships by writing to their child.
3	Child Care/Parenting: Number of parents and childcare providers who report using suggested guidance techniques more often.
4	Parenting Skills for Incarcerated Inmates: Number of inmates who now have an ongojng relationship with their children and demonstrate the need not to violate the law.
5	Child Care/Parenting: Number of parents and child care providers who report putting down or blaming their child less.
6	Child Care/Parenting: Number of parents and child care providers who report talking, singing and playing more with their children than before the program.
7	Divorcing Parents: Number of parents who plan to decrease exposure of their children to parental conflict.
8	Court-Ordered Parents: Number who report feeling better and less stressed about their abilities as parents.
9	Caregiving Education: Number of caregivers who report the Extension program helped them to minimize stress.
10	Extension Afterschool Programs

Outcome #1

1. **Outcome Measures**

Parenting Skills for Incarcerated Inmates: Number of inmates who acquired knowledge about the importance of effective communication required to build parent/child relationships.

Not Reporting on this Outcome Measure

Outcome #2

1. **Outcome Measures**

Parenting Skills for Incarcerated Inmates: Number of inmates who demonstrated their knowledge of positive parent/child relationships by writing to their child.

Not Reporting on this Outcome Measure

Outcome #3

1. **Outcome Measures**

Child Care/Parenting: Number of parents and childcare providers who report using suggested guidance techniques more often.

2. **Associated Institution Types**

- 1862 Extension

3a. **Outcome Type:**

Change in Action Outcome Measure

3b. **Quantitative Outcome**

Year	Actual
2011	1413

3c. **Qualitative Outcome or Impact Statement**

Issue (Who cares and Why)

What has been done

Results

4. **Associated Knowledge Areas**

KA Code	Knowledge Area

802 Human Development and Family Well-Being

Outcome #4

1. Outcome Measures

Parenting Skills for Incarcerated Inmates: Number of inmates who now have an ongojng relationship with their children and demonstrate the need not to violate the law.

Not Reporting on this Outcome Measure

Outcome #5

1. Outcome Measures

Child Care/Parenting: Number of parents and child care providers who report putting down or blaming their child less.

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2011	2545

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done

Results

4. Associated Knowledge Areas

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

Outcome #6

1. Outcome Measures

Child Care/Parenting: Number of parents and child care providers who report talking, singing and playing more with their children than before the program.

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2011	3575

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done

Results

4. Associated Knowledge Areas

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

Outcome #7

1. Outcome Measures

Divorcing Parents: Number of parents who plan to decrease exposure of their children to parental conflict.

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2011	3444

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done

Results

4. Associated Knowledge Areas

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

Outcome #8

1. Outcome Measures

Court-Ordered Parents: Number who report feeling better and less stressed about their abilities as parents.

Not Reporting on this Outcome Measure

Outcome #9

1. Outcome Measures

Caregiving Education: Number of caregivers who report the Extension program helped them to minimize stress.

Not Reporting on this Outcome Measure

Outcome #10

1. Outcome Measures

Extension Afterschool Programs

2. Associated Institution Types

- 1862 Extension

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)
One of the greatest societal changes in modern times is the increasing number of families who have both parents employed outside the home. Thus, quality after-school programming is of vital interest to parents and professionals in many communities. Not only do afterschool programs provide a safe place for children to reside, research also shows that afterschool programs provide an opportunity for students to increase their grades by providing hands-on, experiential learning activities that are an extension of the regular day classroom curricula.

What has been done
: Since 2006, UT Extension has secured over $1.4 million dollars for quality afterschool programming from the Tennessee Department of Education to help schools that have received a ?failing grade? as determined by the Tennessee School Report Card program. We currently operate six afterschool programs serving 600 children. Our philosophy is to provide kids hands-on, experiential activities where they ?learn by doing?. The curriculum focuses on Reading, Science, Math, Technology, Health, Homework, Socialization and Leadership. The program targets children/youth who are struggling academically and emotionally.

Results
*80 of 107 youth/children are able to communicate their understanding of science/math concepts through their involvement with activities.
*67 of 107 youth/children are able to create, present, or use new technologies they didn?t utilize before.
*85 of 107 youth/children have increased their knowledge base in the areas of technology, science, reading, health and relationships.
*99 of 107 youth/children read books or other print at least three times per week in their afterschool or home setting.
*81 of 107 youth/children report feeling better and eating better than before.

4. Associated Knowledge Areas

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

V(H). Planned Program (External Factors)

External factors which affected outcomes

- Government Regulations

Brief Explanation

V(I). Planned Program (Evaluation Studies)

Evaluation Results

In Extension Afterschool Programs:

- 80 of 107 youth/children are able to communicate their understanding of science/math concepts through their involvement with activities.
- 67 of 107 youth/children are able to create, present, or use new technologies they didn't utilize before.
- 85 of 107 youth/children have increased their knowledge base in the areas of technology, science, reading, health and relationships.
- 99 of 107 youth/children read books or other print at least three times per week in their afterschool or home setting.
- 81 of 107 youth/children report feeling better and eating better than before.

Key Items of Evaluation

In Extension Afterschool Programs:

- 80 of 107 youth/children are able to communicate their understanding of science/math concepts through their involvement with activities.
- 67 of 107 youth/children are able to create, present, or use new technologies they didn't utilize before.
- 85 of 107 youth/children have increased their knowledge base in the areas of technology, science, reading, health and relationships.
- 99 of 107 youth/children read books or other print at least three times per week in their afterschool or home setting.
- 81 of 107 youth/children report feeling better and eating better than before.

V(A). Planned Program (Summary)

Program # 14

1. Name of the Planned Program

Sustainable Energy

V(B). Program Knowledge Area(s)

1. Program Knowledge Areas and Percentage

KA Code	Knowledge Area	%1862 Extension	%1890 Extension	%1862 Research	%1890 Research
102	Soil, Plant, Water, Nutrient Relationships	0%	0%	9%	
123	Management and Sustainability of Forest Resources	0%	0%	3%	
131	Alternative Uses of Land	0%	0%	3%	
135	Aquatic and Terrestrial Wildlife	0%	0%	2%	
201	Plant Genome, Genetics, and Genetic Mechanisms	0%	0%	3%	
205	Plant Management Systems	0%	0%	14%	
206	Basic Plant Biology	0%	0%	2%	
212	Pathogens and Nematodes Affecting Plants	0%	0%	3%	
215	Biological Control of Pests Affecting Plants	0%	0%	2%	
307	Animal Management Systems	0%	0%	1%	
402	Engineering Systems and Equipment	0%	0%	5%	
403	Waste Disposal, Recycling, and Reuse	0%	0%	1%	
404	Instrumentation and Control Systems	0%	0%	8%	
501	New and Improved Food Processing Technologies	0%	0%	3%	
511	New and Improved Non-Food Products and Processes	0%	0%	31%	
512	Quality Maintenance in Storing and Marketing Non-Food Products	80%	80%	4%	
601	Economics of Agricultural Production and Farm Management	0%	0%	2%	
603	Market Economics	10%	10%	1%	
605	Natural Resource and Environmental Economics	10%	10%	1%	
804	Human Environmental Issues Concerning Apparel, Textiles, and Residential and Commercial Structures	0%	0%	2%	
	Total	100%	100%	100%	

V(C). Planned Program (Inputs)

1. Actual amount of FTE/SYs expended this Program

Year: 2011	Extension		Research	
	1862	1890	1862	1890
Plan	9.0	1.0	70.0	0.0
Actual Paid Professional	4.0	0.5	84.6	0.0
Actual Volunteer	3.0	1.0	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
85366	28018	752821	0
1862 Matching	1890 Matching	1862 Matching	1890 Matching
371021	28018	7405056	0
1862 All Other	1890 All Other	1862 All Other	1890 All Other
0	0	3471949	0

V(D). Planned Program (Activity)

1. Brief description of the Activity

Our economic research is developing national ethanol, biodiesel, electric, and bioproduct demand quantities and incorporating them into an existing dynamic agricultural sector econometric simulation model (POLYSYS). Regional feedstock supply curves necessary to meet national bioenergy and bioproduct demand quantities are being estimated by modifying POLYSYS to include cellulosic feedstock in addition to existing agricultural grain and oilseed crops. Regional bioenergy and bioproduct supply curves are being developed using regional feedstock supply curves, representative transportation costs, and representative costs for each feedstock-technology-product combination considered. A national expansion curve for the bioenergy and bioproduct industry is being estimated. Key indicators of agricultural sector performance including net farm income, agricultural prices, and government cost in meeting national bioenergy and bioproduct demand quantities are being evaluated.

As part of our engineering research, we are documenting drying rates and methods for corn stover, and quantifying the distribution and quality of the above ground biomass.For existing biomass densification systems, we areidentifying relations between particle size, biomass type, final density, compression pressures and energy, and other engineering factors. We are determining optimum particle sizes based on a balance between expended energy, final density, and integrity of compressed pellet or wafer. We are using these optimum particle sizes to identify or invent technologies to achieve the size based on theoretical cutting lengths due to feed speed, cutter speed, and other engineering factors. We are applying the developed technologies in laboratory-scale granulation tests to verify sizes using laser, image analyzer, sieve, and manual methods. We are comparing the developed methods in particle size reduction to existing technologies.

In terms of downstream processing, we are conducting fundamental studies on the fractionation of various free fatty acid (FFA) mixtures to test whether the mathematical modeling approach used by us for rapeseed oil is more widely applicable.Additionally, the food safety of the purified FFA products is being assessed. We will then complete the cost analysis of this fractionation process using results predicted by

the mathematical model using chemical plant design software. A bench-scale continuous reactor is being assembled and we will attempt to maintain the same productivity (moles of product per time per mass of enzyme) as achieved for batch-mode experiments from previous experiments.We are also attempting the further development of microemulsion-based protein extraction as a rapid low-cost and scalable means of selectively isolating and purifying proteins of interest from aqueous media.

2. Brief description of the target audience

This planned program is trageted to Tennessee farmers. Secondary audiences include consumers of both basic and applied research and the general public.

3. How was eXtension used?

Tennessee is represented by 108 eXtension members in 42 of the 59 approved Communities of Practice (CoP). Tennessee Extension personnel have addressed over 800 Frequently Asked Questions through eXtension.

This Sustainable Energy Planned Program was enhanced through the service of five Tennessee Extension personnel on the "Sustainable Ag Energy" CoP. Tennessee Extension personnel shared implementation strategies, outcome measurement, and evaluation protocols with their CoP colleagues.

V(E). Planned Program (Outputs)

1. Standard output measures

2011	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Actual	2229	0	465	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	71	72

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

- Peer-reviewed technical resource pages in online BioWeb resource (Rials).
  Not reporting on this Output for this Annual Report

Output #2

Output Measure

- Number of research-based publications distributed as part of Extension biofuels programs.

Year	Actual
2011	6

Output #3

Output Measure

- Identify the prevalent foliar and root diseases of switchgrass in Tennessee and the major fungal pathogens associated with seed (Ownley).
  Not reporting on this Output for this Annual Report

Output #4

Output Measure

- Work on gene flow and introgression has shed light on the urgent need to acquire ?basic? information on gene flow (especially pollen flow and hybridization) in switchgrass. (Kwit)

Year	Actual
2011	1

Output #5

Output Measure

- High-throughput technologies are rapid and inexpensive methods to monitor biomass chemical composition, allowing us to analyze hundreds of samples in one day at a cost of about $10 each versus $800-$2000 per sample by the wet chemical method. Numerous scientists from UTIA, UTK and ORNL have benefit from our analytical capabilities over the last year which in return has led to partnership and proposals development. (Labbe)

Year	Actual
2011	1

V(G). State Defined Outcomes

V. State Defined Outcomes Table of Content

O. No.	OUTCOME NAME
1	Research-oriented biorefinery to test range of processes for biomass to cellulosic ethanol (Tiller).
2	Majority of first-pass biomass size reduction done with knife grids or other techology more efficient than rotary (Womac).
3	In-field size reduction and/or compacting done on majority of cellulosic biomass harvested in Tennessee (Womac).
4	Number of growers producing switchgrass as an energy crop. (Jackson)
5	Number of acres of switchgrass grown in Tennessee as an energy crop. (Jackson)
6	Average yield of switchgrass varieties (from introduction to well-managed stands) in Tennessee, tons per acre. (West & Larson)
7	Farmer-owned biomass cooperative to help capture economic advantage of bioenergy production (Tiller).
8	Be evaluating precision-farming / variable-rate technology for switchgrass and other bioenergy crops (Tyler).
9	Switchgrass weed control (Rhodes)
10	Switchgrass rust control (Windham)
11	Using the biomass lignin fraction (Baker)

Outcome #1

1. Outcome Measures

Research-oriented biorefinery to test range of processes for biomass to cellulosic ethanol (Tiller).

2. Associated Institution Types

- 1862 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)

What has been done

Results

4. Associated Knowledge Areas

KA Code	Knowledge Area
402	Engineering Systems and Equipment
511	New and Improved Non-Food Products and Processes
605	Natural Resource and Environmental Economics

Outcome #2

1. Outcome Measures

Majority of first-pass biomass size reduction done with knife grids or other techology more efficient than rotary (Womac).

2. Associated Institution Types

- 1862 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)

What has been done

Results
A switchgrass logistic system that uses a feedstock densification technology to prepare feedstock for storage and transportation and is harvesting using a chopper with a cutter-header can reduce costs by about 22% to 26% when compared to various conventional logistic systems using hay harvest equipment. (English, Larson, Yu, Womac)

4. Associated Knowledge Areas

KA Code	Knowledge Area
402	Engineering Systems and Equipment
511	New and Improved Non-Food Products and Processes
603	Market Economics
605	Natural Resource and Environmental Economics

Outcome #3

1. Outcome Measures

In-field size reduction and/or compacting done on majority of cellulosic biomass harvested in Tennessee (Womac).

2. Associated Institution Types

- 1862 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)
Supply chain efficiencies must be improved for lignocellulosic biomass to become an economically viable energy feedstock. Switchgrass round bales require labor-intensive unit handling and de-baling processes that are not readily scalable, so a bulk-chopped format was investigated to improve handling efficiencies throughout the harvest, transportation, and storage systems. However, low loose-filled bulk density of chopped switchgrass presented challenges for long distance transportation to the end user.

What has been done
Increasing biomass bulk density with minimal time and energy inputs was achieved using waste transfer equipment. A commercial-grade compactor was used to compress size-reduced switchgrass into a transfer trailer. The trailer was then offloaded using the hydraulic-powered ejector ram. Observations were made regarding the compatibility of chopped switchgrass with existing equipment.

Results
Results indicate in-bulk compaction is a promising method to improve transportation efficiencies of loose chopped biomass as a means of increasing low bulk densities of low-moisture switchgrass feedstock by a factor of about 2x. The overall impact means 50% of the required on-road trucks to transport the bulk-format low moisture switchgrass, compared to trucks not equipped to handle compaction.

4. Associated Knowledge Areas

KA Code	Knowledge Area
402	Engineering Systems and Equipment
511	New and Improved Non-Food Products and Processes
603	Market Economics
605	Natural Resource and Environmental Economics

Outcome #4

1. Outcome Measures

Number of growers producing switchgrass as an energy crop. (Jackson)

Not Reporting on this Outcome Measure

Outcome #5

1. **Outcome Measures**

   Number of acres of switchgrass grown in Tennessee as an energy crop. (Jackson)

   Not Reporting on this Outcome Measure

Outcome #6

1. **Outcome Measures**

   Average yield of switchgrass varieties (from introduction to well-managed stands) in Tennessee, tons per acre. (West & Larson)

   Not Reporting on this Outcome Measure

Outcome #7

1. **Outcome Measures**

   Farmer-owned biomass cooperative to help capture economic advantage of bioenergy production (Tiller).

   Not Reporting on this Outcome Measure

Outcome #8

1. **Outcome Measures**

   Be evaluating precision-farming / variable-rate technology for switchgrass and other bioenergy crops (Tyler).

   Not Reporting on this Outcome Measure

Outcome #9

1. **Outcome Measures**

   Switchgrass weed control (Rhodes)

2. **Associated Institution Types**

   - 1862 Extension
   - 1862 Research

3a. Outcome Type:

Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Actual
2011	1

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Weed competition has been cited by numerous state, regional and national expert scientists as the number one limiting factor to the successful establishment of switchgrass for biofuels.

What has been done
A concentrated research and Extension educational program in switchgrass weed management in support of the Tennessee Biofuels Initiative was conducted.

Results
Our efforts led to the granting of numerous state and one federal label for herbicides for use in switchgrass for biofuel and helped to elevate the visibility of TN on the national biofuel research front. Moreover, it helped to protect the UTIA's initial $1,175,850 investment in switchgrass producer contracts and, to the successful completion of the 5100 acres established goal by 2011.

4. Associated Knowledge Areas

KA Code	Knowledge Area
131	Alternative Uses of Land
205	Plant Management Systems
215	Biological Control of Pests Affecting Plants

Outcome #10

1. Outcome Measures

Switchgrass rust control (Windham)

2. Associated Institution Types

- 1862 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)
Switchgrass rust, Puccinia emaculata, reduces growth and biomass of switchgrass in ornamental and agronomic plantings in Tennessee and these epidemics are fueled by asexual spores, urediospores.

What has been done
A fungus (mycoparasite), Sphaerellopsis filum, was observed to be parasitizing rust pustules in ornamental and agronomic plantings of switchgrass and reduced the number of urediospores per rust pustule and the rate of urediospore germination.

Results
This is the first report of a potential biocontrol agent for switchgrass rust that reduces the rust?s inoculum density (number of urediospores) and inoculum potential (germination of urediospores).

4. Associated Knowledge Areas

KA Code	Knowledge Area
205	Plant Management Systems
212	Pathogens and Nematodes Affecting Plants
215	Biological Control of Pests Affecting Plants
601	Economics of Agricultural Production and Farm Management

Outcome #11

1. Outcome Measures

Using the biomass lignin fraction (Baker)

2. Associated Institution Types

- 1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
The concept of utilizing biomass as an efficient replacement for oil requires an integrated biorefinery, where all feedstock fractions are utilized in many product streams. The use of lignin for high value products could significantly improve the cost structure of a biorefinery, would enable the displacement of many petroleum-derived polymer products and provide for the generation of novel low-cost materials.

What has been done
We have investigated various lignin value streams and their requirements.

Results
Lignin could be used as a low-cost substitute for a variety of residential and industrial insulation materials. Buildings consume more than 40% of energy in the U.S., more than industry and more than transportation. Another high impact use for lignin is in graphite foams (if the lignin starting material is suitably treated to give an extensive graphitic structure during manufacture). Lignin based low-cost carbon fiber composite materials can be used as a substitute for common metals and polymers used in transportation.

4. Associated Knowledge Areas

KA Code	Knowledge Area
511	New and Improved Non-Food Products and Processes
601	Economics of Agricultural Production and Farm Management
605	Natural Resource and Environmental Economics

V(H). Planned Program (External Factors)

External factors which affected outcomes
- Natural Disasters (drought, weather extremes, etc.)
- Economy
- Appropriations changes
- Public Policy changes
- Government Regulations
- Competing Public priorities
- Competing Programmatic Challenges
- Other (International conflict)

Brief Explanation

V(I). Planned Program (Evaluation Studies)

Evaluation Results

Our research programs are evaluated by acceptance of publications in peer-reviewed, archival journals, grant proposals that receive funding from government, industry, and foundation sources, and our ability to attract promising graduate and post-doctoral students.

Key Items of Evaluation

V(A). Planned Program (Summary)

Program # 15

1. Name of the Planned Program

Climate Change

V(B). Program Knowledge Area(s)

1. Program Knowledge Areas and Percentage

KA Code	Knowledge Area	%1862 Extension	%1890 Extension	%1862 Research	%1890 Research
101	Appraisal of Soil Resources	0%	0%	24%	
102	Soil, Plant, Water, Nutrient Relationships	0%	0%	12%	
132	Weather and Climate	0%	0%	1%	
133	Pollution Prevention and Mitigation	0%	0%	8%	
403	Waste Disposal, Recycling, and Reuse	0%	0%	5%	
511	New and Improved Non-Food Products and Processes	0%	0%	25%	
601	Economics of Agricultural Production and Farm Management	0%	0%	5%	
607	Consumer Economics	0%	0%	8%	
610	Domestic Policy Analysis	0%	0%	12%	
	Total	0%	0%	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	0.0
Actual Paid Professional	0.0	0.0	0.9	0.0
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	39101	0
1862 Matching	**1890 Matching**	**1862 Matching**	**1890 Matching**
0	0	117692	0
1862 All Other	**1890 All Other**	**1862 All Other**	**1890 All Other**
0	0	23428	0

V(D). Planned Program (Activity)

1. Brief description of the Activity

No active Extension program and very limited research program.

2. Brief description of the target audience

No active Extension program and very limited research program.

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	0	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	14	14

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

- Received initial funding to create the SMART Center. Once operational, this center ? located at the Forestry Resources Research and Education Center ? will provide a tremendous opportunity perform research and conduct outreach programs on stormwater management. (Buchanan, Tyner, Yoder, Ludwig)

Year	Actual
2011	1

V(G). State Defined Outcomes

V. State Defined Outcomes Table of Content

O. No.	OUTCOME NAME
1	not applicable
2	Switchgrass effects on soil properties (Lee, Tyler, English)

Outcome #1

1. Outcome Measures

not applicable

2. Associated Institution Types

- 1862 Extension
- 1890 Extension
- 1862 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)
{No Data Entered}

What has been done
{No Data Entered}

Results
{No Data Entered}

4. Associated Knowledge Areas

KA Code	Knowledge Area
132	Weather and Climate

Outcome #2

1. Outcome Measures

Switchgrass effects on soil properties (Lee, Tyler, English)

2. Associated Institution Types

- 1862 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)
Many of the agricultural characteristics of the seven bordering states are represented in Tennessee such as cropping systems, soil type, weather, and farm type and size. Thus, our results found in Tennessee may be applicable in neighboring states as well.

What has been done
Collection and analysis of four year of soil data were complete.

Results
There was an increase in soil organic carbon (SOC) of roughly 1 Mg ha-1 from 2008 to 2011. No-till planting resulted in a significant increase in SOC compared to conventional tillage planting resulting in no significant changes in SOC.

4. Associated Knowledge Areas

KA Code	Knowledge Area
101	Appraisal of Soil Resources
102	Soil, Plant, Water, Nutrient Relationships
132	Weather and Climate

V(H). Planned Program (External Factors)

External factors which affected outcomes

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

Brief Explanation

V(I). Planned Program (Evaluation Studies)

Evaluation Results

Our research programs are evaluated by acceptance of publications in peer-reviewed, archival journals, grant proposals that receive funding from government, industry, and foundation sources, and our ability to attract promising graduate and post-doctoral students.

Key Items of Evaluation