

2011 University of Tennessee Research and Extension and Tennessee State University Extension Combined Plan of Work

Status: New
Not Yet Submitted

I. Plan Overview

1. Brief Summary about Plan Of Work

Tennessee's two land-grant universities comprise the Tennessee Agricultural Research and Extension System, conducting Research and Extension programs in all 95 counties, serving the state's 5.9 million people. 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 2011-2015 Plan of Work represents the combined efforts of the University of Tennessee (UT) Extension, the Tennessee Agricultural Experiment Station, and the Tennessee State University (TSU) Cooperative Extension Program.

In 2006, an extensive statewide needs assessment was conducted involving almost 1,000 Tennesseans in defining and prioritizing issues that should be addressed by Extension for the foreseeable future. TSU also appointed Program Coordinators in family and consumer sciences, 4-H youth development, agricultural sciences and natural resources, and community resource and economic development to provide linkage with program areas between UT and TSU. These appointees also serve on the TSU Extension Programming Council to coordinate integrated and interdisciplinary programming efforts.

Almost one of every five dollars generated in the state is associated with agriculture or an industry that generates projects from a natural resource – more than \$60 billion annually. In addition, nearly 300,000 Tennesseans are directly employed by agricultural or natural resource industries, making effective research and extension programs critical. UT AgResearch foci include supporting the state's nursery industry; developing agronomic crop varieties to meet consumer and farmer needs; improving the reproductive health of our livestock; concerted efforts to ramp-up biomass production and processing to reduce dependence on foreign oil; and expanding the state's important hardwood lumber processing industry. In addition, we seek to continue our leadership in no-till agriculture and soil erosion modeling; become more adept at using beneficial insects to protect ecosystems in the Great Smoky Mountains and beyond; and contribute to the national public policy conversation through our agricultural and natural policy research centers. We will also continue to safeguard the public with important food safety research; promote technologies to minimize wastewater impact, and develop bio-based sensors to more quickly predict disease patterns in the field.

This plan includes planned programs, stakeholder input, merit/program review, multistate, and integrated research and extension activities. Changes in allocations and FTE assignments between and among planned programs will be made annually to reflect stakeholder input and to reflect the results of statewide needs assessments.

Estimated Number of Professional FTEs/SYs total in the State.

Year	Extension		Research	
	1862	1890	1862	1890
2011	450.0	43.0	300.0	0.0
2012	450.0	43.0	300.0	0.0
2013	450.0	43.0	300.0	0.0
2014	450.0	43.0	300.0	0.0
2015	450.0	43.0	0.0	0.0

II. Merit Review Process

1. The Merit Review Process that will be Employed during the 5-Year POW Cycle

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

2. Brief Explanation

All Extension programs initiated in the state of Tennessee, funded in whole or part from Smith-Lever or NARETPA Section 1444 and 14445 funds, require a merit review process. The criteria for a merit review was established in 2000, and in October of 2005, the Department of Extension Evaluation and Staff Development at the University of Tennessee managed a process to update and validate this criteria. The criteria was submitted to an out-of-state panel of seven Extension administrators, program leaders and scholars for their review. The states represented in the review panel were Arkansas, Kentucky, Mississippi and Texas. The review panel found the criteria to be fair, reliable, consistent with the current research-base, and overall a model for merit review of Extension plans of work. The criteria established includes: needs assessment; networking; appropriate delivery methods; clear implementation steps; plans for evaluation (tools/methods); reaches diverse audience; and outcomes clearly defined. After the criteria was established, UT and TSU pursued a coordinated merit review process for all programs. The planned program proposals are initially prepared by state Extension specialists. The proposals are written in a format called "State Action Agendas" which require that a logic model be established that includes proposed inputs, outputs and outcomes. All program proposals are reviewed by department heads and program leaders (UT) and program coordinators (TSU). This input is considered by the State Action Agenda Review Team which consists of the three UT State Program Leaders, one UT specialist in program planning and evaluation, and one TSU Administrator. This review team accepts the program as presented, rejects the program, or accepts the program pending changes.

For the 2011-2015 Plan of Work, UT Extension also established an Expert Peer Review with Virginia Tech and University of Maryland. Evaluation specialists in the three states review Plans of Work based on needs assessment, planned programs, outcomes and evaluation. This review was helpful in refining the 2011-2015 Plan of Work and improving outcome reporting.

All proposed research projects that are funded under the Hatch Act of 1887 Multistate Research Fund undergo a rigorous review process for merit and scientific soundness. The research review process begins informally with discussions between the project leader and the department head; research center directors are frequently consulted at this stage of project development. After a draft of the research proposal is completed, the department head reviews the proposal. If the department head believes the proposal has potential merit, s(he) either suggests modifications or appoints a panel of scientific peers with expertise and knowledge in the area of the proposed research to review the proposal. The review panel consists of three to five scientists; these scientists are typically from within the researcher's department, but if the department head deems it appropriate, peers from other departments within UT AgResearch, or from other institutions, may also review the proposed research.

The review panel evaluates the proposal to determine if it is editorially appropriate, to determine if the protocol outlined is of sufficient clarity and quality to ensure a sound scientific effort (that should lead to publishable data), and to make a recommendation to the department head about the priority the proposed research should receive relative to the requested resources and the departmental mission. Upon receiving a recommendation from the panel, the department returns the proposal to the author for responses to the reviewer's comments, and, if appropriate, for revision of the proposal.

Multistate project reviews are coordinated on a regional basis, as it is possible for our scientist to "join" a multistate project as our official participant after the project is approved.

III. Evaluation of Multis & Joint Activities

1. How will the planned programs address the critical issues of strategic importance, including those identified by the stakeholders?

Profitable Agriculture - Extension's statewide needs assessment identified marketing and management issues, including new agricultural enterprises, as critical needs for the state's farmers. A major integrated project in organic

fruits and vegetable production has been launched as part of the Global Food Security and Hunger planned program. In partnership with UT AgResearch and the Tennessee Department of Agriculture, research and demonstration will be conducted on Tennessee farms as well as on the University of Tennessee's organic research unit (21 acres) in Knoxville.

Family Economics - Strategies of the National Financial Security in Later Life initiative, of which Tennessee Saves is a part, include (1) far-reaching communications and marketing, (2) insights for and from research, and (3) new/adapted educational strategies.

Childhood Obesity - Tennessee youth are among the most obese in the nation. The Power U program will target the state's fourth graders to reverse this trend. In FY 2009, over 100 schools adopted the program.

2. How will the planned programs address the needs of under-served and under-represented populations of the

Profitable Agriculture - Past Extension and Research programs have not emphasized the needs of small-scale organic fruit and vegetable producers. Our new initiative in organics will be shaped and refined over the next five to seven years to meet the needs of this audience.

Family Economics - Certain programs in Tennessee will be targeted toward clientele of partnering groups to meet the needs of under-served and under-represented clientele. The partnering groups are: Tennessee Housing Development Agency, Tennessee Families First, Tennessee Department of Human Services, Habitat for Humanity and others.

Childhood Obesity - This planned program will target limited resource individuals, particularly with two efforts: the Expanded Food and Nutrition Education Program (EFNEP) and the Tennessee Nutrition and Consumer Education Program (TNCEP). TNCEP is the name of the state's education program for Supplemental Nutrition Assistance Program (SNAP) recipients. Educational materials are available in Spanish and the Food Fiesta curricula targets Hispanic youth. UT Extension has also created the Healthy Steps program to target pre-school teachers and youth with healthful eating and physical activity.

3. How will the planned programs describe the expected outcomes and impacts?

Profitable Agriculture - UT and TSU Extension are committed to measuring the economic impact of planned programs in animal systems, agronomic crop systems and economic infrastructure and commerce. The recurring economic impact of these programs can be described by increased revenue, increased savings, and one-time capital improvements.

Family Economics - Outcomes and impacts will include increases in savings/investment and reduction in debt.

Childhood Obesity - Participants who receive education in a series of sessions will report changes in attitudes and behaviors using a validated instrument.

4. How will the planned programs result in improved program effectiveness and/or efficiency?

Profitable Agriculture - A Tennessee Extension specialist in program development and evaluation collaborated with researchers at Virginia Tech and Louisiana State University to conduct a multi-state research project to determine how farmers learn and implications for Extension education. Findings included a need for easy-to-use, Web-based information and hands-on education. These findings will greatly improve program effectiveness since less effective methods can be greatly reduced or discontinued. Findings will inform planned programs in Animal Systems, Global Food Security and Hunger, and Economic Infrastructure and Commerce.

Family Economics - Training programs will strengthen the capacity of Extension personnel to deliver effective financial education programs. The efficiency of community financial education will be increased through networks and partnerships among Extension, government, business, financial institutions and community agencies.

Childhood Obesity - In delivering this planned program, Tennessee Extension FCS Agents will partner with a number of agencies and individuals to increase program delivery efforts, such as the Tennessee Consolidated School Health programs, a coalition in all Tennessee counties aimed at improving the health and well-being of public school students.

IV. Stakeholder Input

1. Actions taken to seek stakeholder input that encourages 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.

UT Extension pursued multiple data collections for this Plan of Work. (1) An environmental scan was completed by 14 Extension professionals who considered trends, cycles, research and concerns affecting Tennessee. (2) All Extension personnel were surveyed, and asked to rate the issues of importance to their county. (3) The issues were then summarized and submitted to the State Extension Advisory Council. Council membership is composed of UT and TSU representatives and stakeholders. A modified nominal group technique was used to identify priorities. (4) In addition, 100 state leaders in business, government, agriculture, family and consumer sciences and youth development were surveyed as to which issues should be priorities for Extension. Individuals surveyed included commissioners of state agencies, experts outside the land-grant university system, and leaders in business, industry and human services. (5) Next, the UT Human Dimensions Lab was employed to conduct phone interviews with all 665 members of the state's 95 County Agricultural Committees. An additional group of 200 minority leaders, identified by County Extension Directors, were included in the phone interview so that the sample was representative of the state's ethnic and racial diversity.

In all of these data collection activities, stakeholders were asked which issues should be priorities and which issues should NOT be priorities. The data was analyzed showing four strategic directions for Extension's Strategic Plan: (1) Promoting healthy lifestyles; (2) Managing and marketing our environmental and agricultural resources; (3) Preparing youth for a diverse and demanding future; and (4) Building and sustaining personal and family financial skills.

Finally, state action agendas were written to address these strategic directions. The initial Strategic Plan is examined annually to determine progress and make needed changes in state action agendas. One of the data points used to examine the Strategic Plan is input from the state's network of local Extension Advisory Committees. Extension in Tennessee is serious about stakeholder involvement! In FY 2009, UT and TSU Extension made 13,272 contacts for needs assessment purposes to inform our 2011-2015 planning effort. Tennessee Extension Agents placed special emphasis on involving youth and other under-represented groups in needs assessment activities. Of these needs assessment contacts, 20% were young people under 18 years of age. A special accomplishment was the involvement of racial and ethnic minority groups; 1,586 contacts (12% of total) represented racial-ethnic minority groups.

Stakeholder input for TAES research includes the following:

Each of our seven research departments has an advocacy/advisory group, which meets once or more per year. Current research activities and plans for future activities are reviewed at each meeting. Reactions and suggestions from the groups are received and factored into the research agenda-setting process. Membership in each group is by invitation of the department head, and typically consists of industry and regional representatives, scientific peers, alumni, and other relevant stakeholders. Some recent stakeholder input for Animal Science included a request for additional applied research, including additional nutrition and forage analysis, as well as vaccine studies. In Plant Sciences, the advocacy group joined the faculty during their annual planning retreat, and affirmed the department's move into biofuels and a consequent shift of some research positions.

Our ten Research and Education Centers (the regional field laboratories) have advocate groups, similar in function to the department advisory/advocate groups. While the primary function of these groups is local advocacy for the Center involved, some research advising or feedback occurs. Members serve by invitation of the Center director, and include local leaders, commodity group members, and area farmers or business people. They provide local and commodity-focused feedback to the center directors, who then influence research priorities through semi-annual meetings with UT AgResearch administration, immediate communication, and/or individual contact with UT AgResearch faculty conducting research on the centers.

Individual researchers, because of their specialized expertise, are made aware of emerging research needs in the scientific literature and popular press, through attendance and interaction at professional meetings, through RFP's they receive, by their interaction with commodity groups, local associations, through communication with the general public, and in their efforts to continually update coursework (most researchers have a partial teaching appointment; some have a partial Extension appointment).

The UT AgResearch advisory committee consists of a group of senior faculty from various departments with broad, well-developed research backgrounds. This group advises the Dean on research directions and potential areas of interest. One effort underway by this group has been to foster collaborative, cross-disciplinary projects that more closely align with emerging critical real-world issues.

2(A). A brief statement of the process that will be 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.

UT and TSU Extension will employ their extensive, statewide network of advisory groups for stakeholder input. The State Extension Advisory Council provides input and direction for statewide initiatives. In FY 2009, UT and TSU Extension made 13,272 contacts for needs assessment purposes. All of Tennessee's 95 counties have a County Agricultural Committee of seven local stakeholders, nominated by the County Mayor and approved by majority vote of the County Commission. Every County Agriculture Committee meets four times annually, and their duties include input into hiring decisions, local funding, and local programming.

The research advisory committees and advocates groups are responsible for identifying additional individual and group stakeholders that may depend on the work of a particular research department or research and education center, respectively.

2(B). A brief statement of the process that will be 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 geographical dispersion of research and education centers helps in providing a balanced picture of the needs of various populations, regions, and commodity/industry groups. In addition, both our researchers and center administrators conduct informal ongoing needs assessments through literature reviews, monitoring of scientific journals and regional/state news media, attendance at scientific meetings and local conferences, and both solicited and unsolicited communication from the public.

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.

All of the input received was used to update the State Extension Strategic Plan. This document is a guide for identifying emerging issues, redirecting extension programs, building state action agendas and setting program priorities. Performance measures were written based on this planning effort and the current research-base. Stakeholder input at the local, regional and statewide level is used to monitor and adjust deployment of the strategic plan. Stakeholder input was used to modify two programs for this 2011-2015 plan, as described below:

- Science, Engineering and Technology programs were given greater emphasis in 4-H youth development clubs, project groups, and school enrichment.
- The economic downturn caused additional hardship via rising unemployment as 1 of 10 working Tennesseans lost their jobs; and through shrinking investment value as many workers saw their 401(k) values drop by 30 to 40%. Stakeholder input was instrumental in changing the focus of Extension's Tennessee Saves programming from savings and investment education to coping with economic loss.

For UT AgResearch, stakeholder input is an active part of setting budget priorities and redirecting allocations as critical needs emerge, are addressed, and wane. Stakeholder input directly impacts hiring patterns, faculty equipment budgets, publicity efforts, forward-looking action plans, and grant-writing directions. As an example, the dairy advocacy group that is active with three of our Centers played a significant role in the prominence given to environmental research design at our new Little River dairy facility.

V. Planned Program Table of Content

S. No.	PROGRAM NAME
1	4-H Positive Youth Development
2	Agronomic Crop Systems
3	Animal Systems
4	Childhood Obesity
5	Economic Infrastructure and Commerce
6	Environmental and Water Quality Impacts
7	Family Economics
8	Food Safety
9	Forestry, Wildlife, and Fishery Systems
10	Global Food Security and Hunger
11	Health and Safety
12	Horticultural Systems
13	Human Development
14	Sustainable Energy
15	Climate Change

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

4-H Positive Youth Development

2. Brief summary about Planned Program

According to the Tennessee Department of Education, many students graduate from Tennessee high schools without the skills and attitudes needed to get and hold a job. Tennessee 4-H Youth Development will address this problem by helping youth to attain the life skills of achieving goals and communicating.

A recent National Science Foundation report concluded that most Tennessee 4, 8 and 12 grade students did not demonstrate proficiency in the knowledge and skills taught at their grade level in science and mathematics.

The methods used will vary depending on the local situation and the needs of the target audience, however, clubs, afterschool and school enrichment programs will be emphasized in at least 65 Tennessee counties.

3. Program existence : Mature (More than five years)

4. Program duration : Long-Term (More than five years)

5. Expending formula funds or state-matching funds : Yes

6. Expending other than formula funds or state-matching funds : Yes

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	25%	25%	0%	
806	Youth Development	75%	75%	0%	
	Total	100%	100%	0%	

V(C). Planned Program (Situation and Scope)**1. Situation and priorities**

Youth in Tennessee need the skills, experience and confidence necessary to meet the demands of the workplace and succeed in a high-performance economy characterized by high-skill, high-wage employment. According to the Tennessee Department of Education, many students graduate from Tennessee high schools without the skills and attitudes needed to get and hold a job. Tennessee 4-H Youth Development will address the development of skills and personal qualities needed for solid job performance. Youth will attain the life skills of achieving goals and communicating, two life skills essential for adult success in a job or careers. Additional emphasis will be placed on improving science literacy among the state's young people through 4-H efforts in science, engineering, and technology.

2. Scope of the Program

- In-State Extension
- Multistate Extension

V(D). Planned Program (Assumptions and Goals)**1. Assumptions made for the Program**

Assumption A. It is assumed that Tennessee Extension 4-H Agents and adult volunteer leaders have the necessary skills to collaborate with local school systems for the delivery of afterschool and school enrichment programs.

Assumption B. It is assumed that the logic model concept, applied to youth development program planning, will yield positive results.

2. Ultimate goal(s) of this Program

Tennessee youth will attain the life skills of achieving goals and communicating, two life skills essential for adult success in a job or career. Tennessee youth will possess the skills needed to compete in a diverse and demanding workforce.

V(E). Planned Program (Inputs)

1. Estimated Number of professional FTE/SYs to be budgeted for this Program

Year	Extension		Research	
	1862	1890	1862	1890
2011	138.0	13.0	0.0	0.0
2012	138.0	13.0	0.0	0.0
2013	138.0	13.0	0.0	0.0
2014	138.0	13.0	0.0	0.0
2015	135.0	12.0	0.0	0.0

V(F). Planned Program (Activity)

1. Activity for the Program

- **Clubs/Project Groups** - At least 65 Tennessee counties will organize over 2,500 4-H clubs where workforce preparation will be the major emphasis. Project work will be emphasized, and the experiential learning model will be used to highlight jobs and careers aligned with 4-H projects. Activity sheets have been developed to emphasize practical skills which align with jobs and careers.
- **School Enrichment** - Various school enrichment programs in at least 50 Tennessee counties will focus on science, engineering and technology. Youth will be exposed to jobs and careers associated with science fields.
- **Mass media** - Mass media will be used to inform parents, participants and stakeholders about program opportunities and achievements.
- **Youth from Under-Served and Limited Resource Families:** For 2011 – 2015, TSU Extension 4-H Youth Development programs will place special emphasis on SET programs in clubs, afterschool settings and other venues to reach youth. The ultimate goal is to increase science literacy among the state's young people. TSU Extension will reach under-served and limited resource youth.

2. Type(s) of methods to be used to reach direct and indirect contacts

Extension

Direct Methods	Indirect Methods
<ul style="list-style-type: none"> • One-on-One Intervention • Demonstrations 	<ul style="list-style-type: none"> • Newsletters • TV Media Programs • Other 1 (Radio Programs) • Other 2 (Exhibits)

3. Description of targeted audience

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

V(G). Planned Program (Outputs)

1. Standard output measures

Target for the number of persons(contacts) to be reached through direct and indirect contact methods

	Direct Contact Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Year	Target	Target	Target	Target
2011	30000	0	350000	250000
2012	30000	0	350000	250000
2013	30000	0	350000	250000
2014	30000	0	350000	250000
2015	200000	0	500000	500000

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

2011:0 2012:0 2013:0 2014:0 2015:0

3. Expected Peer Review Publications

Year	Research Target	Extension Target	Total
2011	0	4	0
2012	0	4	0
2013	0	4	0
2014	0	4	0
2015	0	4	0

V(H). State Defined Outputs

1. Output Target

- Number of volunteers utilized in delivering this program.

2011:4000 2012:4000 2013:4000 2014:4000 2015:5000

- Number of exhibits produced.

2011:200 2012:200 2013:200 2014:200 2015:1000

V(I). State Defined Outcome

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 Target

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

2. Outcome Type : Change in Knowledge Outcome Measure

2011:15000 2012:15000 2013:15000 2014:15000 2015:15000

3. Associated Knowledge Area(s)

- 806 - Youth Development

4. Associated Institute Type(s)

- 1862 Extension
- 1890 Extension

Outcome # 2

1. Outcome Target

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

2. Outcome Type : Change in Knowledge Outcome Measure

2011:15000 2012:15000 2013:15000 2014:15000 2015:15000

3. Associated Knowledge Area(s)

- 806 - Youth Development

4. Associated Institute Type(s)

- 1862 Extension
- 1890 Extension

Outcome # 3

1. Outcome Target

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

2. Outcome Type : Change in Condition Outcome Measure

2011:500 2012:500 2013:500 2014:500 2015:500

3. Associated Knowledge Area(s)

- 806 - Youth Development

4. Associated Institute Type(s)

- 1862 Extension
- 1890 Extension

Outcome # 4

1. Outcome Target

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

2. Outcome Type : Change in Knowledge Outcome Measure

2011:15000 2012:15000 2013:15000 2014:15000 2015:15000

3. Associated Knowledge Area(s)

- 806 - Youth Development

4. Associated Institute Type(s)

- 1862 Extension
- 1890 Extension

Outcome # 5

1. Outcome Target

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

2. Outcome Type : Change in Knowledge Outcome Measure

2011:15000 2012:15000 2013:15000 2014:15000 2015:15000

3. Associated Knowledge Area(s)

- 806 - Youth Development

4. Associated Institute Type(s)

- 1862 Extension
- 1890 Extension

Outcome # 6

1. Outcome Target

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

2. Outcome Type : Change in Knowledge Outcome Measure

2011:15000 2012:15000 2013:15000 2014:15000 2015:15000

3. Associated Knowledge Area(s)

- 806 - Youth Development

4. Associated Institute Type(s)

- 1862 Extension
- 1890 Extension

Outcome # 7

1. Outcome Target

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

2. Outcome Type : Change in Action Outcome Measure

2011:30000 2012:30000 2013:30000 2014:30000 2015:30000

3. Associated Knowledge Area(s)

- 806 - Youth Development

4. Associated Institute Type(s)

- 1862 Extension
- 1890 Extension

Outcome # 8

1. Outcome Target

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

2. Outcome Type : Change in Action Outcome Measure

2011:30000 2012:30000 2013:30000 2014:30000 2015:30000

3. Associated Knowledge Area(s)

- 806 - Youth Development

4. Associated Institute Type(s)

- 1862 Extension
- 1890 Extension

Outcome # 9

1. Outcome Target

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

2. Outcome Type : Change in Knowledge Outcome Measure

2011:35000 2012:35000 2013:35000 2014:35000 2015:35000

3. Associated Knowledge Area(s)

- 806 - Youth Development

4. Associated Institute Type(s)

- 1862 Extension
- 1890 Extension

Outcome # 10**1. Outcome Target**

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

2. Outcome Type : Change in Knowledge Outcome Measure

2011:30000 2012:30000 2013:30000 2014:30000 2015:30000

3. Associated Knowledge Area(s)

- 806 - Youth Development

4. Associated Institute Type(s)

- 1862 Extension
- 1890 Extension

Outcome # 11**1. Outcome Target**

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

2. Outcome Type : Change in Knowledge Outcome Measure

2011:1000 2012:1000 2013:1000 2014:1000 2015:1000

3. Associated Knowledge Area(s)

- 803 - Sociological and Technological Change Affecting Individuals, Families and Communities
- 806 - Youth Development

4. Associated Institute Type(s)

- 1862 Extension
- 1890 Extension

V(J). Planned Program (External Factors)**1. External Factors which may affect Outcomes**

- Competing Public priorities

Description

Much of this program will be delivered in Tennessee public schools to reach the target audience which includes underserved youth. If the program is not available to large numbers of public school youth, the outcome targets will be greatly reduced since additional time and effort is required to reach youth through community-based settings. The delivery of 4-H school-based programs targeting workforce preparation and science literacy has been a priority for Tennessee educational leaders at the local level, but changing accountability demands through standardized testing may alter that priority, and school gatekeepers (i.e. principals, superintendents and local school boards) may have new priorities.

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

1. Evaluation Studies Planned

- After Only (post program)

Description

The Program Evaluation Network will be used to evaluate the 4-H Workforce Preparation program. The after-only or post-program questionnaire is the appropriate method for this program and audience. Instruments have been created and validated for this study Reliability was established by pilot-tests involving over 1,000 Tennessee youth.

2. Data Collection Methods

- Sampling
- On-Site

Description

Intact groups of youth will be randomly selected for the sample; and the sample will be composed of all youth in 20% of local intact groups (clubs, project groups or school enrichment classes) served in this program. The questionnaire will be administered to youth participants by Extension 4-H Agents and volunteers, all of whom have received instruction in administering the questionnaire without bias. As this is an evaluation study conducted to account for USDA funds, it is not under the purview of the Institutional Review Board of the University of Tennessee or Tennessee State University.

V(A). Planned Program (Summary)

Program # 2

1. Name of the Planned Program

Agronomic Crop Systems

2. Brief summary about Planned Program

Improving profit margins for cotton producers benefits Tennessee's economy. Cotton production also impacts environmental quality. Yield improvements may be obtained with proper variety selection, insect, disease and weed management, appropriate use of fertilizers and irrigation, and other best management practices. These and other factors directly affect the profitability of crop production and environmental quality.

Profit margins are very small in many years and producers must be certain that their production practices are economically sound. Producers need research-based recommendations to insure maximum profitability.

We will continue to develop varieties and genetic lines that provide high-yielding, disease-resistant options for producers, and compare these to commercial standards. This will result in unbiased, research-based information to improve the ability of producers to make sound selections for optimum performance and yields. Optimum production systems will be determined through research which will provide producers with best management practices.

Because growth rates and pest and disease resistance and control are critical to the success of farmers, insect and disease control technologies are continually being created by sources within the University system and outside it. We will continue to develop and utilize new Integrated Pest Management technology for control of existing, invasive, new and re-emerging insect and disease pests of cropping systems.

In many cases, agricultural production research develops new technologies and practices to increase yields while ignoring economic tradeoffs. We will seek to use a multidisciplinary approach to evaluate crop systems for economically optimal production of the agricultural commodities produced in Tennessee.

3. Program existence : Mature (More than five years)

4. Program duration : Long-Term (More than five years)

5. Expending formula funds or state-matching funds : Yes

6. Expending other than formula funds or state-matching funds : Yes

V(B). Program Knowledge Area(s)

1. Program Knowledge Areas and Percentage

KA Code	Knowledge Area	%1862 Extension	%1890 Extension	%1862 Research	%1890 Research
112	Watershed Protection and Management	0%	0%	2%	
133	Pollution Prevention and Mitigation	0%	0%	3%	
201	Plant Genome, Genetics, and Genetic Mechanisms	12%	12%	15%	
202	Plant Genetic Resources and Biodiversity	0%	0%	3%	
203	Plant Biological Efficiency and Abiotic Stresses Affecting Plants	0%	0%	12%	
204	Plant Product Quality and Utility (Preharvest)	0%	0%	3%	
205	Plant Management Systems	62%	62%	19%	
206	Basic Plant Biology	0%	0%	2%	
211	Insects, Mites, and Other Arthropods Affecting Plants	3%	3%	5%	
212	Pathogens and Nematodes Affecting Plants	16%	16%	23%	
213	Weeds Affecting Plants	0%	0%	4%	
215	Biological Control of Pests Affecting Plants	0%	0%	2%	
216	Integrated Pest Management Systems	0%	0%	7%	
601	Economics of Agricultural Production and Farm Management	7%	7%	0%	
	Total	100%	100%	100%	

V(C). Planned Program (Situation and Scope)**1. Situation and priorities**

Various needs assessments conducted by Extension specialists show that the following practices are key for Tennessee row crops producers: conservation tillage; planting insect-tolerant crops; planting herbicide-tolerant crops; spraying with foliar fungicide to manage disease; using recommended varieties.

Producers of agronomic crops 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.

2. Scope of the Program

- In-State Extension
- In-State Research

- Multistate Research
- Multistate Extension
- Integrated Research and Extension

V(D). Planned Program (Assumptions and Goals)

1. Assumptions made for the Program

Row crops will continue to be a mainstay of the economy, particularly in the thirty-one West Tennessee counties, for the foreseeable future. The Innovation-Decision Process (Rogers, 1995) is a valid representation of adoption decisions made by Tennessee row crop producers. The level of staff and budget resources for research available from appropriated sources will remain approximately constant. Useable data can be developed from field experiments. Scientists in other disciplines will cooperate in developing and analyzing data. Producers will be willing to adopt technologies and systems that are shown to be economically superior. New pests and diseases will invade the region. Crop genetics will continue to change. Adequate expertise will exist in areas critical to this effort such as molecular, marker-assisted and traditional plant breeding; varietal evaluation, and system development and refinement. The volume and quality of our research work will be increased through substantial extramural funding.

2. Ultimate goal(s) of this Program

The ultimate goal is to improve profitability for Tennessee row crop producers by assisting them to learn and adopt research-based recommendations; by developing and testing technology that will protect commercial agronomic crop systems from existing and invasive pests and disease and provide data in support of new genetics where appropriate; and by developing and selecting improved crop varieties and production systems.

V(E). Planned Program (Inputs)

1. Estimated Number of professional FTE/SYs to be budgeted for this Program

Year	Extension		Research	
	1862	1890	1862	1890
2011	86.0	8.0	62.0	0.0
2012	86.0	8.0	62.0	0.0
2013	86.0	8.0	62.0	0.0
2014	86.0	8.0	62.0	0.0
2015	31.5	3.0	0.0	0.0

V(F). Planned Program (Activity)

1. Activity for the Program

The Extension portion of this plan includes cotton, irrigation, entomology, plant pathology and row crops management and marketing issues. It 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 practices will be targeted: 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 will be used to build awareness of UT

Extension resources and practices for more profitable production. Mass media will also highlight pests and pesticides in a timely manner.

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

Decision: Group meetings and classes will be held in which Extension specialists will deliver detailed instruction to producers.

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

Confirmation: Farm visits and telephone calls will assist producers to continue use of the practices, respond to environmental factors, and realize greater profits.

From a research perspective, molecular, marker-assisted and traditional breeding techniques are used to develop genetic lines and varieties of corn, soybeans, tobacco, and wheat which are adapted, high-yielding, and disease-resistant. Varieties of these crops and cotton are evaluated in replicated field research plots at our Research and Education Centers and with producer cooperators in selected counties. Likewise, cropping systems research addressing tillage systems and rotation schemes are conducted to develop production system information.

We conduct surveillance for exotic and invasive organisms using both conventional and molecular technologies. We research the effects of biological, cultural and chemical control technology for efficacy and effect on productivity of cropping systems under study. We search for new organisms to use in integrated control programs for pests and diseases of those agronomic systems that are predicted to be in danger of severe damage from new, emerging, and re-emerging pests and diseases.

Economic data are developed from field experiments on agricultural experiment stations, through surveys of producers, and through simulation modeling. Data are analyzed using standard methods for estimating yield response functions, budgeting, optimization techniques, risk analysis procedures, simulation modeling, and other methods of economic analysis as appropriate.

2. Type(s) of methods to be used to reach direct and indirect contacts

Extension

Direct Methods	Indirect Methods
<ul style="list-style-type: none"> ● Education Class ● One-on-One Intervention ● Demonstrations ● Other 1 (On-site Visits) 	<ul style="list-style-type: none"> ● Newsletters ● TV Media Programs ● Web sites ● Other 1 (Newspaper Articles) ● Other 2 (Radio Programs)

3. Description of targeted audience

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

V(G). Planned Program (Outputs)

1. Standard output measures

Target for the number of persons(contacts) to be reached through direct and indirect contact methods

	Direct Contact Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Year	Target	Target	Target	Target
2011	45000	200000	10000	200000

	Direct Contact Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Year	Target	Target	Target	Target
2012	45000	200000	10000	200000
2013	45000	200000	10000	200000
2014	45000	200000	10000	200000
2015	45000	200000	10000	200000

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

2011:1 2012:1 2013:1 2014:0 2015:0

3. Expected Peer Review Publications

Year	Research Target	Extension Target	Total
2011	36	15	0
2012	36	15	0
2013	36	15	0
2014	0	15	0
2015	0	15	0

V(H). State Defined Outputs**1. Output Target**

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

2011:20	2012:20	2013:20	2014:20	2015:20
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- Number of research-based publications distributed as part of this program.

2011:5000	2012:5000	2013:5000	2014:5000	2015:5000
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- Exploitation of the strong resistance mechanism in epazote to the plant parasitic nematode, *Meloidogyne incognita* (Bernard).

2011:0	2012:0	2013:0	2014:0	2015:0
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- Publish disease and nematode ratings for soybean producers. (Newman)

2011:1	2012:1	2013:1	2014:1	2015:0
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- Release a new soybean variety tailored to Tennessee needs. (Pantalone)

2011:1	2012:1	2013:1	2014:1	2015:0
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- Release new maize parental lines. (West)

2011:1	2012:1	2013:1	2014:1	2015:0
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V(I). State Defined Outcome

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

Outcome # 1**1. Outcome Target**

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. Outcome Type : Change in Action Outcome Measure**2011:100****2012:100****2013:100****2014:100****2015:100****3. Associated Knowledge Area(s)**

- 205 - Plant Management Systems

4. Associated Institute Type(s)

- 1862 Extension

Outcome # 2**1. Outcome Target**

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

2. Outcome Type : Change in Action Outcome Measure**2011:250****2012:250****2013:250****2014:250****2015:250****3. Associated Knowledge Area(s)**

- 205 - Plant Management Systems
- 211 - Insects, Mites, and Other Arthropods Affecting Plants

4. Associated Institute Type(s)

- 1862 Extension

Outcome # 3**1. Outcome Target**

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. Outcome Type : Change in Condition Outcome Measure**2011:200****2012:200****2013:200****2014:200****2015:200****3. Associated Knowledge Area(s)**

- 211 - Insects, Mites, and Other Arthropods Affecting Plants
- 601 - Economics of Agricultural Production and Farm Management

4. Associated Institute Type(s)

- 1862 Extension

Outcome # 4**1. Outcome Target**

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

2. Outcome Type : Change in Knowledge Outcome Measure

2011:500 2012:500 2013:500 2014:500 2015:0

3. Associated Knowledge Area(s)

- 204 - Plant Product Quality and Utility (Preharvest)
- 205 - Plant Management Systems
- 211 - Insects, Mites, and Other Arthropods Affecting Plants
- 212 - Pathogens and Nematodes Affecting Plants
- 213 - Weeds Affecting Plants
- 601 - Economics of Agricultural Production and Farm Management

4. Associated Institute Type(s)

- 1862 Extension
- 1862 Research

V(J). Planned Program (External Factors)**1. External Factors which may affect Outcomes**

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

Description

Corn yields are heavily dependent on available moisture and hot, dry conditions in July can affect pollination and subsequently production for the year. Although sorghum is relatively drought tolerant, yields are still depend on available moisture. Dry conditions in June and July can destroy yield.

The macroeconomics of agriculture may affect the economic environment of specific enterprises and, in turn, affect the applicability of decision-making tools. In addition, Extension and other information providers may have competing demands that prevent effective dissemination of research results. IPM program outcomes will be affected by weather extremes, corporate and academic production of new plant genetics and new chemistries for control.

V(K). Planned Program (Evaluation Studies and Data Collection)**1. Evaluation Studies Planned**

- After Only (post program)
- Retrospective (post program)
- Other (Third-Party)

Description

- End-of-year follow up survey: Agents make one-on-one contacts to interview producers.
- End-of-program survey: Used at the Dyersburg, TN Grain Conference.
- Third-Party: Interviews with agri-businesses who sell chemicals and seed (sales records of chemicals and seed varieties used).
 - Producers will be surveyed at area crop production meetings to determine the percentage of acres planted to varieties developed/recommended by UT AgResearch, and the percentage which follow cropping system practices based on the results of our research. IPM evaluation information will be acquired from Extension agents, direct contact with growers, and area production meetings, where available.

2. Data Collection Methods

- Sampling
- Whole population
- On-Site
- Structured

Description

- End-of-year follow up survey: sample of participating producers, stratified by county.
- End-of-program survey: population of producers in attendance at the Used at the Dyersburg, TN Grain Conference.
- Third-Party: structured interviews with third parties

V(A). Planned Program (Summary)

Program # 3

1. Name of the Planned Program

Animal Systems

2. Brief summary about Planned Program

Our research and extension programs will seek ways to increase the health and productivity of livestock through strategies that reduce disease pathogens and stress factors, optimize livestock nutrition, and increase reproduction.

Research in disease prevention and therapy of lactating dairy cattle will be conducted using established challenge models, allowing the comparison of treatments. Research to determine genetic factors that impact response to stress and disease as well as those that optimize production in cattle, swine and poultry will constitute a significant component. Additional research will be conducted to find more rapid and reliable identification methods for disease pathogens. Research to determine optimal nutritional regimens and least cost inputs, including byproducts for cattle, swine, and poultry will also be conducted, in the context of modern genetics and current commercial production settings.

Work to determine ways to increase reproductive rates in cattle will constitute another significant component of this program. Identification of physiological factors that impact embryo development and viability, as well as sperm and oocyte longevity will allow for the development of practical and economical techniques that producers can implement at the farm level, which will ultimately result in increased meat and milk production and sustainability of livestock farms. Research for domestic animals includes development of faster disease diagnostic methods for livestock.

With 2.17 million cattle and calves in the state, beef cattle remain the number one agricultural enterprise for Tennessee farmers. Cash receipts annually exceed \$514 million, representing 20% of the state's total cash receipts from agriculture. UT and TSU Extension will provide producers with in-depth and comprehensive education on production, management, and marketing of beef cattle, and especially feeder cattle, through its Master Beef Producer Program.

3. Program existence : Mature (More than five years)

4. Program duration : Long-Term (More than five years)

5. Expending formula funds or state-matching funds : Yes

6. Expending other than formula funds or state-matching funds : Yes

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	0%	0%	2%	
135	Aquatic and Terrestrial Wildlife	0%	0%	12%	
301	Reproductive Performance of Animals	16%	16%	21%	
302	Nutrient Utilization in Animals	5%	5%	8%	
303	Genetic Improvement of Animals	5%	5%	3%	
304	Animal Genome	0%	0%	5%	
305	Animal Physiological Processes	0%	0%	13%	
306	Environmental Stress in Animals	0%	0%	2%	
307	Animal Production Management Systems	57%	57%	5%	
311	Animal Diseases	17%	17%	26%	
315	Animal Welfare, Well-Being and Protection	0%	0%	3%	
	Total	100%	100%	100%	

V(C). Planned Program (Situation and Scope)

1. Situation and priorities

Animal health, efficiency, and performance are critical factors for the profitability and sustainability of livestock systems impacting the ability of farms to remain profitable. Livestock producers and their families are directly impacted economically by these factors and consumers are ultimately affected through costs of food and other farm goods.

The market for beef cattle, like many other agricultural commodities, is becoming increasingly competitive due to consumer demands for safe and wholesome products, international market influences on prices, and escalating energy, fertilizer, and feed prices. Tennessee feeder cattle have been discounted in the past due to perceived inadequacies related to health and management. To ensure future viability of the industry, producers need in-depth and comprehensive education on these priorities: production, management, and marketing of beef cattle, and especially feeder cattle. Such education is not suited for one to two hour county meetings, but rather must be delivered in the form of a multi-week, multi-disciplinary educational program.

Vector-borne diseases of man and animals (zoonotic diseases) and blood-feeding arthropods have a negative impact on human activities and human development. Agricultural production is also decreased when either humans or livestock are affected by an infectious disease agent.

2. Scope of the Program

- In-State Extension
- In-State Research
- Multistate Research
- Integrated Research and Extension

V(D). Planned Program (Assumptions and Goals)**1. Assumptions made for the Program**

County Extension Agents have the knowledge and skills to collaborate with county livestock associations, cattlemen's associations, local agribusinesses and other local stakeholders to conduct the Master Beef Producer program. Adequate scientific and technical personnel will remain in place so that changes in the research-base will be reflected in the Master Beef Producer curricula and other publications necessary for this program. Research funding will remain static or increase. New vectors and/or diseases will emerge. We will be able to maintain sufficient personnel to continue our research programs.

2. Ultimate goal(s) of this Program

Our research and extension efforts will result in information that producers can use to increase animal health, efficiency, and productivity, thus increasing profits of those enterprises.

The Master Beef Producer Program is an educational program designed to educate Tennessee cow-calf producers to help them be the very best in the country, improve their profitability and position the industry to be competitive with other states.

V(E). Planned Program (Inputs)**1. Estimated Number of professional FTE/SYs to be budgeted for this Program**

Year	Extension		Research	
	1862	1890	1862	1890
2011	37.0	3.5	27.0	0.0
2012	37.0	3.5	27.0	0.0
2013	37.0	3.5	27.0	0.0
2014	37.0	3.5	27.0	0.0
2015	36.0	3.0	0.0	0.0

V(F). Planned Program (Activity)**1. Activity for the Program**

The Master Beef Producer Program will be 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 that have an interest in the state's cattle industry. Master Beef Producer programs may only be taught by agents that have completed the comprehensive training curriculum. During this training, agents are exposed to each session of the program, and are provided on-screen presentations, speaker notes, evaluation instruments, and instructions about the most effective strategies for teaching this curriculum. Industry professionals, veterinarians, and other local industry leaders may be included as a part of the teaching team, provided that they are familiar with the subject matter content included in the Master Beef Producer manual that is related to the subject they will address. The Master Beef Producer Program will:

1. Include a series of 12 educational sessions that focus on cow-calf production and issues facing the beef industry. These are conducted at various off-campus locations accessible to Tennessee beef producers. These sessions include hands-on demonstrations, mini-lectures, discussions, question and answer sessions, etc.
2. Enhance the profitability and competitiveness of cow-calf operations by providing essential, technical information.
3. Provide participants with a beef production reference manual that covers in detail the educational information presented in

the sessions.

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

Goats are an environmentally adaptive specie 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.

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. Type(s) of methods to be used to reach direct and indirect contacts

Extension

Direct Methods	Indirect Methods
<ul style="list-style-type: none"> ● Education Class ● One-on-One Intervention ● Demonstrations ● Other 1 (On-Site Visits) 	<ul style="list-style-type: none"> ● Newsletters ● TV Media Programs ● Other 1 (Newspaper Articles) ● Other 2 (Radio Programs)

3. Description of targeted 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.

V(G). Planned Program (Outputs)

1. Standard output measures

Target for the number of persons(contacts) to be reached through direct and indirect contact methods

	Direct Contact Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Year	Target	Target	Target	Target
2011	10000	15000	5000	0
2012	10000	15000	5000	0
2013	10000	15000	5000	0
2014	10000	15000	5000	0
2015	100000	1000000	25000	0

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

2011:1 2012:1 2013:1 2014:1 2015:0

3. Expected Peer Review Publications

Year	Research Target	Extension Target	Total
2011	30	4	0
2012	30	4	0
2013	30	4	0
2014	30	4	0
2015	0	4	0

V(H). State Defined Outputs

1. Output Target

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

2011:5 2012:5 2013:5 2014:5 2015:100

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

2011:2500 2012:2500 2013:2500 2014:5000 2015:5000

- Development of a 'hand-held' diagnostic device for Johne's disease by merging our diagnostic method and microfluidic technology. (Eda)

2011:1 2012:0 2013:0 2014:0 2015:0

V(I). State Defined Outcome

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	Adoption of reproduction-enhancing media additive for cattle embryo transfer, annual uses in Tennessee (Schrack).
4	Reduction in mastitis in Tennessee dairy cattle by genetic marker screening, percent reduction (Oliver).
5	Educational assistance was provided to beef producers resulting in increased Tennessee Department of Agriculture cost-share assistance for improved facilities, equipment and genetics.
6	Dairy producer involvement in the Tennessee Quality Milk Producer (TQMP) program (Oliver).
7	Beef Production and Marketing: Number of beef producers who improved marketing methods.
8	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.
9	Beef Production and Marketing: The number of calves managed according to Beef Quality Assurance (BQA) guidelines.
10	Sales of multiple ovulation embryo transfer (MOET) technology for cattle embryo transfer, dollars (Schrack)
11	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 Target**

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

2. Outcome Type : Change in Condition Outcome Measure

2011:249000000 2012:249000000 2013:249000000 2014:249000000 2015:249000000

3. Associated Knowledge Area(s)

- 307 - Animal Production Management Systems

4. Associated Institute Type(s)

- 1862 Extension

Outcome # 2**1. Outcome Target**

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

2. Outcome Type : Change in Action Outcome Measure

2011:350 2012:350 2013:350 2014:350 2015:1500

3. Associated Knowledge Area(s)

- 303 - Genetic Improvement of Animals

4. Associated Institute Type(s)

- 1862 Extension
- 1890 Extension

Outcome # 3**1. Outcome Target**

Adoption of reproduction-enhancing media additive for cattle embryo transfer, annual uses in Tennessee (Schrick).

2. Outcome Type : Change in Action Outcome Measure

2011:30000 2012:40000 2013:40000 2014:40000 2015:0

3. Associated Knowledge Area(s)

- 301 - Reproductive Performance of Animals
- 307 - Animal Production Management Systems

4. Associated Institute Type(s)

- 1862 Research

Outcome # 4**1. Outcome Target**

Reduction in mastitis in Tennessee dairy cattle by genetic marker screening, percent reduction (Oliver).

2. Outcome Type : Change in Condition Outcome Measure

2011:3 **2012:3** **2013:4** **2014:4** **2015:0**

3. Associated Knowledge Area(s)

- 303 - Genetic Improvement of Animals
- 311 - Animal Diseases

4. Associated Institute Type(s)

- 1862 Research

Outcome # 5**1. Outcome Target**

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

2. Outcome Type : Change in Condition Outcome Measure

2011:7000000 **2012:7000000** **2013:7000000** **2014:7000000** **2015:0**

3. Associated Knowledge Area(s)

- 307 - Animal Production Management Systems

4. Associated Institute Type(s)

- 1862 Extension

Outcome # 6**1. Outcome Target**

Dairy producer involvement in the Tennessee Quality Milk Producer (TQMP) program (Oliver).

2. Outcome Type : Change in Action Outcome Measure

2011:45 **2012:45** **2013:45** **2014:45** **2015:0**

3. Associated Knowledge Area(s)

- 302 - Nutrient Utilization in Animals
- 305 - Animal Physiological Processes
- 306 - Environmental Stress in Animals
- 307 - Animal Production Management Systems
- 311 - Animal Diseases
- 315 - Animal Welfare, Well-Being and Protection

4. Associated Institute Type(s)

- 1862 Extension
- 1862 Research

Outcome # 7

1. Outcome Target

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

2. Outcome Type : Change in Action Outcome Measure

2011:400 2012:400 2013:400 2014:400 2015:400

3. Associated Knowledge Area(s)

- 307 - Animal Production Management Systems

4. Associated Institute Type(s)

- 1862 Extension
- 1890 Extension

Outcome # 8

1. Outcome Target

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. Outcome Type : Change in Action Outcome Measure

2011:500 2012:500 2013:500 2014:500 2015:500

3. Associated Knowledge Area(s)

- 302 - Nutrient Utilization in Animals
- 307 - Animal Production Management Systems

4. Associated Institute Type(s)

- 1862 Extension
- 1890 Extension

Outcome # 9

1. Outcome Target

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

2. Outcome Type : Change in Knowledge Outcome Measure

2011:1200 2012:1200 2013:1200 2014:1200 2015:1200

3. Associated Knowledge Area(s)

- 307 - Animal Production Management Systems
- 315 - Animal Welfare, Well-Being and Protection

4. Associated Institute Type(s)

- 1862 Extension
- 1890 Extension

Outcome # 10

1. Outcome Target

Sales of multiple ovulation embryo transfer (MOET) technology for cattle embryo transfer, dollars (Schrick)

2. Outcome Type : Change in Knowledge Outcome Measure

2011:1000000 2012:1000000 2013:1000000 2014:1000000 2015:0

3. Associated Knowledge Area(s)

- 301 - Reproductive Performance of Animals
- 307 - Animal Production Management Systems

4. Associated Institute Type(s)

- 1862 Research

Outcome # 11

1. Outcome Target

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. Outcome Type : Change in Action Outcome Measure

2011:25 2012:25 2013:25 2014:25 2015:25

3. Associated Knowledge Area(s)

- 301 - Reproductive Performance of Animals
- 302 - Nutrient Utilization in Animals
- 303 - Genetic Improvement of Animals
- 307 - Animal Production Management Systems
- 311 - Animal Diseases
- 315 - Animal Welfare, Well-Being and Protection

4. Associated Institute Type(s)

- 1890 Extension

V(J). Planned Program (External Factors)

1. External Factors which may affect Outcomes

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

Description

Drought could greatly inhibit the beef program's effectiveness at achieving the stated outcomes. Significant changes in the economic environment or demographics will impact the user adoption of our research efforts.

Appropriations changes will greatly affect outcome -- the possible loss of one faculty member may be critical. Policies regarding antibiotic use in animals may change over time and would thus impact the direction and implications of this research.

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

1. Evaluation Studies Planned

- Retrospective (post program)
- Before-After (before and after program)
- During (during program)
- Time series (multiple points before and after program)
- Other (Ongoing)

Description

Before-After: Both pre and post program survey instruments are to be used for each Master Beef Producer participant.

During: In addition, evaluation instruments will be administered for each session of the program, to evaluate the quality of the material presented and the instructor(s). These instruments will assess knowledge gains as a result of the training.

Retrospective: Three years after the completion of the program, participants will be surveyed to determine the extent of the changes in practices that they have adopted. This information will be used to assess the impact of the program on producer behavior.

Ongoing: Disease transmission rates will be monitored by state and regional health officials.

Disease transmission will be monitored by state and regional health officials.

2. Data Collection Methods

- Whole population
- Mail
- Telephone
- On-Site
- Tests

Description

The entire population of Master Beef Producer graduates will be surveyed.
Data collection methods include diagnostic tests for Johne's disease in livestock, and cortisol stress in catfish.

V(A). Planned Program (Summary)

Program # 4

1. Name of the Planned Program

Childhood Obesity

2. Brief summary about Planned Program

Obesity has reached epidemic proportions in Tennessee with two of three adults and four of ten school age children overweight or obese. This program will reduce obesity rates in the state and help Tennesseans live healthier lives.

The Centers for Disease Control estimates that 76 million people get sick, more than 325,000 are hospitalized, and 5,000 Americans die each year from foodborne illness. This program will improve consumer practices for safe food handling.

Our microbiological food safety research program seeks to improve detection of, and develop physical and chemical intervention methods for, bacterial and fungal foodborne pathogens. In addition, we want to develop education and monitoring programs for at-risk populations or those who serve food to at-risk populations. Improving food safety is a collaborative effort between scientists in the microbiological food safety and food biopolymer chemistry research groups. Proteins and polysaccharides will be studied for their potential to serve as carriers to help improve the availability of bioactive food antimicrobials and other components in food matrices or in the human gastrointestinal tract, or for their direct antimicrobial effects in packaging, on surfaces or in foods.

We are also active in nutrition-related cancer research. A common mechanism of modifying tumor growth and cancer risk may lie in the ability to alter intracellular calcium levels, and by doing so, we may be able to develop nutritional therapies to combat cancers.

3. Program existence : Mature (More than five years)

4. Program duration : Long-Term (More than five years)

5. Expending formula funds or state-matching funds : Yes

6. Expending other than formula funds or state-matching funds : Yes

V(B). Program Knowledge Area(s)

1. Program Knowledge Areas and Percentage

KA Code	Knowledge Area	%1862 Extension	%1890 Extension	%1862 Research	%1890 Research
204	Plant Product Quality and Utility (Preharvest)	0%	0%	3%	
205	Plant Management Systems	0%	0%	6%	
307	Animal Production Management Systems	0%	0%	2%	
311	Animal Diseases	0%	0%	6%	
501	New and Improved Food Processing Technologies	10%	10%	10%	
502	New and Improved Food Products	5%	5%	12%	
503	Quality Maintenance in Storing and Marketing Food Products	0%	0%	4%	
511	New and Improved Non-Food Products and Processes	0%	0%	1%	
701	Nutrient Composition of Food	0%	0%	1%	
702	Requirements and Function of Nutrients and Other Food Components	5%	5%	21%	
703	Nutrition Education and Behavior	40%	40%	0%	
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	40%	40%	28%	
722	Zoonotic Diseases and Parasites Affecting Humans	0%	0%	5%	
	Total	100%	100%	100%	

V(C). Planned Program (Situation and Scope)**1. Situation and priorities**

Obesity has reached epidemic proportions in Tennessee with two of three adults and four of ten school age children overweight or obese. Obesity is the leading risk factor for many chronic diseases such as diabetes, arthritis, heart disease, hypertension, and some types of cancer. The economic and psychosocial costs of obesity and the underlying health issues are impacting all of society. Medical care costs are escalating and creating an economic burden for families, employers, and insurance entities. It is important for Extension to implement programs to reverse this trend.

In 2000, the Economic Research Service (ERS) estimated the cost from five bacterial foodborne pathogens as \$6.9 billion, which includes medical costs, productivity losses from missed work, and an estimate of the value of premature death. Safety of food products is a primary concern of consumers, and confidence in our agricultural food products is critical for the acceptance of such products and the ultimate well-being of livestock farms and farm families.

Child care providers serve one of the segments of our population which is most vulnerable to foodborne illness. In the US, children under five years of age account for 21% of the cases of food poisoning. Education of child care providers and children may go a long way to reducing foodborne illness.

Nutritional and metabolic disorders, including obesity hypertension, and nutrition-related cancers impact a large portion of consumers and their families. For example, colorectal cancer is the second leading cause of cancer deaths in the United States. Research-based information to help consumers optimize nutrition and reduce health risks is needed.

Biopolymers, i.e., polysaccharides and proteins, are major components of food products. Improvement of functional

properties of biopolymers is important for improving the quality of foods which is of interest to the food industry. Additionally, biopolymers may be used for food, pharmaceutical, agricultural, and biotechnological applications such as carrier-delivery systems for food additives or 'release-on-demand' systems for drugs and other bioactive compounds which would be of benefit to all people.

2. Scope of the Program

- In-State Extension
- In-State Research
- Integrated Research and Extension

V(D). Planned Program (Assumptions and Goals)

1. Assumptions made for the Program

Extension Family and Consumer Sciences Agents have the necessary skills to build partnerships that will engage individuals, families and institutions for community-level change in diet quality. Consumers will use a wide range of outreach programs to provide up to date information that will help them formulate healthier lifestyles. A combination of applied and basic research can address food safety and nutrition issues. Directed funding for this research will remain level or increase.

2. Ultimate goal(s) of this Program

The ultimate goals of this planned program are to:

- reduce obesity among Tennesseans to reduce the prevalence of many chronic diseases such as diabetes, arthritis, heart disease, hypertension, and some types of cancer.
- provide consumers with reliable information to allow them to lead healthier lifestyles.

V(E). Planned Program (Inputs)

1. Estimated Number of professional FTE/SYs to be budgeted for this Program

Year	Extension		Research	
	1862	1890	1862	1890
2011	97.0	9.0	34.0	0.0
2012	97.0	9.0	34.0	0.0
2013	97.0	9.0	34.0	0.0
2014	97.0	9.0	34.0	0.0
2015	90.0	10.0	0.0	0.0

V(F). Planned Program (Activity)

1. Activity for the Program

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

- how to use MyPyramid.gov and following Dietary 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. Type(s) of methods to be used to reach direct and indirect contacts

Extension

Direct Methods	Indirect Methods
<ul style="list-style-type: none"> • Education Class • One-on-One Intervention • Demonstrations • Other 1 (On-Site Visits) 	<ul style="list-style-type: none"> • Newsletters • TV Media Programs • Web sites • Other 1 (Newspaper Articles) • Other 2 (Radio Programs)

3. Description of targeted 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.

V(G). Planned Program (Outputs)

1. Standard output measures

Target for the number of persons(contacts) to be reached through direct and indirect contact methods

	Direct Contact Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Year	Target	Target	Target	Target
2011	100000	300000	100000	0
2012	100000	300000	100000	0
2013	100000	300000	100000	0
2014	100000	300000	100000	0
2015	100000	300000	100000	0

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

2011:1 2012:0 2013:1 2014:0 2015:0

3. Expected Peer Review Publications

Year	Research Target	Extension Target	Total
2011	34	1	0
2012	34	1	0
2013	34	1	0
2014	34	1	0
2015	0	1	0

V(H). State Defined Outputs**1. Output Target**

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

2011:250 2012:250 2013:250 2014:250 2015:300

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

2011:300 2012:300 2013:300 2014:300 2015:5000

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

2011:0 2012:1 2013:0 2014:0 2015:0

V(I). State Defined Outcome

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.
9	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).
10	Adoption of a homogenization pasteurization process as an alternative to thermal processing by small or mid-sized juice processors (Davidson).

Outcome # 1

1. Outcome Target

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. Outcome Type : Change in Action Outcome Measure

2011:6000 2012:6000 2013:6000 2014:6000 2015:6000

3. Associated Knowledge Area(s)

- 703 - Nutrition Education and Behavior

4. Associated Institute Type(s)

- 1862 Extension
- 1890 Extension

Outcome # 2

1. Outcome Target

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. Outcome Type : Change in Action Outcome Measure

2011:6000 2012:6000 2013:6000 2014:6000 2015:6000

3. Associated Knowledge Area(s)

- 703 - Nutrition Education and Behavior

4. Associated Institute Type(s)

- 1862 Extension
- 1890 Extension

Outcome # 3

1. Outcome Target

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

2. Outcome Type : Change in Action Outcome Measure

2011:6000 2012:6000 2013:6000 2014:6000 2015:6000

3. Associated Knowledge Area(s)

- 703 - Nutrition Education and Behavior

4. Associated Institute Type(s)

- 1862 Extension
- 1890 Extension

Outcome # 4

1. Outcome Target

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

2. Outcome Type : Change in Action Outcome Measure

2011:6000 2012:6000 2013:6000 2014:6000 2015:6000

3. Associated Knowledge Area(s)

- 703 - Nutrition Education and Behavior

4. Associated Institute Type(s)

- 1862 Extension
- 1890 Extension

Outcome # 5

1. Outcome Target

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

2. Outcome Type : Change in Action Outcome Measure

2011:6000 2012:6000 2013:6000 2014:6000 2015:6000

3. Associated Knowledge Area(s)

- 703 - Nutrition Education and Behavior

4. Associated Institute Type(s)

- 1862 Extension
- 1890 Extension

Outcome # 6

1. Outcome Target

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

2. Outcome Type : Change in Action Outcome Measure

2011:6000 2012:6000 2013:6000 2014:6000 2015:6000

3. Associated Knowledge Area(s)

- 703 - Nutrition Education and Behavior

4. Associated Institute Type(s)

- 1862 Extension
- 1890 Extension

Outcome # 7

1. Outcome Target

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

2. Outcome Type : Change in Action Outcome Measure

2011:1000 2012:1000 2013:1000 2014:1000 2015:1000

3. Associated Knowledge Area(s)

- 703 - Nutrition Education and Behavior

4. Associated Institute Type(s)

- 1862 Extension
- 1890 Extension

Outcome # 8

1. Outcome Target

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

2. Outcome Type : Change in Action Outcome Measure

2011:1000 2012:1000 2013:1000 2014:1000 2015:1000

3. Associated Knowledge Area(s)

- 703 - Nutrition Education and Behavior

4. Associated Institute Type(s)

- 1862 Extension
- 1890 Extension

Outcome # 9

1. Outcome Target

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. Outcome Type : Change in Action Outcome Measure

2011:1 2012:0 2013:0 2014:0 2015:0

3. Associated Knowledge Area(s)

- 501 - New and Improved Food Processing Technologies
- 502 - New and Improved Food Products
- 702 - Requirements and Function of Nutrients and Other Food Components
- 712 - Protect Food from Contamination by Pathogenic Microorganisms, Parasites, and Naturally Occurring Toxins

4. Associated Institute Type(s)

- 1862 Research

Outcome # 10

1. Outcome Target

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

2. Outcome Type : Change in Action Outcome Measure

2011:0	2012:0	2013:1	2014:0	2015:0
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3. Associated Knowledge Area(s)

- 501 - New and Improved Food Processing Technologies
- 502 - New and Improved Food Products
- 712 - Protect Food from Contamination by Pathogenic Microorganisms, Parasites, and Naturally Occurring Toxins

4. Associated Institute Type(s)

- 1862 Extension
- 1862 Research

V(J). Planned Program (External Factors)

1. External Factors which may affect Outcomes

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

Description

If Federal formula funds (Smith-Lever, Hatch and NARETPA) are reduced over the next five years, Extension's response to Tennessee's obesity epidemic will be greatly hindered.

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

1. Evaluation Studies Planned

- After Only (post program)
- Retrospective (post program)
- Before-After (before and after program)
- During (during program)
- Comparisons between program participants (individuals,group,organizations) and non-participants

Description

Tennessee Shapes Up: After Only (Post-Program): The Tennessee Shapes Up short-term knowledge gained checklist will be administered to participants at the end of each session. Retrospective (Post-Program): The Tennessee Shapes Up intermediate behavior checklist will be administered at the end of the multi-session

program. During the Program: Extension Family and Consumer Sciences Agents will document participant and third-party testimonials and observations.

Impacts from EFNEP adult and youth programs will be reported through the national EFNEP Reporting System.

Evaluation of outreach program events will be conducted to determine baseline knowledge of participants before and after the event. Evaluation of our programs will occur through participant surveys following outreach programs.

2. Data Collection Methods

- Sampling
- Whole population
- On-Site
- Observation

Description

Extension Family and Consumer Science Agents work in 94 Tennessee counties. In conducting this program, they will note observations, third-party or other sources of information about the impact of the program on participants' lives.

Microbiological survey projects will utilize collection of samples from retail outlets, transportation to the laboratory and analysis. Survey of surfaces at child care facilities will involve swab sampling and laboratory microbiological analysis along with use of rapid sanitation assay methods.

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

Economic Infrastructure and Commerce

2. Brief summary about Planned Program

The economic viability of rural areas is crucial to the welfare of rural residents. Viability is affected by population shifts (e.g., an influx of retirees), economic changes (e.g., transition from tobacco production to other crops or development of a biofuels industry), and other factors.

Research will estimate the impacts that changes in agricultural and forest products industries have on the state's economy and identify growth opportunities for existing and new agri-industry products. Given the severe cost-price squeeze and uncertainties about markets, economic conditions, and agricultural and environmental policies currently facing producers, they need risk, financial, and enterprise management information to help them improve profitability and avoid financial stress. Our research will assess impacts of exogenous changes and will produce management information and decision tools that will help producers develop optimal management strategies for their operations to improve survivability.

We will also investigate food consumer awareness and perceptions regarding safe food choices, factors affecting the consumption of risky foods, and the roles of government programs in improving nutrient intakes and food security. The purpose is to inform public policy decisions about how to influence consumer choices affecting food safety and security.

Our Extension planned program will target small and limited resource farmers. A special target will be farmers transitioning from tobacco to other crops.

3. Program existence : Mature (More than five years)

4. Program duration : Long-Term (More than five years)

5. Expending formula funds or state-matching funds : Yes

6. Expending other than formula funds or state-matching funds : Yes

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

KA Code	Knowledge Area	%1862 Extension	%1890 Extension	%1862 Research	%1890 Research
601	Economics of Agricultural Production and Farm Management	30%	30%	15%	
602	Business Management, Finance, and Taxation	4%	4%	7%	
603	Market Economics	4%	4%	12%	
604	Marketing and Distribution Practices	26%	26%	31%	
607	Consumer Economics	0%	0%	13%	
608	Community Resource Planning and Development	16%	16%	8%	
609	Economic Theory and Methods	10%	10%	8%	
610	Domestic Policy Analysis	10%	10%	3%	
701	Nutrient Composition of Food	0%	0%	3%	
	Total	100%	100%	100%	

V(C). Planned Program (Situation and Scope)

1. Situation and priorities

Rural areas do not offer the same potential level of income as more metropolitan areas. This situation can be partially attributed to lack of employment opportunities in agri-business industries and to low returns on resources employed in agriculture. Improvements in income levels can be directly affected by additional agribusiness employment opportunities and by reducing risk and increasing profitability for agricultural enterprises. Agri-businesses also offer markets for local agricultural commodities resulting in increased farm incomes.

For 2011 – 2015, TSU Extension will place special emphasis on "Small Business Development" for rural and urban areas. The ultimate goal is to increase economic stability for limited resource individuals. TSU Extension will produce and distribute resource materials and educational programs on a variety of topics for interested individuals, young entrepreneurs, and professionals. According to the Small Business Administration Office of Advocacy, small businesses are the heart of Tennessee's economy (2007). Research shows that small businesses create most of the nation's net new jobs, bring innovative ideas, services and products to the marketplace. In 2006, Tennessee had an estimated total of 531,200 small businesses. The employer firms total 113,900 (in 2006), an increase from previous years. Of this total an estimated 97.2% were small businesses. TSU Extension will collaborate with the North Mississippi Higher Educational Attainment Center on multi-state efforts to improve entrepreneurship in the two states.

For 2011 – 2015, TSU Extension will incorporate "global" and "mobile" aspects into its programs. The ultimate goal is to increase access and literacy of technology resources, especially for landowners. Our assessments have found that many Tennessee landowners have never accessed the Internet. TSU Extension will use a mobile computer lab with Internet access to empower these individuals.

TSU Extension is also collaborating with Penn State University as virtual content developers for different aspects of eXtension information technology. One of the projects is the exploration and demonstration of Second Life for educational purposes. TSU Extension will reach under-served and limited resource individuals.

A recent needs assessment by Tennessee State University found that effective community leadership is essential for the development and sustainability of vibrant healthy communities. It assists in developing important relationships, establishing communication and imparting community direction. A recent survey of community leadership programs revealed that the long-term impact of participation in leadership programs can result in the creation of more informally trained leaders through the use of curriculum and methodology obtained from formally trained persons. Researchers have found evidence that leadership programs can produce a multiplier effect by extending program impact beyond the participants who formally participate in the leadership training program. A recent study also found that for every \$1 invested, there is a return of \$2.86 in net benefits in return on investment (ROI) of the Southern Extension Leadership Development (SELD) Program as implemented at the University of Georgia.

Leadership in the 21st century requires a new vision of management. Many community leaders are often thrust into their role with little or no leadership training. Out-migration by youth and skilled individuals from traditionally rural counties and limited resource communities has resulted in fewer "traditional" leaders. As community demographics shift, more leaders need to be drawn from overlooked "non-traditional" groups or sources. These include leaders who are retirees, youth, women and ethnic or social minorities. Leadership development for these groups or the people working with these leaders needs to be more systematic and intentional. As a result, more training for innovative collaboration, problem-solving, transparent decision making and effective advocacy is needed.

We want to set-up a webinar system for multi-state collaborations among Extension educators to deliver the best, most updated information to our clients. TSU Extension will also provide leadership for the American Distance Education Consortium (ADEC) that has six states involved in a new online venture.

TSU expertise will provide more online visibility. More educators and communities will access our resources, and we believe this program will have local, state, national and international implications.

Small farm research, extension, and education are multi-disciplinary and diverse. They include plant and animal production, farm profitability, marketing, farm and economic sustainability, environmental issues, minority farmer issues, farmland preservation, retaining young farmers, and rural communities. The plight of small and limited resource farmers coupled with their significant economic contributions to Tennessee and the South justifies the need for small farm revitalization and profitability.

Tennessee small-scale and limited resource farmers need education to take advantage of niche markets and consumer demand. Enterprises which hold great promise for increasing profits for the small-scale farmer include goat production and organic farming.

According to the 2002 Census of Agriculture, there were 87,595 farms in Tennessee. There were 836 Spanish-origin or Hispanic farmers and 107 Asian farmers operating farms. There were 1,266 African American farmers in Tennessee operating 1,117 farms. Land ownership tied to farming in general has decreased greatly. This is reflected best within the African American communities where the ownership of farm properties has drastically declined. The exodus from the land has been caused by a number of factors, many of them economic, institutional and legal. Many obstacles have been faced by black farmers in their efforts to remain in farming and to retain ownership of their land. The loss of land points to the need for an intensive educational program that will address estate planning, making wills, getting legal help, and property ownership rights and responsibilities.

One key to a successful business start-up and expansion is the ability to obtain and secure appropriate financing. Raising capital is the most basic of all business activities. But as many new entrepreneurs quickly discover, raising capital may not be easy; in fact, it can be a complex and frustrating process. The process of developing a business plan will help in thinking through some important issues that entrepreneurs may not have yet considered.

2. Scope of the Program

- In-State Extension
- In-State Research
- Multistate Research
- Multistate Extension

V(D). Planned Program (Assumptions and Goals)

1. Assumptions made for the Program

Both UT Extension and TSU Extension have adequate personnel trained in farm financial management. Federal, state and county resources needed for this Extension program will continue over the next five years. Resources available for research will be approximately constant or declining over the life of this research process.

2. Ultimate goal(s) of this Program

The ultimate goal of the Extension component is to revitalize the economies of Tennessee's rural communities and help small farmers to earn a living wage.

The UT AgResearch component seeks to enhance income in rural areas through agri-business development, to increase incomes to agricultural producers, and to improve public policy regarding food safety and security.

V(E). Planned Program (Inputs)

1. Estimated Number of professional FTE/SYs to be budgeted for this Program

Year	Extension		Research	
	1862	1890	1862	1890
2011	26.0	2.5	19.0	0.0
2012	26.0	2.5	19.0	0.0
2013	26.0	2.5	19.0	0.0
2014	26.0	2.5	19.0	0.0
2015	22.5	2.0	0.0	0.0

V(F). Planned Program (Activity)

1. Activity for the Program

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 helps families analyze their total farming business so they can 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 is will offer hundreds of of workshops to help farmers improve their financial situation. For example, workshops will be offerde in improved marketing, goal-setting, and strategic planning.

Although the MANAGE program will not remove uncertainty of the future, it will provide farm families with a clear understanding of their current financial situation and help 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 is 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" will continue to be 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. Type(s) of methods to be used to reach direct and indirect contacts

Extension

Direct Methods	Indirect Methods
<ul style="list-style-type: none"> • Education Class • One-on-One Intervention • Demonstrations • Other 1 (On-Site Visits) 	<ul style="list-style-type: none"> • Newsletters • TV Media Programs • Web sites • Other 1 (Newspaper Articles) • Other 2 (Radio Programs)

3. Description of targeted 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

V(G). Planned Program (Outputs)

1. Standard output measures

Target for the number of persons(contacts) to be reached through direct and indirect contact methods

	Direct Contact Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Year	Target	Target	Target	Target
2011	10000	25000	5000	0
2012	10000	25000	5000	0
2013	10000	25000	5000	0
2014	10000	25000	5000	0
2015	10000	25000	5000	0

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

2011:0 2012:0 2013:0 2014:0 2015:0

3. Expected Peer Review Publications

Year	Research Target	Extension Target	Total
2011	11	5	0
2012	12	5	0
2013	13	5	0
2014	13	5	0
2015	0	5	0

V(H). State Defined Outputs

1. Output Target

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

2011:25

2012:25

2013:25

2014:25

2015:25

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

2011:5000

2012:5000

2013:5000

2014:5000

2015:5000

V(I). State Defined Outcome

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 between 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.

Outcome # 1

1. Outcome Target

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

2. Outcome Type : Change in Knowledge Outcome Measure

2011:15 2012:15 2013:15 2014:15 2015:20

3. Associated Knowledge Area(s)

- 601 - Economics of Agricultural Production and Farm Management
- 607 - Consumer Economics

4. Associated Institute Type(s)

- 1890 Extension

Outcome # 2

1. Outcome Target

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

2. Outcome Type : Change in Action Outcome Measure

2011:15 2012:15 2013:15 2014:15 2015:20

3. Associated Knowledge Area(s)

- 601 - Economics of Agricultural Production and Farm Management
- 607 - Consumer Economics

4. Associated Institute Type(s)

- 1890 Extension

Outcome # 3

1. Outcome Target

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 between generations.

2. Outcome Type : Change in Condition Outcome Measure

2011:15 2012:15 2013:15 2014:15 2015:20

3. Associated Knowledge Area(s)

- 601 - Economics of Agricultural Production and Farm Management
- 607 - Consumer Economics

4. Associated Institute Type(s)

- 1890 Extension

Outcome # 4

1. Outcome Target

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. Outcome Type : Change in Action Outcome Measure

2011:300 2012:300 2013:300 2014:300 2015:300

3. Associated Knowledge Area(s)

- 601 - Economics of Agricultural Production and Farm Management

4. Associated Institute Type(s)

- 1862 Extension

Outcome # 5

1. Outcome Target

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

2. Outcome Type : Change in Action Outcome Measure

2011:300 2012:300 2013:300 2014:300 2015:300

3. Associated Knowledge Area(s)

- 601 - Economics of Agricultural Production and Farm Management

4. Associated Institute Type(s)

- 1862 Extension

Outcome # 6

1. Outcome Target

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

2. Outcome Type : Change in Action Outcome Measure

2011:250 2012:250 2013:250 2014:250 2015:250

3. Associated Knowledge Area(s)

- 601 - Economics of Agricultural Production and Farm Management

4. Associated Institute Type(s)

- 1862 Extension

Outcome # 7

1. Outcome Target

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

2. Outcome Type : Change in Knowledge Outcome Measure

2011:0	2012:0	2013:0	2014:0	2015:10
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3. Associated Knowledge Area(s)

- 608 - Community Resource Planning and Development

4. Associated Institute Type(s)

- 1890 Extension

V(J). Planned Program (External Factors)

1. External Factors which may affect Outcomes

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

Description

In the event of natural disasters, the program focus will change to assist producers with basic needs. In that event, outcome measures will be changed to measure the success of the recovery effort. Changes in the U.S. economy may affect the number of firms expanding and locating new facilities in rural areas. The general farm economy will affect risk and returns to agricultural enterprises across a broad spectrum. Federal funding for food safety and security programs may affect consumers' willingness and ability to adopt improved food safety practices.

Research outcomes in this program area are typically cross-cutting by discipline.For this reason, they will largely be reported under other planned program areas (e.g. bioenergy, environmental).

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

1. Evaluation Studies Planned

- Before-After (before and after program)
- Time series (multiple points before and after program)

Description

Before-After questionnaires and time-series evaluations will be used to evaluate adoption/success of economic infrastructure and commerce programs.

2. Data Collection Methods

- Whole population
- On-Site

Description

All individuals served directly will be contacted for at least one evaluation study.

V(A). Planned Program (Summary)

Program # 6

1. Name of the Planned Program

Environmental and Water Quality Impacts

2. Brief summary about Planned Program

Our economic and policy research will examine the various ways in which agriculture is affecting, and being affected by, the natural environment, and the implications of this changing relationship for agricultural producers, consumers, and rural communities.

Given the impacts of farm management practices on water quality, we will assess the economic impact of water quality regulations on individual producers and the agricultural industry in Tennessee. Sustained economic growth, coupled with population and income growth, have brought about rapid changes in land use at the rural-urban interface. We will examine development patterns and their estimated effects on natural resource conditions under different policy scenarios to forecast the effects of local policies, including direct land use planning and regulation and indirect land use policies such as provision of public infrastructure or other public services, for land areas in transition in Tennessee.

From an engineering and soils perspective, we will explore various means of reducing the environmental impact of agricultural production and other land uses while not only maintaining but improving water quality. The effectiveness of various best-management practices will be evaluated. New interpretive soil uses will be cataloged as they are added each year to insure proper soil classification and evaluation of landscape position. Studies will be continued to help determine septic systems compatible with the limitations of available soil resources.

3. Program existence : Mature (More than five years)

4. Program duration : Long-Term (More than five years)

5. Expending formula funds or state-matching funds : Yes

6. Expending other than formula funds or state-matching funds : Yes

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%	6%	
102	Soil, Plant, Water, Nutrient Relationships	0%	0%	22%	
104	Protect Soil from Harmful Effects of Natural Elements	0%	0%	1%	
111	Conservation and Efficient Use of Water	0%	0%	1%	
112	Watershed Protection and Management	0%	0%	17%	
123	Management and Sustainability of Forest Resources	0%	0%	4%	
131	Alternative Uses of Land	0%	0%	6%	
132	Weather and Climate	0%	0%	4%	
133	Pollution Prevention and Mitigation	0%	0%	16%	
135	Aquatic and Terrestrial Wildlife	0%	0%	2%	
205	Plant Management Systems	0%	0%	1%	
403	Waste Disposal, Recycling, and Reuse	0%	0%	8%	
601	Economics of Agricultural Production and Farm Management	0%	0%	1%	
603	Market Economics	0%	0%	1%	
604	Marketing and Distribution Practices	0%	0%	2%	
605	Natural Resource and Environmental Economics	0%	0%	6%	
901	Program and Project Design, and Statistics	0%	0%	2%	
	Total	0%	0%	100%	

V(C). Planned Program (Situation and Scope)**1. Situation and priorities**

Agriculture's effects on the natural environment and the effects of urbanization on surrounding agriculture are becoming more pronounced as both population and per capita wealth grow. Public concern about the impacts of agricultural production practices on water quality continues to increase. Conflicts about land use, odors, and chemical use abound as urban land uses expand into rural areas. Agricultural producers are also constrained by regulation and legal action against production management decisions, thus increasing production costs. Producers, residents of transition land areas, and downstream water users are directly affected by these issues.

Proper soil classification and evaluation of landscape position are crucial to understanding environmental impacts and assessing their effects on water quality. Continuing technical assistance is needed to catalog and communicate the new interpretive uses being added each year.

Tennessee has numerous stream segments that are impaired due (in part) to failing or leaking septic systems. Systems fail because the design, installation, operation and/or maintenance were not compatible with the limitations of available soil resources.

Manures are a problematic P source. Many soil test extractants do not adequately quantify organic P compounds in soil. This results in underestimating the amount of P available to a growing crop. Elevated phosphorus and potentially hazardous

trace element concentrations in biosolid-amended soils pose a risk to human health and the environment through off-site movement. Atrazine (widely used in weed control) is also consequently often detected in environmental media.

The implementation of best-management practices to improve the health of watersheds is widely promoted, but these BMP's are not always effective.

2. Scope of the Program

- In-State Research
- Multistate Research

V(D). Planned Program (Assumptions and Goals)

1. Assumptions made for the Program

Environmental conflicts and issues will continue to grow in importance. Additional detrimental chemical residues in water supplies will be detected. Urban growth will demand better septic system solutions. There will continue to be a gap between best practice knowledge and best practice application. Resources will be available for our research efforts.

2. Ultimate goal(s) of this Program

We want to provide information to help producers and the public better understand environmental issues and potential solutions, and to enable them to make superior public policy decisions. We plan to develop, improve, and evaluate watershed models; supply more accurate rainfall data for decision-makers; provide technical assistance to soil survey updates in Tennessee; reduce the number of failed onsite wastewater disposal systems; determine available, total, and bioavailable P on P-limited and P-excess sites; and isolate and characterize novel atrazine degrading bacteria from soils and wetland sediments.

V(E). Planned Program (Inputs)

1. Estimated Number of professional FTE/SYs to be budgeted for this Program

Year	Extension		Research	
	1862	1890	1862	1890
2011	0.0	0.0	40.0	0.0
2012	0.0	0.0	40.0	0.0
2013	0.0	0.0	40.0	0.0
2014	0.0	0.0	40.0	0.0
2015	0.0	0.0	0.0	0.0

V(F). Planned Program (Activity)

1. Activity for the Program

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 resulting from the evaluation of AMPs 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. A model used to project land use change estimates the probability of land development of individual parcels as a function of parcel-level attributes.

Soil research is fundamental to our environmental program. The erosion, sediment transport, and contaminant transport

capabilities of the RUSLE2 soil erosion model continue to be refined as the model's use increases nationally and around the world. Soil samples are thoroughly 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 by agricultural producers and fellow researchers 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. Type(s) of methods to be used to reach direct and indirect contacts

Extension

Direct Methods	Indirect Methods
• Other 1 (Research-only program)	• Other 1 (Research-only program)

3. Description of targeted audience

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

V(G). Planned Program (Outputs)

1. Standard output measures

Target for the number of persons(contacts) to be reached through direct and indirect contact methods

	Direct Contact Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Year	Target	Target	Target	Target
2011	0	0	0	0
2012	0	0	0	0
2013	0	0	0	0
2014	0	0	0	0
2015	0	0	0	0

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

2011:0 2012:1 2013:0 2014:1 2015:0

3. Expected Peer Review Publications

Year	Research Target	Extension Target	Total
2011	20	0	0
2012	22	0	0
2013	22	0	0
2014	22	0	0
2015	0	0	0

V(H). State Defined Outputs

1. Output Target

- Reduce water-flux measurement error of heat-pulse probe, percent error (Lee).

2011:5

2012:5

2013:5

2014:5

2015:0

V(I). State Defined Outcome

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).

Outcome # 1

1. Outcome Target

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

2. Outcome Type : Change in Condition Outcome Measure

2011:90 2012:90 2013:91 2014:91 2015:0

3. Associated Knowledge Area(s)

- 112 - Watershed Protection and Management
- 133 - Pollution Prevention and Mitigation

4. Associated Institute Type(s)

- 1862 Research

Outcome # 2

1. Outcome Target

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

2. Outcome Type : Change in Action Outcome Measure

2011:2 2012:2 2013:2 2014:2 2015:0

3. Associated Knowledge Area(s)

- 102 - Soil, Plant, Water, Nutrient Relationships
- 133 - Pollution Prevention and Mitigation

4. Associated Institute Type(s)

- 1862 Research

V(J). Planned Program (External Factors)

1. External Factors which may affect Outcomes

- Public Policy changes
- Competing Public priorities

Description

Public policies regarding water quality and land use may change, causing the research results to be more or less useful. Changes of public perceptions and concerns about environmental issues and land use would alter the usefulness of results.

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

1. Evaluation Studies Planned

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

- Time series (multiple points before and after program)

Description

2. Data Collection Methods

- Other ()

Description

V(A). Planned Program (Summary)

Program # 7

1. Name of the Planned Program

Family Economics

2. Brief summary about Planned Program

Because they spend too much and save too little, many Tennesseans will not have enough money to live securely throughout life. This program will help Tennesseans to build and protect wealth, plan for a secure financial future, pay down debt, and protect themselves against financial fraud. This is one of our planned programs because Tennessee is a national leader in personal bankruptcy, and the State Extension Advisory Council and numerous stakeholders have identified financial education as one of the top needs in our state.

3. Program existence : Mature (More than five years)

4. Program duration : Long-Term (More than five years)

5. Expending formula funds or state-matching funds : Yes

6. Expending other than formula funds or state-matching funds : Yes

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 (Situation and Scope)

1. Situation and priorities

Because they spend too much and save too little, many Tennesseans will not have enough money to live securely throughout life. The priority of family economics programs in Tennessee is saving - building wealth throughout the life span. The percentage of retirement-age Tennesseans is expected to almost double over the next 30 years. In addition, they are expected to live 20 years after retirement, in contrast to 15 years after retirement in 1940 (Social Security Administration). During two of the past six years, Tennessee has led the nation in personal bankruptcy (American Bankruptcy Institute).

2. Scope of the Program

- In-State Extension
- Multistate Extension

V(D). Planned Program (Assumptions and Goals)

1. Assumptions made for the Program

- Assumption A. This program plan assumes that Tennessee's banks and credit unions will continue their support Extension's efforts in family economics education.
- Assumption B. This program plan assumes that existing Tennessee Saves county and regional coalitions will be maintained or strengthened over the next five years.

2. Ultimate goal(s) of this Program

The ultimate goal of this program is that Tennesseans will save the necessary funds to live securely throughout their lives. This will be shown by the state's bankruptcy rate being at or below national levels. Tennesseans will:

- build and protect wealth,
- plan for a secure financial future,
- pay down debt, and
- protect themselves against financial fraud.

V(E). Planned Program (Inputs)

1. Estimated Number of professional FTE/SYs to be budgeted for this Program

Year	Extension		Research	
	1862	1890	1862	1890
2011	20.0	2.0	0.0	0.0
2012	20.0	2.0	0.0	0.0
2013	20.0	2.0	0.0	0.0
2014	20.0	2.0	0.0	0.0
2015	18.0	1.0	0.0	0.0

V(F). Planned Program (Activity)

1. Activity for the Program

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 "Financial 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, newsletters, news releases and community events will be conducted for adult audiences.

2. Type(s) of methods to be used to reach direct and indirect contacts

Extension

Direct Methods	Indirect Methods
<ul style="list-style-type: none"> • Education Class • One-on-One Intervention • Demonstrations • Other 1 (On-site visits) 	<ul style="list-style-type: none"> • Newsletters • TV Media Programs • Web sites • Other 1 (Newspaper Articles) • Other 2 (Radio Programs)

3. Description of targeted 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.

V(G). Planned Program (Outputs)

1. Standard output measures

Target for the number of persons(contacts) to be reached through direct and indirect contact methods

	Direct Contact Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Year	Target	Target	Target	Target
2011	30000	400000	30000	400000
2012	30000	400000	30000	400000
2013	30000	400000	30000	400000
2014	30000	400000	30000	400000
2015	30000	400000	30000	400000

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

2011:0 2012:0 2013:0 2014:0 2015:0

3. Expected Peer Review Publications

Year	Research Target	Extension Target	Total
2011	0	1	0
2012	0	1	0
2013	0	1	0
2014	0	1	0
2015	0	1	0

V(H). State Defined Outputs

1. Output Target

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

2011:45 2012:45 2013:45 2014:45 2015:50

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

2011:15000 2012:15000 2013:15000 2014:15000 2015:10000

V(I). State Defined Outcome

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 Target

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

2. Outcome Type : Change in Knowledge Outcome Measure

2011:10000 2012:10000 2013:10000 2014:10000 2015:10000

3. Associated Knowledge Area(s)

- 801 - Individual and Family Resource Management

4. Associated Institute Type(s)

- 1862 Extension
- 1890 Extension

Outcome # 2

1. Outcome Target

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

2. Outcome Type : Change in Knowledge Outcome Measure

2011:10000 2012:10000 2013:10000 2014:10000 2015:10000

3. Associated Knowledge Area(s)

- 801 - Individual and Family Resource Management

4. Associated Institute Type(s)

- 1862 Extension
- 1890 Extension

Outcome # 3

1. Outcome Target

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

2. Outcome Type : Change in Knowledge Outcome Measure

2011:20000 2012:20000 2013:20000 2014:20000 2015:20000

3. Associated Knowledge Area(s)

- 801 - Individual and Family Resource Management

4. Associated Institute Type(s)

- 1862 Extension
- 1890 Extension

Outcome # 4

1. Outcome Target

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

2. Outcome Type : Change in Knowledge Outcome Measure

2011:15000 2012:15000 2013:15000 2014:15000 2015:15000

3. Associated Knowledge Area(s)

- 801 - Individual and Family Resource Management

4. Associated Institute Type(s)

- 1862 Extension
- 1890 Extension

Outcome # 5

1. Outcome Target

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

2. Outcome Type : Change in Action Outcome Measure

2011:6000 2012:6000 2013:6000 2014:6000 2015:6000

3. Associated Knowledge Area(s)

- 801 - Individual and Family Resource Management

4. Associated Institute Type(s)

- 1862 Extension
- 1890 Extension

Outcome # 6

1. Outcome Target

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

2. Outcome Type : Change in Action Outcome Measure

2011:10000 2012:10000 2013:10000 2014:10000 2015:10000

3. Associated Knowledge Area(s)

- 801 - Individual and Family Resource Management

4. Associated Institute Type(s)

- 1862 Extension
- 1890 Extension

Outcome # 7

1. Outcome Target

TN Saves: Number of participants who reduced debt.

2. Outcome Type : Change in Action Outcome Measure

2011:12000 **2012:**12000 **2013:**12000 **2014:**12000 **2015:**12000

3. Associated Knowledge Area(s)

- 801 - Individual and Family Resource Management

4. Associated Institute Type(s)

- 1862 Extension
- 1890 Extension

Outcome # 8

1. Outcome Target

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

2. Outcome Type : Change in Knowledge Outcome Measure

2011:21600000 **2012:**21600000 **2013:**21600000 **2014:**21600000 **2015:**21600000

3. Associated Knowledge Area(s)

- 801 - Individual and Family Resource Management

4. Associated Institute Type(s)

- 1862 Extension
- 1890 Extension

V(J). Planned Program (External Factors)

1. External Factors which may affect Outcomes

- Competing Public priorities
- Competing Programmatic Challenges

Description

Either competing public priorities or competing programs may influence attainment of family economics outcome targets. Programs require local and state resources (volunteers, public funds, private funds, etc.) in addition to Smith-Lever funds, and if local and state resources change, the outcome targets may not be met.

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

1. Evaluation Studies Planned

- After Only (post program)
- Before-After (before and after program)

Description

State Extension Specialists have created 35 instruments to collect data on the outcome indicators. Reliable, validated instruments will be used to collect data on the outcome indicators. The data will be used to report to our funders and other stakeholders as well as to improve the Tennessee Saves effort to help Tennesseans better manage their financial resources.

2. Data Collection Methods

- Sampling

Description

Family Economics programs are typically evaluated via questionnaires from a random sample of participants.

V(A). Planned Program (Summary)**Program # 8****1. Name of the Planned Program**

Food Safety

2. Brief summary about Planned Program

The ultimate goals of this planned program are to:

- improve consumer food handling practices to lower foodborne illnesses.
- provide consumers with reliable information to allow them to lead healthier lifestyles.
- improve food safety to reduce foodborne illness.
- provide opportunities for food processors to produce safe, high quality, shelf-stable food products.
- improve food safety education to child care providers and school children.

3. Program existence : New (One year or less)

4. Program duration : Short-Term (One year or less)

5. Expending formula funds or state-matching funds : Yes

6. Expending other than formula funds or state-matching funds : No

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

KA Code	Knowledge Area	%1862 Extension	%1890 Extension	%1862 Research	%1890 Research
503	Quality Maintenance in Storing and Marketing Food Products	10%	10%	0%	
504	Home and Commercial Food Service	10%	10%	0%	
712	Protect Food from Contamination by Pathogenic Microorganisms, Parasites, and Naturally Occurring Toxins	80%	80%	0%	
	Total	100%	100%	0%	

V(C). Planned Program (Situation and Scope)**1. Situation and priorities**

The Centers for Disease Control estimates that 76 million people get sick, more than 325,000 are hospitalized, and 5,000 Americans die each year from foodborne illness. This Extension program will improve consumer practices for safe food handling.

Our microbiological food safety research program seeks to improve detection of, and develop physical and chemical intervention methods for, bacterial and fungal foodborne pathogens. In addition, we want to develop education and monitoring programs for at-risk populations or those who serve food to at-risk populations. Improving food safety is a collaborative effort between scientists in the microbiological food safety and food biopolymer chemistry research groups. Proteins and polysaccharides will be studied for their potential to serve as carriers to help improve the availability of bioactive food antimicrobials and other components in food matrices or in the human gastrointestinal tract, or for their direct antimicrobial effects in packaging, on surfaces or in foods.

2. Scope of the Program

- In-State Extension
- In-State Research
- Integrated Research and Extension

V(D). Planned Program (Assumptions and Goals)

1. Assumptions made for the Program

Extension Family and Consumer Sciences Agents have the necessary skills to build partnerships that will engage individuals, families and institutions for community-level change in safe food handling practices.

A combination of applied and basic research can address food safety issues. Directed funding for this research will remain level or increase.

2. Ultimate goal(s) of this Program

The ultimate goals of this planned program are to:

- improve consumer food handling practices to lower foodborne illnesses.
- provide consumers with reliable information to allow them to lead healthier lifestyles.
- improve food safety to reduce foodborne illness.
- provide opportunities for food processors to produce safe, high quality, shelf-stable food products.
- improve food safety education to child care providers and school children.

V(E). Planned Program (Inputs)

1. Estimated Number of professional FTE/SYs to be budgeted for this Program

Year	Extension		Research	
	1862	1890	1862	1890
2011	9.0	1.0	0.0	0.0
2012	9.0	1.0	0.0	0.0
2013	9.0	1.0	0.0	0.0
2014	9.0	1.0	0.0	0.0
2015	9.0	1.0	0.0	0.0

V(F). Planned Program (Activity)

1. Activity for the Program

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

Youth participants will receive food safety education using Fight BAC and other curricula through their school classroom, community center, after-school program, or other locations to reach youth. Direct methods (group meetings, classes, demonstrations, and on-site visits) and indirect methods (newsletters, TV media programs, web sites, newspaper articles and radio programs) will emphasize 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. Type(s) of methods to be used to reach direct and indirect contacts

Extension

Direct Methods	Indirect Methods
<ul style="list-style-type: none"> • Workshop • Group Discussion • One-on-One Intervention • Demonstrations 	<ul style="list-style-type: none"> • Newsletters • TV Media Programs • Web sites • Other 1 (Radio Programs)

3. Description of targeted audience

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

V(G). Planned Program (Outputs)

1. Standard output measures

Target for the number of persons(contacts) to be reached through direct and indirect contact methods

	Direct Contact Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Year	Target	Target	Target	Target
2011	30000	100000	30000	0
2012	30000	100000	30000	0
2013	30000	100000	30000	0
2014	30000	100000	30000	0
2015	30000	100000	30000	0

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

2011:0 2012:0 2013:0 2014:0 2015:0

3. Expected Peer Review Publications

Year	Research Target	Extension Target	Total
2011	0	2	0

Year	Research Target	Extension Target	Total
2012	0	2	0
2013	0	2	0
2014	0	2	0
2015	0	2	0

V(H). State Defined Outputs

1. Output Target

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

2011:50

2012:50

2013:50

2014:50

2015:50

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

2011:500

2012:500

2013:500

2014:500

2015:500

V(I). State Defined Outcome

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.

Outcome # 1**1. Outcome Target**

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

2. Outcome Type : Change in Action Outcome Measure

2011:10000 2012:10000 2013:10000 2014:10000 2015:10000

3. Associated Knowledge Area(s)

- 504 - Home and Commercial Food Service
- 712 - Protect Food from Contamination by Pathogenic Microorganisms, Parasites, and Naturally Occurring Toxins

4. Associated Institute Type(s)

- 1862 Extension
- 1890 Extension

Outcome # 2**1. Outcome Target**

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

2. Outcome Type : Change in Action Outcome Measure

2011:2000 2012:2000 2013:2000 2014:2000 2015:2000

3. Associated Knowledge Area(s)

- 504 - Home and Commercial Food Service
- 712 - Protect Food from Contamination by Pathogenic Microorganisms, Parasites, and Naturally Occurring Toxins

4. Associated Institute Type(s)

- 1862 Extension
- 1890 Extension

Outcome # 3**1. Outcome Target**

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

2. Outcome Type : Change in Action Outcome Measure

2011:1500 2012:1500 2013:1500 2014:1500 2015:1500

3. Associated Knowledge Area(s)

- 503 - Quality Maintenance in Storing and Marketing Food Products
- 504 - Home and Commercial Food Service

4. Associated Institute Type(s)

- 1862 Extension
- 1890 Extension

Outcome # 4

1. Outcome Target

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

2. Outcome Type : Change in Action Outcome Measure

2011:500 2012:500 2013:500 2014:500 2015:500

3. Associated Knowledge Area(s)

- 503 - Quality Maintenance in Storing and Marketing Food Products
- 504 - Home and Commercial Food Service
- 712 - Protect Food from Contamination by Pathogenic Microorganisms, Parasites, and Naturally Occurring Toxins

4. Associated Institute Type(s)

- 1862 Extension
- 1890 Extension

V(J). Planned Program (External Factors)

1. External Factors which may affect Outcomes

- Competing Public priorities
- Competing Programmatic Challenges

Description

Either competing public priorities or competing programs may influence attainment of Extension food safety outcome targets. Programs require local and state resources (volunteers, public funds, private funds, etc.) in addition to Smith-Lever funds, and if local and state resources change, the outcome targets may not be met.

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

1. Evaluation Studies Planned

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

Description

Safe Food for Tennessee: Adult participants who receive food safety education using lessons in "Cook's Corner" and "Safe Food for You" will complete survey questions on "Your Opinions About Food Safety" (short term attitude/knowledge outcomes) or "Food Handling and Eating Preferences Questionnaire" (intermediate outcomes) before and after education. Impacts from EFNEP adult and youth programs will be reported through the national EFNEP Reporting System.

Evaluation of outreach program events will be conducted to determine baseline knowledge of participants before and after the event. Evaluation of our programs will occur through participant surveys following outreach programs. Child care facilities that have instituted a designed food sanitation plan and food safety educational training will be compared with control facilities that have not used the plan. The effectiveness will be determined by monitoring the microbiology of facility food service areas.

Educational programs will be evaluated by conducting examinations of participants before and after training and at some period following training to evaluate behavior changes.

2. Data Collection Methods

- Sampling
- Whole population
- On-Site
- Observation

Description

{NO DATA ENTERED}

V(A). Planned Program (Summary)

Program # 9

1. Name of the Planned Program

Forestry, Wildlife, and Fishery Systems

2. Brief summary about Planned Program

The Extension portion of this planned program will encourage and educate Tennesseans to balance productivity and profitability with environmental stewardship, and pass on healthy and sustainable forestry, wildlife and fisheries systems to future generations. develop and use data on protecting Eastern Hemlock against the Hemlock Woolly Adelgid, to create innovative tools to characterize key parameters of high-performance composite materials, to establish new statistical methods to advance intelligent manufacturing practices, to develop techniques for increasing re-forestation by establishing genetic variation in nursery and field characteristics of native hardwood and coniferous forest tree species, to identify environmental and physiological factors having the greatest effects on the survival and growth of tree species native to Tennessee, and to develop an objective understanding of innovative forest policy tools and the forest policy environment in Tennessee.

Planned forestry research programs have several principal emphases, including to

Wildlife research includes biology and ecology of non-game bird species, the assessment and evaluation of agricultural crop damage due to wildlife, and the management and distribution of large game species (such as bear and elk) in the Southeast.

3. Program existence : Mature (More than five years)

4. Program duration : Long-Term (More than five years)

5. Expending formula funds or state-matching funds : Yes

6. Expending other than formula funds or state-matching funds : Yes

V(B). Program Knowledge Area(s)

1. Program Knowledge Areas and Percentage

KA Code	Knowledge Area	%1862 Extension	%1890 Extension	%1862 Research	%1890 Research
112	Watershed Protection and Management	0%	0%	4%	
121	Management of Range Resources	0%	0%	1%	
122	Management and Control of Forest and Range Fires	0%	0%	1%	
123	Management and Sustainability of Forest Resources	38%	38%	41%	
125	Agroforestry	7%	7%	0%	
132	Weather and Climate	0%	0%	2%	
133	Pollution Prevention and Mitigation	0%	0%	6%	
135	Aquatic and Terrestrial Wildlife	12%	12%	4%	
201	Plant Genome, Genetics, and Genetic Mechanisms	0%	0%	2%	
203	Plant Biological Efficiency and Abiotic Stresses Affecting Plants	0%	0%	1%	
205	Plant Management Systems	0%	0%	1%	
206	Basic Plant Biology	0%	0%	1%	
212	Pathogens and Nematodes Affecting Plants	0%	0%	1%	
301	Reproductive Performance of Animals	0%	0%	1%	
311	Animal Diseases	33%	33%	0%	
511	New and Improved Non-Food Products and Processes	0%	0%	15%	
605	Natural Resource and Environmental Economics	5%	5%	11%	
606	International Trade and Development	0%	0%	1%	
610	Domestic Policy Analysis	5%	5%	2%	
901	Program and Project Design, and Statistics	0%	0%	5%	
	Total	100%	100%	100%	

V(C). Planned Program (Situation and Scope)**1. Situation and priorities**

In Tennessee the agroforestry complex includes the primary industries of agriculture and forestry, the input supply industry, the value-added subsectors, food and kindred products, apparel and textiles, and forest products. Tennessee's agriculture and forest products account for 18% of the state's economy and generates more than \$60 billion in output.

About 292,000 Tennesseans are employed by the agroforestry complex, with 126,000 employed in agricultural production. Leading value-added industries include food manufacturing, paper manufacturing, beverage and tobacco products manufacturing, furniture and related products manufacturing, and wood products manufacturing. These subsectors account

for more than 85% of the value-added to agriculture and forest products.

Agroforestry can be a win-win situation for small wood landowners. It provides opportunities to balance productivity and profitability with environmental stewardship, and pass on healthy and sustainable agricultural systems to future generations. Agroforestry can provide a diversified income and increase farm productivity. Tennessee merchandise exports from agriculture and forestry production and manufacturing, including fishing, hunting and trapping contributed to close to \$2 billion, or 17% of the state's total export base of \$11.6 billion. Also, agroforestry provides conservation buffer systems against runoff, soil loss, and pollution from heavy rains. Agroforestry can be used to address human needs by improving quality of life, health, comfort, enjoyment, security and recreation.

The Hemlock Woolly Adelgid is an invasive insect pest that first arrived in Tennessee in 2002. The insect has devastated hemlock forests in the northeastern U.S. The U.S. Forest Service and the Great Smoky Mountains National Park are concerned that the loss of major parts of the hemlock forest would permanently damage the local forest ecosystem. Simultaneous urgent needs for release of predatory beetles and studies of the affects of those releases on the adelgid populations go together with studies of non-target effects of chemical controls used on the adelgids and searches for new predators.

We are faced today with unique opportunities to further the effective and efficient use of renewable resources like wood and wood fiber. The elimination of key natural disturbances in TN hardwood forests and the addition of human disturbances have resulted in a lack of oak regeneration needed to replace valuable oak trees. Research is extremely critical at the present time due to the pressures faced by Tennessee's landowners, which include rising demands for timber and recreational opportunities, which calls for policies to enhance environmental services from forests, and increasing land values from non-forest uses. Forest landowners and policy makers often lack information to evaluate the economic returns associated with managing public and private lands for a range of goods and services.

Greenhouse gasses in our atmosphere are increasing, and this phenomenon is expected to increase average global temperature and drought. Forests in the Southeast are particularly vulnerable to decreasing precipitation. A decline in forest health has numerous implications for timber and biomass production, wildlife habitat, and overall ecosystem stability. Micorrhizal fungi form beneficial plant symbioses and are a critical natural resource of healthy forests. Benefits of these symbioses include improved soil structure and, therefore, the ability of soils to support tree root growth and resist erosion; and protection of trees from stresses related to salinity, herbicides, and infection by pathogens. Changes in our atmosphere such as increased greenhouse gasses, elevated temperature and drought can affect mycorrhizal associations. Our ability to predict and react to climate changes, as to their effects on forest health, requires an understanding of how these changes affect mycorrhizal symbioses.

Certain bird species utilize Tennessee habitat during their annual migratory activities; ecosystem habitat alterations may affect their population numbers and distribution along those migratory routes. Interactions of wildlife large game species, both existing and re-introduced, may result in crop damage, ecosystem alterations, or human-animal conflicts. The loss of tobacco as a revenue source in Tennessee has farmers looking for an extra source of income, such as aquaculture.

There is evidence that amphibians serve as wildlife reservoirs for the human pathogen E coli. Human health implications of this hosting include possible direct human uptake through swimming or open wounds, vegetable contamination water via irrigation water, or indirect transmission via cattle and meat contamination.

2. Scope of the Program

- In-State Extension
- In-State Research
- Multistate Research
- Multistate Extension
- Integrated Research and Extension

V(D). Planned Program (Assumptions and Goals)

1. Assumptions made for the Program

- Tennessee's County Forestry Associations will remain viable organizations over the next five years for the delivery of research-based information on best management practices.
- The resources needed to implement this statewide planned program will be secured as needed.
- External research funding will continue to grow.
- Appropriately skilled staff can be recruited.
- Projected building projects for which private funds exist will be completed.
- Sufficient field research sites will be available.

2. Ultimate goal(s) of this Program

We seek to educate and inform Tennesseans to preserve, protect and enhance Tennessee's forestry, wildlife and fisheries systems.

From a forestry research perspective, we want to provide data and technological advances as part of a regional effort to prevent the eradication of hemlock by the Hemlock Woolly Adelgid, predict effects of elevated temperatures/other environmental changes to Tennessee forests by understanding tree physiological mechanisms, re-establish chestnut trees in forest ecosystems, genetically improve selected hardwood/coniferous species, and determine the influence of drought, such as could be expected as a result of global warming, on the beneficial mycorrhizal symbioses in mature temperate forests.

With regard to forest products, we want to understand the role of the wood/polymer interface in composites, develop patentable software for real-time prediction using advanced statistical systems.

In the area of wildlife research, we hope to refine methods to evaluate deer damage to agriculture, develop wildlife-based indicators of sustainability to help managers identify forests where sustainability is threatened, evaluate non-intrusive DNA sampling techniques to determine population densities of black bears in the Great Smoky Mountains National Park, and develop faster, more specific tests for fish diseases.

V(E). Planned Program (Inputs)

1. Estimated Number of professional FTE/SYs to be budgeted for this Program

Year	Extension		Research	
	1862	1890	1862	1890
2011	8.0	1.0	45.0	0.0
2012	8.0	1.0	45.0	0.0
2013	8.0	1.0	45.0	0.0
2014	8.0	1.0	45.0	0.0
2015	4.5	1.0	0.0	0.0

V(F). Planned Program (Activity)

1. Activity for the Program

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. Demonstrations 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. Type(s) of methods to be used to reach direct and indirect contacts

Extension

Direct Methods	Indirect Methods
<ul style="list-style-type: none"> ● Education Class ● Workshop ● One-on-One Intervention ● Demonstrations ● Other 1 (On-site Visits) ● Other 2 (Field Days) 	<ul style="list-style-type: none"> ● Newsletters ● TV Media Programs ● Web sites ● Other 1 (Newspaper/Radio) ● Other 2 (Publications)

3. Description of targeted 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.

V(G). Planned Program (Outputs)

1. Standard output measures

Target for the number of persons(contacts) to be reached through direct and indirect contact methods

	Direct Contact Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Year	Target	Target	Target	Target

	Direct Contact Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Year	Target	Target	Target	Target
2011	15000	30000	1000	30000
2012	15000	30000	1000	30000
2013	15000	30000	1000	30000
2014	15000	30000	1000	30000
2015	15000	30000	1000	30000

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

2011:1 2012:0 2013:1 2014:0 2015:0

3. Expected Peer Review Publications

Year	Research Target	Extension Target	Total
2011	40	10	0
2012	40	10	0
2013	40	10	0
2014	40	10	0
2015	0	8	0

V(H). State Defined Outputs

1. Output Target

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

2011:150000 2012:150000 2013:150000 2014:150000 2015:0

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

2011:0 2012:0 2013:0 2014:0 2015:0

V(I). State Defined Outcome

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).

Outcome # 1

1. Outcome Target

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. Outcome Type : Change in Knowledge Outcome Measure

2011:100 2012:100 2013:100 2014:100 2015:100

3. Associated Knowledge Area(s)

- 123 - Management and Sustainability of Forest Resources

4. Associated Institute Type(s)

- 1862 Extension
- 1890 Extension

Outcome # 2

1. Outcome Target

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

2. Outcome Type : Change in Action Outcome Measure

2011:100 2012:100 2013:100 2014:100 2015:100

3. Associated Knowledge Area(s)

- 123 - Management and Sustainability of Forest Resources

4. Associated Institute Type(s)

- 1862 Extension
- 1890 Extension

Outcome # 3

1. Outcome Target

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

2. Outcome Type : Change in Action Outcome Measure

2011:200 2012:200 2013:200 2014:200 2015:0

3. Associated Knowledge Area(s)

- 135 - Aquatic and Terrestrial Wildlife
- 301 - Reproductive Performance of Animals

4. Associated Institute Type(s)

- 1862 Research

V(J). Planned Program (External Factors)

1. External Factors which may affect Outcomes

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

Description

A number of environmental factors could change the direction and outcomes of programming in forestry, wildlife and fisheries. These include insect infestation and forest fires. Other natural disasters, such as hurricanes and tornadoes, may significantly alter forested and riverine habitat which ultimately may affect game and non-game population densities.

Outcomes may also be affected by governmental regulations and public policy changes regarding wildlife populations, economic changes affecting the hardwood industry, state and government funding for public lands, government regulations and/or public policy changes that affect forest policy and the sustainability of forest lands research, and possible appropriations changes within DOE.

Natural events such as drought and extreme weather conditions may affect studies designed to identify environmental and physiological factors affecting the survival and growth of tree species native to Tennessee.

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

1. Evaluation Studies Planned

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

Description

After Only (post program): Post-program questionnaires will be used to ascertain the degree of knowledge and attitude change.

Observation: County Extension Agents will observe landowners before and after programs to determine the level of practice adoption.

Time series as well as comparisons between groups/programs with and without program intervention: Deer damage to agricultural production.

Case study: Bear monitoring using DNA technology.

Comparison between sites where various treatments were made. Tree improvement programs are generally long-term activities with monitoring throughout the study and summary evaluation after a designated period of time; forest policy studies often use the case study approach.

2. Data Collection Methods

- Sampling
- Whole population
- On-Site
- Other (Diagnostic tests)

Description

After Only (post program): Post-program questionnaires will be used to ascertain the degree of knowledge and attitude change.

Whole population: Black bear distribution, avian populations.

On-site survey: Deer damage in agricultural crops.

Diagnostic tests: For cortisol stress in catfish.

Sampling: for Hemlock Woolly Adelgids and predator species.

Sustainability of forest lands research will utilize a combination of data collection methods, including personal interview and focus groups, mail and phone surveys, and literature review.

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

Global Food Security and Hunger

2. Brief summary about Planned Program

This program seeks to increase yield for Tennessee's corn, soybeans, wheat, and commercial vegetable production.

3. Program existence : New (One year or less)

4. Program duration : Long-Term (More than five years)

5. Expending formula funds or state-matching funds : Yes

6. Expending other than formula funds or state-matching funds : Yes

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 (Situation and Scope)**1. Situation and priorities**

Row crops including corn, soybeans, and wheat are valued at close to \$1 billion annually in Tennessee, and are grown on about three million acres in the state. Yield improvements may be obtained with proper variety selection, insect, disease, and weed management, appropriate use of fertilizers and irrigation, and other best management practices. These and other factors directly affect the profitability of crop production and environmental quality. Producers need research-based recommendations to insure maximum production and profitability.

2. Scope of the Program

- In-State Extension
- Multistate Extension
- Integrated Research and Extension

V(D). Planned Program (Assumptions and Goals)**1. Assumptions made for the Program**

- Corn, soybeans, wheat, and commercial vegetable production will continue to be a mainstay of

Tennessee's economy.

- The Innovation-Decision Process (Rogers, 1995) is a valid representation of adoption decisions made by Tennessee farmers.

2. Ultimate goal(s) of this Program

The ultimate goal of this program is to increase food security and reduce hunger in Tennessee, the United States, and the entire world.

V(E). Planned Program (Inputs)

1. Estimated Number of professional FTE/SYs to be budgeted for this Program

Year	Extension		Research	
	1862	1890	1862	1890
2011	27.0	2.0	0.0	0.0
2012	27.0	2.0	0.0	0.0
2013	27.0	2.0	0.0	0.0
2014	27.0	2.0	0.0	0.0
2015	27.0	2.0	0.0	0.0

V(F). Planned Program (Activity)

1. Activity for the Program

Various needs assessments conducted by Extension specialists show that the following practices are key for Tennessee row crops producers: 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.

2. Type(s) of methods to be used to reach direct and indirect contacts

Extension

Direct Methods	Indirect Methods
<ul style="list-style-type: none"> • Education Class • One-on-One Intervention • Demonstrations • Other 1 (On-site visits) 	<ul style="list-style-type: none"> • Newsletters • TV Media Programs • Web sites • Other 1 (Newspaper articles) • Other 2 (Radio programs)

3. Description of targeted audience

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

V(G). Planned Program (Outputs)

1. Standard output measures

Target for the number of persons(contacts) to be reached through direct and indirect contact methods

	Direct Contact Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Year	Target	Target	Target	Target
2011	30000	50000	1000	0
2012	30000	50000	1000	0
2013	30000	50000	1000	0
2014	30000	50000	1000	0
2015	30000	50000	1000	0

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

2011:0 2012:0 2013:0 2014:0 2015:0

3. Expected Peer Review Publications

Year	Research Target	Extension Target	Total
2011	0	5	0
2012	0	5	0
2013	0	5	0
2014	0	5	0
2015	0	5	0

V(H). State Defined Outputs

1. Output Target

- Number of exhibits displayed to educate producers.

2011:25 2012:25 2013:25 2014:25 2015:25

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

2011:100 2012:100 2013:100 2014:100 2015:100

V(I). State Defined Outcome

O. No.	Outcome Name
1	Wheat: Number of acres utilized precision agriculture technologies for variable 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 practices that can improve production potential (e.g., conservation tillage, winter covers, plant population, row spacing, planting dates, plant growth regulators, harvest, variety selection, irrigation, fertility).
4	Soybeans: Percentage 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).

Outcome # 1

1. Outcome Target

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

2. Outcome Type : Change in Action Outcome Measure

2011:40000 2012:40000 2013:40000 2014:40000 2015:40000

3. Associated Knowledge Area(s)

- 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

4. Associated Institute Type(s)

- 1862 Extension
- 1890 Extension

Outcome # 2

1. Outcome Target

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

2. Outcome Type : Change in Knowledge Outcome Measure

2011:500 2012:500 2013:500 2014:500 2015:500

3. Associated Knowledge Area(s)

- 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

4. Associated Institute Type(s)

- 1862 Extension
- 1890 Extension

Outcome # 3

1. Outcome Target

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

2. Outcome Type : Change in Knowledge Outcome Measure

2011:400 2012:400 2013:400 2014:400 2015:400

3. Associated Knowledge Area(s)

- 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

4. Associated Institute Type(s)

- 1862 Extension
- 1890 Extension

Outcome # 4

1. Outcome Target

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

2. Outcome Type : Change in Condition Outcome Measure

2011:8 2012:8 2013:8 2014:8 2015:8

3. Associated Knowledge Area(s)

- 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

4. Associated Institute Type(s)

- 1862 Extension
- 1890 Extension

Outcome # 5

1. Outcome Target

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

2. Outcome Type : Change in Condition Outcome Measure

2011:10 2012:10 2013:10 2014:10 2015:10

3. Associated Knowledge Area(s)

- 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

4. Associated Institute Type(s)

- 1862 Extension
- 1890 Extension

Outcome # 6

1. Outcome Target

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

2. Outcome Type : Change in Action Outcome Measure

2011:800 2012:800 2013:800 2014:800 2015:800

3. Associated Knowledge Area(s)

- 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

4. Associated Institute Type(s)

- 1862 Extension
- 1890 Extension

Outcome # 7

1. Outcome Target

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

2. Outcome Type : Change in Knowledge Outcome Measure

2011:65 2012:65 2013:65 2014:65 2015:65

3. Associated Knowledge Area(s)

- 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

4. Associated Institute Type(s)

- 1862 Extension
- 1890 Extension

V(J). Planned Program (External Factors)

1. External Factors which may affect Outcomes

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

Description

Corn yields are heavily dependent on available moisture and hot, dry conditions in July can affect pollination and subsequently production for the year. Although sorghum is relatively drought tolerant, yields are still depend on available moisture. Dry conditions in June and July can destroy yield.

The macroeconomics of agriculture may affect the economic environment of specific enterprises and, in turn, affect the applicability of decision-making tools. In addition, Extension and other information providers may have competing demands that prevent effective dissemination of research results. IPM program outcomes will be affected by weather extremes, corporate and academic production of new plant genetics and new chemistries for control.

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

1. Evaluation Studies Planned

- Retrospective (post program)

Description

{NO DATA ENTERED}

2. Data Collection Methods

- Sampling
- Whole population
- On-Site
- Structured

Description

{NO DATA ENTERED}

V(A). Planned Program (Summary)

Program # 11

1. Name of the Planned Program

Health and Safety

2. Brief summary about Planned Program

The state of Tennessee spends over 37.5% of its state budget on health care, in part due to the costs incurred by patients who do not understand medical information, chronic disease self-care, the health care system and health provider information. This public health crisis is called low health literacy, which threatens every person in Tennessee, regardless of age, race, education, or income level. Our Extension program will build the health literacy of Tennesseans by helping them to read, understand, and act on health information for personal health decisions. Health literacy affects peoples' ability to: navigate the healthcare system; share personal information, such as health histories with providers; and engage in self care and chronic disease management. At risk are: older adults, racial and ethnic minorities, people with less than an high school degree or GED, people with low income levels, non-native speakers of English and people with compromised health status. Strategies for improving Health Literacy are: usability, evaluation, cultural competence, use plain language, speaking clearly and listen carefully and partner with Health Educators.

Emergency preparedness once only concerned people who lived in areas prone to natural disasters, like earthquakes and tornados. However with man-made, natural disasters, and infectious diseases on the rise, emergency preparedness has become an issue for all Americans. This is particularly true for vulnerable populations, whose access to emergency preparedness information and tools is severely limited. Recent examples, like those affected by Hurricane Katrina, have made awareness of vulnerable populations' emergency needs clear.

Knowing what to do is important in preparing for emergencies. Having the right information and resources can make all the difference when seconds count. Providing these tools to vulnerable populations is critical. Offering them where underserved children and adults live, work, and play is essential. Academic institutions can help with all of these.

We are conducting research in two areas related to health and safety:

- There is a need to develop new materials and composites for textile systems for protective and medical applications with enhanced resistance (or, in some cases, susceptibility) to environmental degradation. One project focuses on expanding the uses for agricultural commodities and by products in the manufacture of these textiles. •A new ASAE Engineering Standard includes a lateral upset test for front drive, self-propelled, ride-on lawnmowers. Whether or not a particular model will meet the new standard can be determined by either conducting an actual vehicle roll or using a simulation model. We will be evaluating the validity of the computer model used for this purpose.

3. Program existence : Mature (More then five years)

4. Program duration : Long-Term (More than five years)

5. Expending formula funds or state-matching funds : Yes

6. Expending other than formula funds or state-matching funds : Yes

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%	20%	
402	Engineering Systems and Equipment	5%	5%	10%	
403	Waste Disposal, Recycling, and Reuse	0%	0%	4%	
404	Instrumentation and Control Systems	0%	0%	6%	
511	New and Improved Non-Food Products and Processes	5%	5%	10%	
702	Requirements and Function of Nutrients and Other Food Components	0%	0%	20%	
723	Hazards to Human Health and Safety	0%	0%	10%	
724	Healthy Lifestyle	70%	70%	0%	
801	Individual and Family Resource Management	0%	0%	10%	
802	Human Development and Family Well-Being	0%	0%	4%	
804	Human Environmental Issues Concerning Apparel, Textiles, and Residential and Commercial Structures	0%	0%	6%	
805	Community Institutions, Health, and Social Services	20%	20%	0%	
	Total	100%	100%	100%	

V(C). Planned Program (Situation and Scope)

1. Situation and priorities

Health care costs are rising in Tennessee, with the state spending over 37.5% of its state budget on health care. Reasons suggested for the rising health care costs include technological advances, new drug therapies, malpractice costs, and a growing aging population. A reason that is less recognized is the costs incurred by patients who do not understand medical information, chronic disease self-care, the health care system and health provider information. This public health crisis is called low health literacy, which threatens every person in Tennessee, regardless of age, race, education, or income level. Health literacy refers to the ability to read, understand, and act on health information to make personal health decisions. Diabetes is the sixth leading cause of death in Tennessee. One in three Tennesseans have arthritis.

Extension will deliver the Walk Across Tennessee program in over 25 communities in the state. This eight-week walking program organizes teams for walking, jogging, or biking. Instruction is delivered in the prevention of obesity-related diseases such as cancer, diabetes and heart disease. Also, physical activity and weight management are taught.

Environmental sustainability, security, and emergency preparedness are increasingly important to citizens because of limited resources leading to environmental pressure, and significant worldwide disease and terror threats. The textiles used in Personal Protective Equipment (PPE) are an important tool in dealing with these emerging and ongoing threats. There is a need to develop new materials and composites, and ways of disposing of used textiles, in ways that are more environmentally friendly. The economic, personal protection, comfort, and degradation properties of cotton-enhanced protective apparel appear attractive to a broad range of end-users in the industrial and medical sectors, as well as populations at risk of chemical and biological harm.

Personal safety is an issue as hobbies, work patterns, and disposable income bring individuals into contact with machinery for which they have little operational training, or only occasionally use. One major area of concern is riding mowers. Overturn of riding mowers is a significant source of injury and death in the United States. Mower design and testing must evolve as accident mechanisms are identified.

2. Scope of the Program

- In-State Extension
- In-State Research
- Multistate Research
- Multistate Extension

V(D). Planned Program (Assumptions and Goals)

1. Assumptions made for the Program

The Tennessee Department of Health will continue to its stewardship of 95 County Health Councils in the state, and Extension Family and Consumer Sciences Agents will continue to educate and involve local councils for community health outreach. The resources needed to conduct this program over the next five years will be available as needed.

Agricultural commodities and by-products will continue to be available for protective apparel uses. We will be able to develop value-added products from renewable and recyclable resources. Petroleum prices will remain relatively high to enhance the attractiveness of such alternate products. We will be able to engineer fabrics that have the appropriate combinations of properties.

The ASAE Engineering Standard will continue to be the leading standard adopted for front-drive, self-propelled, ride-on lawnmowers. Industry compliance with this standard will continue. Simulation modeling will be an adequate surrogate for conducting actual vehicle rolls. We will be able to construct and refine a model that accurately replicates actual behavior.

2. Ultimate goal(s) of this Program

The ultimate goals of this planned program are to improve the health and safety of Tennesseans:

- To stabilize or lower health care costs in Tennessee by helping the state's citizens to read, understand, and act on health information to make personal health decisions.
- To develop value-added protective apparel products from by-products, and renewable and recyclable agricultural resources in an environmental friendly manner.
- To investigate, model, develop, and evaluate rollover protective structure (ROPS) designs for agricultural vehicles for which approved ROPS are not currently available.

V(E). Planned Program (Inputs)

1. Estimated Number of professional FTE/SYs to be budgeted for this Program

Year	Extension		Research	
	1862	1890	1862	1890
2011	15.0	2.0	9.0	0.0
2012	15.0	2.0	9.0	0.0
2013	15.0	2.0	9.0	0.0
2014	15.0	2.0	0.0	0.0
2015	13.5	2.0	0.0	0.0

V(F). Planned Program (Activity)

1. Activity for the Program

Dining with Diabetes is a three-session course which will be offered throughout the state. This course is taught by Extension Family and Consumer Sciences Agents who coordinate with local health officials to target people with diabetes and/or their caregivers.

Arthritis Self-Help is a program delivered in six sessions. Each session is two-hours in length. Participants are provided with the book, *The Arthritis Helpbook*, written by Kate Lorig and James Fries. This evidence-based program is designed to increase the self-confidence of participants to manage their arthritis. It will be delivered 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 include:

- 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 will also target arthritis sufferers. Extension will offer 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.

The protective apparel uses for agricultural commodities and by products will be expanded. Investigations will continue to produce lyocell from agrifibers and consumer wastes. Undervalued cellulose sources such as hardwoods and softwood pulps, recycled newsprint, bagasse, and kudzu will be explored as starting materials for lyocell solutions. Solution properties will be measured and related to processing. Needlepunched nonwoven mats will be produced and evaluated. The effects of different delignification and post treatments on dyeability of bagasse fibers will be determined. Carded fiber webs will be further processed into sliver and spun into yarns and yarn characteristics determined. Optimal bonding conditions will be determined for cotton core nonwovens. Hand properties of the nonwovens will be evaluated.

Ease of mower rollover has been determined, and currently available ROPS have been tested for a full-size front drive lawnmower. The modeling aspect of the standard has been evaluated to determine the accuracy of simulating a vehicle rollover. ROPS test results for the currently available ROPS have been reported to the manufacturer. Follow-up recommendations and concerns relative to the application of the ASAE S547 Standard may be developed.

2. Type(s) of methods to be used to reach direct and indirect contacts

Extension

Direct Methods	Indirect Methods
<ul style="list-style-type: none"> • Education Class • One-on-One Intervention • Demonstrations • Other 1 (On-site visits) 	<ul style="list-style-type: none"> • Newsletters • TV Media Programs • Web sites • Other 1 (Newspaper Articles) • Other 2 (Radio Programs)

3. Description of targeted 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 professionals and volunteers who serve them.

V(G). Planned Program (Outputs)

1. Standard output measures

Target for the number of persons(contacts) to be reached through direct and indirect contact methods

	Direct Contact Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Year	Target	Target	Target	Target
2011	20000	80000	20000	40000
2012	20000	80000	20000	40000
2013	20000	80000	20000	40000
2014	20000	80000	20000	40000
2015	20000	80000	20000	40000

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

2011:0 2012:0 2013:0 2014:0 2015:0

3. Expected Peer Review Publications

Year	Research Target	Extension Target	Total
2011	4	1	0
2012	4	1	0
2013	4	1	0
2014	0	1	0
2015	0	1	0

V(H). State Defined Outputs

1. Output Target

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

2011:25 2012:25 2013:25 2014:25 2015:25

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

2011:800 2012:800 2013:800 2014:800 2015:800

V(I). State Defined Outcome

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	Sanitary Operating Procedure adoption by daycare programs in Tennessee pending grant funding, centers involved (Draughon).

Outcome # 1

1. Outcome Target

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

2. Outcome Type : Change in Action Outcome Measure

2011:200 2012:200 2013:200 2014:200 2015:200

3. Associated Knowledge Area(s)

- 724 - Healthy Lifestyle
- 802 - Human Development and Family Well-Being
- 805 - Community Institutions, Health, and Social Services

4. Associated Institute Type(s)

- 1862 Extension
- 1890 Extension

Outcome # 2

1. Outcome Target

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

2. Outcome Type : Change in Action Outcome Measure

2011:200 2012:200 2013:200 2014:200 2015:200

3. Associated Knowledge Area(s)

- 724 - Healthy Lifestyle
- 802 - Human Development and Family Well-Being
- 805 - Community Institutions, Health, and Social Services

4. Associated Institute Type(s)

- 1862 Extension
- 1890 Extension

Outcome # 3

1. Outcome Target

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

2. Outcome Type : Change in Action Outcome Measure

2011:200 2012:200 2013:200 2014:200 2015:200

3. Associated Knowledge Area(s)

- 724 - Healthy Lifestyle

- 802 - Human Development and Family Well-Being
- 805 - Community Institutions, Health, and Social Services

4. Associated Institute Type(s)

- 1862 Extension
- 1890 Extension

Outcome # 4

1. Outcome Target

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

2. Outcome Type : Change in Action Outcome Measure

2011:200 2012:200 2013:200 2014:200 2015:200

3. Associated Knowledge Area(s)

- 724 - Healthy Lifestyle
- 802 - Human Development and Family Well-Being
- 805 - Community Institutions, Health, and Social Services

4. Associated Institute Type(s)

- 1862 Extension
- 1890 Extension

Outcome # 5

1. Outcome Target

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

2. Outcome Type : Change in Action Outcome Measure

2011:200 2012:200 2013:200 2014:200 2015:0

3. Associated Knowledge Area(s)

- 724 - Healthy Lifestyle

4. Associated Institute Type(s)

- 1862 Extension

Outcome # 6

1. Outcome Target

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

2. Outcome Type : Change in Action Outcome Measure

2011:200 2012:200 2013:200 2014:200 2015:0

3. Associated Knowledge Area(s)

- 724 - Healthy Lifestyle

4. Associated Institute Type(s)

- 1862 Extension

Outcome # 7

1. Outcome Target

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

2. Outcome Type : Change in Action Outcome Measure

2011:200 2012:200 2013:200 2014:200 2015:200

3. Associated Knowledge Area(s)

- 724 - Healthy Lifestyle
- 802 - Human Development and Family Well-Being
- 805 - Community Institutions, Health, and Social Services

4. Associated Institute Type(s)

- 1862 Extension
- 1890 Extension

Outcome # 8

1. Outcome Target

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

2. Outcome Type : Change in Action Outcome Measure

2011:200 2012:200 2013:200 2014:200 2015:200

3. Associated Knowledge Area(s)

- 724 - Healthy Lifestyle
- 802 - Human Development and Family Well-Being
- 805 - Community Institutions, Health, and Social Services

4. Associated Institute Type(s)

- 1862 Extension
- 1890 Extension

Outcome # 9

1. Outcome Target

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

2. Outcome Type : Change in Action Outcome Measure

2011:200 2012:200 2013:200 2014:200 2015:200

3. Associated Knowledge Area(s)

- 724 - Healthy Lifestyle
- 802 - Human Development and Family Well-Being
- 805 - Community Institutions, Health, and Social Services

4. Associated Institute Type(s)

- 1862 Extension
- 1890 Extension

Outcome # 10

1. Outcome Target

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

2. Outcome Type : Change in Action Outcome Measure

2011:200 2012:200 2013:200 2014:200 2015:200

3. Associated Knowledge Area(s)

- 724 - Healthy Lifestyle

4. Associated Institute Type(s)

- 1862 Extension

Outcome # 11

1. Outcome Target

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

2. Outcome Type : Change in Action Outcome Measure

2011:200 2012:200 2013:200 2014:200 2015:200

3. Associated Knowledge Area(s)

- 724 - Healthy Lifestyle

4. Associated Institute Type(s)

- 1862 Extension

Outcome # 12

1. Outcome Target

Sanitary Operating Procedure adoption by daycare programs in Tennessee pending grant funding, centers involved (Draughon).

2. Outcome Type : Change in Action Outcome Measure

2011:120 2012:180 2013:180 2014:180 2015:0

3. Associated Knowledge Area(s)

- 805 - Community Institutions, Health, and Social Services

4. Associated Institute Type(s)

- 1862 Research

V(J). Planned Program (External Factors)

1. External Factors which may affect Outcomes

- Competing Public priorities
- Competing Programmatic Challenges

Description

Public perception, as well as new health and safety crises, may affect governmental policy, priorities, and funding for individual research areas.

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

1. Evaluation Studies Planned

- After Only (post program)
- Other (Surveillance Data)

Description

To evaluate the Dining with Diabetes and Arthritis Self-Help Course, surveillance data from TN Department of Health will be employed. After Only (post program) questionnaires will be used with various other health programs including Dining with Diabetes, Arthritis Self-Help and Tai Chi.

2. Data Collection Methods

- Sampling
- Whole population
- Case Study
- Observation
- Other (Experimental results)

Description

Research data collection methods will include experimental results, case studies, and sampling/observation of cooperating sites.

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

Horticultural Systems

2. Brief summary about Planned Program

Tennessee's horticultural crop industry is an important, growing sector of our agricultural economy. Health conscious consumers are purchasing more fruits and vegetables, and an increasing value is being placed on beautification of residences and businesses via use of annual and perennial plants, many of which are grown in Tennessee. Horticultural production in Tennessee is increasing, partially due to diversification of agronomic crop and beef cattle farms.

Our research involves searching out profitable and marketable products to supplement or replace existing crops. Insect and disease resistant cultivars of ornamental and food plants will be located and tested to determine their ability to contribute to financial improvement in the growing horticultural industry. New Integrated Pest Management technologies will be tested to determine the degree of increased control efficacy they offer.

The U.S. environmental horticulture industry, also known as the "Green Industry", is comprised of wholesale nursery, greenhouse, and sod growers; landscape architects, designers/builders, contractors and maintenance firms; retail garden centers, home centers and mass merchandisers with lawn and garden departments; and marketing intermediaries such as brokers and horticultural distribution centers (re-wholesalers). The Green Industry is one of fastest growing sectors in agriculture. Economic impacts for the U.S. Green Industry in 2002 were estimated at \$147.8 billion in output, 1,964,339 jobs, \$95.1 billion in value added, \$64.3 billion in labor income, and \$6.9 billion in indirect business taxes, with these values expressed in 2004 dollars. Many challenges face this industry including marketing, integrated pest management, sustainable cultural practices, environmental and human health risks, invasive species, regulations, and profitability.

3. Program existence : Mature (More than five years)

4. Program duration : Long-Term (More than five years)

5. Expending formula funds or state-matching funds : Yes

6. Expending other than formula funds or state-matching funds : Yes

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

KA Code	Knowledge Area	%1862 Extension	%1890 Extension	%1862 Research	%1890 Research
204	Plant Product Quality and Utility (Preharvest)	0%	0%	20%	
205	Plant Management Systems	60%	60%	26%	
211	Insects, Mites, and Other Arthropods Affecting Plants	10%	10%	14%	
212	Pathogens and Nematodes Affecting Plants	10%	10%	16%	
213	Weeds Affecting Plants	10%	10%	6%	
216	Integrated Pest Management Systems	10%	10%	6%	
312	External Parasites and Pests of Animals	0%	0%	12%	
	Total	100%	100%	100%	

V(C). Planned Program (Situation and Scope)**1. Situation and priorities**

Many producers are searching for viable and profitable alternative crops. 95% of the vegetables and fruits consumed in-state are imported from other states. Fruits and vegetables also have the potential for considerably more income per acre than row crops.

Greenhouse and horticultural operations in Tennessee need to have technology for control of plant diseases in order to take advantage of state-wide, national and international markets that require healthy plants. There are several ways to improve plant health, including plant genetics and Integrated Pest Management technology -- strengths of the TAES.

Production and marketing of horticultural crops in Tennessee is a rapidly expanding portion of Tennessee's agricultural income. Part of the reasons for recent expansion and interest in horticultural crop production is the diversification of agronomic crop and beef cattle farms across the state. These "high value" crops are also crops which have relatively high costs of production. It essential that our producers are provided with the research-based information they need to manage their operations for profit. This information includes selection of crops/varieties which will appeal to consumers, and management methods which reduce labor expenses, pest infestations, pesticide use, and risk of frost damage.

2. Scope of the Program

- In-State Extension
- In-State Research
- Multistate Extension

V(D). Planned Program (Assumptions and Goals)

1. Assumptions made for the Program

Fruits and vegetables have the potential for considerably more income per acre than row crops. Production information for growers will reduce risk and increase profitability. Infrastructure, expertise, and staffing are appropriate. Extramural funding will remain the same or increase with the addition of competitive grants.

2. Ultimate goal(s) of this Program

The overall objective of this planned program is to facilitate the production of the vegetable and ornamental crops that have been identified as feasible for production in Tennessee. We want to prevent plant diseases from damaging plants that are grown for commercial or ornamental purposes, and to develop new plants that will increase Tennessee and mid-south grower profitability. We hope to develop horticultural production systems which will lead to an improvement in profit and, therefore, the economic sustainability of Tennessee's horticultural crop production units.

V(E). Planned Program (Inputs)

1. Estimated Number of professional FTE/SYs to be budgeted for this Program

Year	Extension		Research	
	1862	1890	1862	1890
2011	36.0	3.0	31.0	0.0
2012	36.0	3.0	31.0	0.0
2013	36.0	3.0	31.0	0.0
2014	36.0	3.0	31.0	0.0
2015	36.0	3.0	0.0	0.0

V(F). Planned Program (Activity)

1. Activity for the Program

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. Type(s) of methods to be used to reach direct and indirect contacts

Extension

Direct Methods	Indirect Methods
<ul style="list-style-type: none"> • Education Class • One-on-One Intervention • Demonstrations • Other 1 (On-site visits) 	<ul style="list-style-type: none"> • Newsletters • TV Media Programs • Web sites • Other 1 (Newspaper articles) • Other 2 (Radio programs)

3. Description of targeted 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 business.

V(G). Planned Program (Outputs)

1. Standard output measures

Target for the number of persons(contacts) to be reached through direct and indirect contact methods

	Direct Contact Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Year	Target	Target	Target	Target
2011	75000	20000	10000	0
2012	75000	20000	10000	0
2013	75000	20000	10000	0
2014	75000	20000	10000	0
2015	75000	20000	10000	0

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

2011:1 2012:1 2013:1 2014:1 2015:0

3. Expected Peer Review Publications

Year	Research Target	Extension Target	Total
2011	10	2	0
2012	12	2	0
2013	12	2	0
2014	12	2	0
2015	0	2	0

V(H). State Defined Outputs**1. Output Target**

- Horticultural workshops and conferences.

2011:4**2012:4****2013:0****2014:0****2015:0**

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

2011:100**2012:100****2013:100****2014:100****2015:100**

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

2011:800**2012:800****2013:800****2014:800****2015:800**

V(I). State Defined Outcome

O. No.	Outcome Name
1	Projected licenses for dogwood cultivars (M. Windham).
2	Target number of research laboratories using our reverse-genetic tool for Phytophthora gene function analysis (Lamour).
3	Annual Tennessee economic contribution of Encore azaleas based on TAES research, dollars (M. Windham).
4	Consumer Horticulture: Number of consumers who applied fewer fertilizers and pesticides due to a better understanding of landscape best management practices.
5	Consumer Horticulture: Number of consumers who learned about plant selection and proper planting to save money and time in the landscape.

Outcome # 1**1. Outcome Target**

Projected licenses for dogwood cultivars (M. Windham).

2. Outcome Type : Change in Action Outcome Measure

2011:80 2012:85 2013:90 2014:90 2015:0

3. Associated Knowledge Area(s)

- 204 - Plant Product Quality and Utility (Preharvest)
- 212 - Pathogens and Nematodes Affecting Plants

4. Associated Institute Type(s)

- 1862 Research

Outcome # 2**1. Outcome Target**

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

2. Outcome Type : Change in Action Outcome Measure

2011:40 2012:40 2013:50 2014:50 2015:0

3. Associated Knowledge Area(s)

- 205 - Plant Management Systems
- 212 - Pathogens and Nematodes Affecting Plants

4. Associated Institute Type(s)

- 1862 Research

Outcome # 3**1. Outcome Target**

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

2. Outcome Type : Change in Knowledge Outcome Measure

2011:450000 2012:300000 2013:250000 2014:250000 2015:0

3. Associated Knowledge Area(s)

- 204 - Plant Product Quality and Utility (Preharvest)
- 212 - Pathogens and Nematodes Affecting Plants

4. Associated Institute Type(s)

- 1862 Research

Outcome # 4

1. Outcome Target

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

2. Outcome Type : Change in Knowledge Outcome Measure

2011:1000 2012:1000 2013:1000 2014:1000 2015:1000

3. Associated Knowledge Area(s)

- 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

4. Associated Institute Type(s)

- 1862 Extension
- 1890 Extension

Outcome # 5

1. Outcome Target

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

2. Outcome Type : Change in Knowledge Outcome Measure

2011:4000 2012:4000 2013:4000 2014:4000 2015:4000

3. Associated Knowledge Area(s)

- 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

4. Associated Institute Type(s)

- 1862 Extension
- 1890 Extension

V(J). Planned Program (External Factors)

1. External Factors which may affect Outcomes

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

Description

Unfavorable weather conditions, unexpected diseases, and natural disasters can affect cultivar evaluations.Changes in the economy may affect grower practices, priorities, and product mixes.

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

1. Evaluation Studies Planned

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

Description

Variety evaluation of several different vegetable crops will be conducted to determine suitability to climate, soils and cultural practices for Tennessee producers.We will evaluate the number of cultivars developed and sold.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.

2. Data Collection Methods

- Sampling
- On-Site

Description

Our progress during, and success of, this program will be evaluated utilizing questionnaires completed by growers at selected educational meetings/conferences and at on-site visits to their farms.

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

Human Development

2. Brief summary about Planned Program

Adults, youth and children alike in Tennessee are continuing to have problems with drug abuse, emotional problems, child abuse, juvenile delinquency, divorce, etc. Because many children come from at-risk environments where they do not receive appropriate love and attention, children are not ready for school when they get to kindergarten. Tennessee has one of the highest adult illiteracy rates in the country (21%).

3. Program existence : Mature (More than five years)

4. Program duration : Long-Term (More than five years)

5. Expending formula funds or state-matching funds : Yes

6. Expending other than formula funds or state-matching funds : Yes

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 (Situation and Scope)**1. Situation and priorities**

Inadequate parenting and interpersonal skills are associated with family instability which negatively affects child well-being and results in increased costs to individuals, communities, and governments.

- Court-ordered parents: Many courts are requiring parents whose children have been removed to state custody to complete a parent education program. In addition, some agencies will refer parents to classes who are at-risk for having their children removed. Juvenile courts are requiring some parents whose children are in trouble with the law to attend parenting classes as well.

- Relative caregivers: Relative caregivers face not only ambiguous legal status in caring for these children, but they face difficulties in transitioning from their roles as grandparents or other relatives to the role of parent. Children enter these relationships having experienced loss or rejection and often other types of trauma. Relatives may feel overwhelmed by the new responsibilities and fear that they will not be adequate for the task. Providing education and support for these surrogate parents can help ease their stress and provide a refresher or initial training in parenting for those who have never parented or who parented several years ago.

- Teen parents: Fewer than 8% of unwed teen mothers marry the baby's father within one year of giving birth. Teen mothers have a reduced chance of ever marrying and an increased risk of divorce if they do marry. Unmarried mothers have lower levels of education, lower incomes, and are more likely to receive public assistance than married mothers. Children of unmarried mothers are more likely to have low educational attainment, early sexual activity, and problem behaviors than children of married mothers, and they have lower levels of father involvement in their lives.

- Incarcerated parents: Children of incarcerated parents are at great risk for negative outcomes as adults and face many hardships during their parents' incarceration. Incarcerated parents often lack the skills and self-confidence to maintain a relationship with their children during incarceration which may result in a break in the parent-child relationship.

A recent needs assessment by TSU Extension specialists found numerous studies that there is an increase in the number of individuals who provide care for others in the United States. There are two types of caregiving - formal and informal. The recipients of care include persons with disabilities, aging parents, and underage children and/or grandchildren.

In Tennessee there are 101,510 children living in grandparent-headed households (7.3% of all children in the state). There are another 24,774 children living in households headed by other relatives (1.8% of all children in the state). Of the children living in households headed by grandparents or other relatives in Tennessee, 56,682 are living without the presence of either parent (U.S. Census 2000).

The number of Tennessee grandparents reporting having responsibility for their grandchildren who live with them is 61,252. Thirty-one percent are African American; 1% is Hispanic/Latino; and 66% are White. Of these, 42% of these grandparents live in households without the presence of the children's parents. Grandparents under the age of 60 consist of 74%; 20% of them live in poverty.

The person most likely providing care to an older person is an adult child. Other relationships to the older person other than their child are a spouse, other relative or a non-relative. Nearly 25% of caregivers are 65 years of age or older and are likely to be caring for a spouse.

Family caregivers provide the overwhelming majority of long-term-care services in the U.S., which is approximately 80%. Over three-fourths (78%) of adults living in the community and in need of long-term care depend on family and friends as their only source of help; 14% receive a combination of family and hired assistance, and only 8% use paid help only. Over 40% of family caregivers provide some type of nursing care for their loved ones, such as giving medications, changing bandages, managing machinery and monitoring vital signs.

It is reported that 600,000 informal caregivers expend services of 600.4 million caregiving hours per year in the state; with a market value of approximately \$5.3 billion. However, providing care for others has its share of shortcomings. For example a significant portion of those in the workforce are providing elder care to family members. Between 25 to 35% of all workers report that they are currently providing or have recently provided care to someone 65 years of age or older. Two-thirds report having to rearrange their work schedule, decrease their hours or take an unpaid leave in order to meet their caregiving responsibilities. Difficulties due to work and caregiving are particularly higher among those caring for someone with dementia. Many employers have no programs or policies in place designed to assist their workers to provide better care.

2. Scope of the Program

- In-State Extension

V(D). Planned Program (Assumptions and Goals)

1. Assumptions made for the Program

Assumption A. Tennessee Extension Family and Consumer Sciences Agents have the necessary relationships to involve and motivate child care providers to access Extension education programs in their communities.

Assumption B. The Tennessee Department of Human Service will continue the enforcement of required training for child care providers.

2. Ultimate goal(s) of this Program

Many Tennessee children are not ready for school when they get to kindergarten. This program will ensure that they are ready for kindergarten and contribute to improved literacy rates in the state. This program will also improve parenting skills, especially for the state's divorced parents and incarcerated parents.

V(E). Planned Program (Inputs)

1. Estimated Number of professional FTE/SYs to be budgeted for this Program

Year	Extension		Research	
	1862	1890	1862	1890
2011	23.0	2.0	0.0	0.0
2012	23.0	2.0	0.0	0.0
2013	23.0	2.0	0.0	0.0
2014	23.0	2.0	0.0	0.0
2015	18.0	2.0	0.0	0.0

V(F). Planned Program (Activity)

1. Activity for the Program

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

The following will be 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 will be created and disseminated. Extension FCS Agents in over 60 of Tennessee's 95 counties will offer 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 provides them with strategies for minimizing those effects. It is expected that approximately 2,000 participants will complete the Extension class annually.

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

For 2011 – 2015, TSU Extension Family and Community Health programs will place special emphasis on "Healthy Aging" for the mind, body and spirit. The ultimate goal is 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 will produce and distribute resource materials and educational programs on a variety of topics for interested individuals, caregivers, and professionals. Various methods will be employed, including inter-generational connections.

2. Type(s) of methods to be used to reach direct and indirect contacts

Extension

Direct Methods	Indirect Methods
<ul style="list-style-type: none"> ● Education Class ● One-on-One Intervention ● Demonstrations ● Other 1 (On-site Visits) 	<ul style="list-style-type: none"> ● Newsletters ● TV Media Programs ● Web sites ● Other 1 (Newspaper Articles) ● Other 2 (Radio Programs)

3. Description of targeted audience

The target audiences for this planned program are Tennessee child care providers, parents, and adolescents. While all parents of infants and young children are targeted for literacy programs, parents seeking a divorce are

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.

V(G). Planned Program (Outputs)

1. Standard output measures

Target for the number of persons(contacts) to be reached through direct and indirect contact methods

	Direct Contact Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Year	Target	Target	Target	Target
2011	5000	10000	0	0
2012	5000	10000	0	0
2013	5000	10000	0	0
2014	5000	10000	0	0
2015	5000	10000	0	0

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

2011:0 2012:0 2013:0 2014:0 2015:0

3. Expected Peer Review Publications

Year	Research Target	Extension Target	Total
2011	0	1	0
2012	0	1	0
2013	0	1	0
2014	0	1	0
2015	0	1	0

V(H). State Defined Outputs

1. Output Target

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

2011:25 2012:25 2013:25 2014:25 2015:25

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

2011:200 2012:200 2013:200 2014:200 2015:200

V(I). State Defined Outcome

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 ongoing 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.

Outcome # 1**1. Outcome Target**

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

2. Outcome Type : Change in Knowledge Outcome Measure

2011:225 2012:225 2013:225 2014:225 2015:225

3. Associated Knowledge Area(s)

- 802 - Human Development and Family Well-Being

4. Associated Institute Type(s)

- 1890 Extension

Outcome # 2**1. Outcome Target**

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

2. Outcome Type : Change in Action Outcome Measure

2011:150 2012:150 2013:150 2014:150 2015:150

3. Associated Knowledge Area(s)

- 802 - Human Development and Family Well-Being

4. Associated Institute Type(s)

- 1890 Extension

Outcome # 3**1. Outcome Target**

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

2. Outcome Type : Change in Action Outcome Measure

2011:300 2012:300 2013:300 2014:300 2015:300

3. Associated Knowledge Area(s)

- 802 - Human Development and Family Well-Being

4. Associated Institute Type(s)

- 1862 Extension

Outcome # 4

1. Outcome Target

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

2. Outcome Type : Change in Condition Outcome Measure

2011:150 2012:150 2013:150 2014:150 2015:150

3. Associated Knowledge Area(s)

- 802 - Human Development and Family Well-Being

4. Associated Institute Type(s)

- 1890 Extension

Outcome # 5

1. Outcome Target

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

2. Outcome Type : Change in Action Outcome Measure

2011:300 2012:300 2013:300 2014:300 2015:300

3. Associated Knowledge Area(s)

- 802 - Human Development and Family Well-Being

4. Associated Institute Type(s)

- 1862 Extension

Outcome # 6

1. Outcome Target

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. Outcome Type : Change in Action Outcome Measure

2011:300 2012:300 2013:300 2014:300 2015:300

3. Associated Knowledge Area(s)

- 802 - Human Development and Family Well-Being

4. Associated Institute Type(s)

- 1862 Extension

Outcome # 7

1. Outcome Target

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

2. Outcome Type : Change in Knowledge Outcome Measure

2011:1000 2012:1000 2013:1000 2014:1000 2015:1000

3. Associated Knowledge Area(s)

- 802 - Human Development and Family Well-Being

4. Associated Institute Type(s)

- 1862 Extension

Outcome # 8

1. Outcome Target

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

2. Outcome Type : Change in Knowledge Outcome Measure

2011:100 2012:100 2013:100 2014:100 2015:100

3. Associated Knowledge Area(s)

- 802 - Human Development and Family Well-Being

4. Associated Institute Type(s)

- 1862 Extension
- 1890 Extension

Outcome # 9

1. Outcome Target

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

2. Outcome Type : Change in Action Outcome Measure

2011:25 2012:25 2013:25 2014:25 2015:25

3. Associated Knowledge Area(s)

- 802 - Human Development and Family Well-Being

4. Associated Institute Type(s)

- 1890 Extension

V(J). Planned Program (External Factors)

1. External Factors which may affect Outcomes

- Government Regulations

Description

If Tennessee law relative to required instructional hours for child care providers changes, the outcomes will likely change. An increase in the number of instructional hours would likely cause an increase in the child care providers reached and the outcomes achieved, provided that the increased demand could be successfully met with current funding levels.

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

1. Evaluation Studies Planned

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

Description

To evaluate human development programs, post-program questionnaires, pre-tests and post-tests will be used. Typically, participants' knowledge gain is also measured during the actual programs.

2. Data Collection Methods

- Whole population
- Mail
- Telephone
- On-Site

Description

When questionnaires are used for evaluation of Extension human development programs, participants provide responses on-site, via mail, or via telephone.

V(A). Planned Program (Summary)

Program # 14

1. Name of the Planned Program

Sustainable Energy

2. Brief summary about Planned Program

Economic research will estimate the capacity of U.S. agriculture to generate a supply of feedstock to sustain a bioenergy and bioproducts industry. Expansion curves for the growth of the bioenergy and bioproducts industries will be developed by estimating a national bioenergy and bioproducts demand for agricultural feedstock, the agricultural resources demanded, and the price and income impacts on the agricultural sector. The economic and land use impacts of alternative sizes of the bioenergy and bioproducts industries and the corresponding economic feasibility to generate feedstock from agricultural sources will also be estimated.

Through the BioWeb project, UT researchers are deploying a dynamic, online, world-class technical resource of peer-reviewed content to support the rapidly changing bioenergy research field.

Engineering research objectives are to develop a knowledge base and/or equipment related to the influence particle size on biomass densification, to identify the most economical ways of size-reducing, separating and transporting biomass feedstocks, and to improve existing approaches and develop new approaches to produce valuable chemical products from common agricultural sources such as seed oils, proteins, and carbohydrates.

Initial funding is in place for a research-oriented biorefinery to study the full range of processes involved in converting cellulosic biomass to ethanol; construction has begun. Producers are being engaged to begin to grow the required biomass feedstock for the biorefinery.

UT Extension will continue to conduct needs assessment activities that will influence the biomass utilization research agenda.

3. Program existence : Intermediate (One to five years)

4. Program duration : Long-Term (More than five years)

5. Expending formula funds or state-matching funds : Yes

6. Expending other than formula funds or state-matching funds : Yes

V(B). Program Knowledge Area(s)

1. Program Knowledge Areas and Percentage

KA Code	Knowledge Area	%1862 Extension	%1890 Extension	%1862 Research	%1890 Research
135	Aquatic and Terrestrial Wildlife	0%	0%	4%	
205	Plant Management Systems	0%	0%	7%	
307	Animal Production Management Systems	0%	0%	3%	
402	Engineering Systems and Equipment	0%	0%	20%	
404	Instrumentation and Control Systems	0%	0%	7%	
501	New and Improved Food Processing Technologies	0%	0%	7%	
511	New and Improved Non-Food Products and Processes	0%	0%	32%	
512	Quality Maintenance in Storing and Marketing Non-Food Products	80%	80%	3%	
603	Market Economics	10%	10%	7%	
605	Natural Resource and Environmental Economics	10%	10%	4%	
606	International Trade and Development	0%	0%	3%	
711	Ensure Food Products Free of Harmful Chemicals, Including Residues from Agricultural and Other Sources.	0%	0%	3%	
	Total	100%	100%	100%	

V(C). Planned Program (Situation and Scope)**1. Situation and priorities**

Domestic production of energy in the U.S. lags behind growth in demand, resulting in increasing energy prices. U.S. dependence on imported sources of energy has also created international difficulties for our country including contributing to our large trade deficit. The production of important chemicals from agriculture rather than from petroleum will decrease U.S. dependence upon foreign oil and provide additional income for U.S. farmers. Government at all levels has endorsed research to identify and develop new domestic sources of energy.

Sound information on the extent of energy production capacity in agriculture, costs per unit, benefits to agricultural producers, and impacts on production of other products and the environment is not readily available.

While some research has been reported on the handling of forest residue, reported experimental work on collection, transportation, and primary processing of crop residues is scarce. Biomass must generally be fractionated into small droplets or particles prior to use. Atomization of sprayed materials affects spray distribution, and granulation of biomass influences input energy. As an example, corn stover has been suggested as an ideal strategic feedstock for the bioenergy program because of its abundance and proximity to existing grain-to-ethanol conversion facilities. However, corn stover is a low-value product with a high moisture content at the time of grain harvest. As such, it is difficult to handle, spoils readily, is prone to spontaneous combustion, and is a safety hazard when moldy. In addition, the leaf and stalk fractions have different mechanical and chemical properties, affecting size reduction, handling, and ultimate direction of very different feedstocks.

2. Scope of the Program

- In-State Research
- Multistate Research

V(D). Planned Program (Assumptions and Goals)**1. Assumptions made for the Program**

Appropriated and extramural funding and personnel resources will remain adequate to support the research. Energy prices will remain "relatively high" for the foreseeable future. Agriculture will continue to have excess capacity that will enable it to support energy production. Reported experimental work on collection, transportation, and primary processing of crop residue will continue to be limited. New approaches in atomizing and granulating biomass will be environmentally friendly and energy-efficient.

2. Ultimate goal(s) of this Program

This research seeks to provide information that will enable wise private investment and public policy decisions regarding the development of new domestic energy sources from agriculture, to deliver premium quality feedstocks at a low cost to bioconversion facilities, and to improve existing technologies and develop new technologies for cost-effective, inexpensive, and environmentally-friendly downstream purification and processing of lipid and protein feedstocks.

V(E). Planned Program (Inputs)**1. Estimated Number of professional FTE/SYs to be budgeted for this Program**

Year	Extension		Research	
	1862	1890	1862	1890
2011	9.0	1.0	42.0	0.0
2012	9.0	1.0	42.0	0.0
2013	9.0	1.0	42.0	0.0
2014	9.0	1.0	42.0	0.0
2015	9.0	1.0	0.0	0.0

V(F). Planned Program (Activity)**1. Activity for the Program**

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 are identifying 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

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. Type(s) of methods to be used to reach direct and indirect contacts

Extension

Direct Methods	Indirect Methods
<ul style="list-style-type: none"> • Education Class • One-on-One Intervention • Demonstrations • Other 1 (On-site visits) 	<ul style="list-style-type: none"> • Newsletters • TV Media Programs • Web sites • Other 1 (Newspaper articles) • Other 2 (Radio programs)

3. Description of targeted audience

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

V(G). Planned Program (Outputs)

1. Standard output measures

Target for the number of persons(contacts) to be reached through direct and indirect contact methods

	Direct Contact Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Year	Target	Target	Target	Target
2011	9000	300000	0	0
2012	9000	300000	0	0
2013	9000	300000	0	0
2014	9000	300000	0	0
2015	9000	300000	0	0

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

2011:2

2012:1

2013:2

2014:1

2015:0

3. Expected Peer Review Publications

Year	Research Target	Extension Target	Total
2011	16	1	0
2012	18	1	0
2013	20	1	0

Year	Research Target	Extension Target	Total
2014	20	1	0
2015	0	1	0

V(H). State Defined Outputs

1. Output Target

- Peer-reviewed technical resource pages in online BioWeb resource (Rials).

2011:1700

2012:2000

2013:2000

2014:2000

2015:0

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

2011:1000

2012:1000

2013:1000

2014:1000

2015:1000

V(I). State Defined Outcome

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 technology 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	Biofuels: Number of producers gaining knowledge of dedicated energy crops for either on-farm production of renewable energy or for sale to a bio-refinery or other energy producer.

Outcome # 1

1. Outcome Target

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

2. Outcome Type : Change in Knowledge Outcome Measure

2011:1 2012:1 2013:1 2014:1 2015:0

3. Associated Knowledge Area(s)

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

4. Associated Institute Type(s)

- 1862 Research

Outcome # 2

1. Outcome Target

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

2. Outcome Type : Change in Condition Outcome Measure

2011:0 2012:0 2013:0 2014:1 2015:0

3. Associated Knowledge Area(s)

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

4. Associated Institute Type(s)

- 1862 Research

Outcome # 3

1. Outcome Target

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

2. Outcome Type : Change in Condition Outcome Measure

2011:0 2012:0 2013:0 2014:1 2015:0

3. Associated Knowledge Area(s)

- 402 - Engineering Systems and Equipment
- 511 - New and Improved Non-Food Products and Processes
- 603 - Market Economics

- 605 - Natural Resource and Environmental Economics

4. Associated Institute Type(s)

- 1862 Research

Outcome # 4

1. Outcome Target

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

2. Outcome Type : Change in Condition Outcome Measure

2011:125 2012:150 2013:250 2014:300 2015:0

3. Associated Knowledge Area(s)

- 205 - Plant Management Systems
- 511 - New and Improved Non-Food Products and Processes
- 603 - Market Economics
- 605 - Natural Resource and Environmental Economics

4. Associated Institute Type(s)

- 1862 Extension
- 1862 Research

Outcome # 5

1. Outcome Target

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

2. Outcome Type : Change in Condition Outcome Measure

2011:7000 2012:10000 2013:12000 2014:15000 2015:0

3. Associated Knowledge Area(s)

- 205 - Plant Management Systems
- 511 - New and Improved Non-Food Products and Processes
- 603 - Market Economics
- 605 - Natural Resource and Environmental Economics

4. Associated Institute Type(s)

- 1862 Extension
- 1862 Research

Outcome # 6

1. Outcome Target

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

2. Outcome Type : Change in Condition Outcome Measure

2011:5 2012:8 2013:9 2014:10 2015:0

3. Associated Knowledge Area(s)

- 205 - Plant Management Systems
- 511 - New and Improved Non-Food Products and Processes
- 603 - Market Economics
- 605 - Natural Resource and Environmental Economics

4. Associated Institute Type(s)

- 1862 Extension
- 1862 Research

Outcome # 7

1. Outcome Target

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

2. Outcome Type : Change in Knowledge Outcome Measure

2011:1 2012:1 2013:1 2014:1 2015:0

3. Associated Knowledge Area(s)

- 512 - Quality Maintenance in Storing and Marketing Non-Food Products
- 603 - Market Economics
- 605 - Natural Resource and Environmental Economics

4. Associated Institute Type(s)

- 1862 Extension
- 1862 Research

Outcome # 8

1. Outcome Target

Biofuels: Number of producers gaining knowledge of dedicated energy crops for either on-farm production of renewable energy or for sale to a bio-refinery or other energy producer.

2. Outcome Type : Change in Knowledge Outcome Measure

2011:150 2012:150 2013:150 2014:150 2015:150

3. Associated Knowledge Area(s)

- 205 - Plant Management Systems
- 511 - New and Improved Non-Food Products and Processes
- 603 - Market Economics

4. Associated Institute Type(s)

- 1862 Extension

V(J). Planned Program (External Factors)

1. External Factors which may affect Outcomes

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

Description

Changes in the relative prices of energy or agricultural commodities beyond those included in the economic modeling may lessen the applicability of research results. International conflicts or energy shortages may intensify usefulness and urgency of the research. Available funding, the success of biomass research, the degree to which conversion processes can be optimized, and the availability of alternate energy sources will greatly affect the rate of increase of cellulosic biomass growers, the market price for resulting products, and the extent to which various processes are scaled-up.

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

1. Evaluation Studies Planned

- After Only (post program)
- Retrospective (post program)
- During (during program)
- Time series (multiple points before and after program)

Description

Some of the anticipated outputs are easily measured research parameters that will be evaluated in the course of conducting the research. In the case of the BioWeb, web content and adoption will be measured using web logs. Outcome evaluation will consist of publicly-available or Extension-generated acreage and grower numbers.

2. Data Collection Methods

- Observation

Description

Increases in the numbers of bio-mass producers and dedicated biomass acreage will be determined by observation through contracts handled by the Office of Bioenergy Programs.

V(A). Planned Program (Summary)

Program # 15

1. Name of the Planned Program

Climate Change

2. Brief summary about Planned Program

not applicable

3. Program existence : New (One year or less)

4. Program duration : Short-Term (One year or less)

5. Expending formula funds or state-matching funds : Yes

6. Expending other than formula funds or state-matching funds : No

V(B). Program Knowledge Area(s)

1. Program Knowledge Areas and Percentage

KA Code	Knowledge Area	%1862 Extension	%1890 Extension	%1862 Research	%1890 Research
132	Weather and Climate	100%	100%	100%	
	Total	100%	100%	100%	

V(C). Planned Program (Situation and Scope)

1. Situation and priorities

not applicable

2. Scope of the Program

V(D). Planned Program (Assumptions and Goals)

1. Assumptions made for the Program

not applicable

2. Ultimate goal(s) of this Program

not applicable

V(E). Planned Program (Inputs)

1. Estimated Number of professional FTE/SYs to be budgeted for this Program

Year	Extension		Research	
	1862	1890	1862	1890
2011	0.0	0.0	0.0	0.0

Year	Extension		Research	
	1862	1890	1862	1890
2012	0.0	0.0	0.0	0.0
2013	0.0	0.0	0.0	0.0
2014	0.0	0.0	0.0	0.0
2015	0.0	0.0	0.0	0.0

V(F). Planned Program (Activity)

1. Activity for the Program

not applicable

2. Type(s) of methods to be used to reach direct and indirect contacts

Extension

Direct Methods	Indirect Methods

3. Description of targeted audience

not applicable

V(G). Planned Program (Outputs)

1. Standard output measures

Target for the number of persons(contacts) to be reached through direct and indirect contact methods

	Direct Contact Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Year	Target	Target	Target	Target
2011	0	0	0	0
2012	0	0	0	0
2013	0	0	0	0
2014	0	0	0	0
2015	0	0	0	0

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

2011:0 2012:0 2013:0 2014:0 2015:0

3. Expected Peer Review Publications

Year	Research Target	Extension Target	Total
2011	0	0	0
2012	0	0	0
2013	0	0	0
2014	0	0	0
2015	0	0	0

V(H). State Defined Outputs**1. Output Target**

V(I). State Defined Outcome

V(J). Planned Program (External Factors)

1. External Factors which may affect Outcomes

Description

not applicable

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

1. Evaluation Studies Planned

Description

not applicable

2. Data Collection Methods

Description

not applicable