

**V(A). Planned Program (Summary)**

**Program # 3**

**1. Name of the Planned Program**

Animal Systems

- Reporting on this Program

**V(B). Program Knowledge Area(s)**

**1. Program Knowledge Areas and Percentage**

KA Code	Knowledge Area	%1862 Extension	%1890 Extension	%1862 Research	%1890 Research
102	Soil, Plant, Water, Nutrient Relationships	0%	0%	8%	
205	Plant Management Systems	0%	0%	8%	
301	Reproductive Performance of Animals	15%	15%	8%	
302	Nutrient Utilization in Animals	0%	0%	13%	
303	Genetic Improvement of Animals	10%	10%	0%	
304	Animal Genome	0%	0%	5%	
305	Animal Physiological Processes	0%	0%	13%	
306	Environmental Stress in Animals	0%	0%	6%	
307	Animal Management Systems	60%	60%	5%	
311	Animal Diseases	15%	15%	14%	
312	External Parasites and Pests of Animals	0%	0%	5%	
315	Animal Welfare/Well-Being and Protection	0%	0%	9%	
402	Engineering Systems and Equipment	0%	0%	3%	
712	Protect Food from Contamination by Pathogenic Microorganisms, Parasites, and Naturally Occurring Toxins	0%	0%	3%	
	<b>Total</b>	100%	100%	100%	

**V(C). Planned Program (Inputs)**

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

Year: 2014	Extension		Research	
	1862	1890	1862	1890
<b>Plan</b>	41.0	5.0	21.0	0.0
<b>Actual Paid</b>	41.0	8.0	21.7	0.0
<b>Actual Volunteer</b>	12.0	0.0	0.0	0.0

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

Extension		Research	
Smith-Lever 3b & 3c	1890 Extension	Hatch	Evans-Allen
802969	261363	482889	0
1862 Matching	1890 Matching	1862 Matching	1890 Matching
3426523	351363	4793004	0
1862 All Other	1890 All Other	1862 All Other	1890 All Other
200000	0	85558	0

**V(D). Planned Program (Activity)**

**1. Brief description of the Activity**

The Master Beef Producer Program was led by a team of UT 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. The Master Beef Producer Program:

1. Included a series of 12 educational sessions that focused on cow-calf production and issues facing the beef industry. These were conducted at various off-campus locations accessible to Tennessee beef producers. These sessions included hands-on demonstrations, mini-lectures, discussions, question and answer sessions, etc.
2. Enhanced the profitability and competitiveness of cow-calf operations by providing essential, technical information.
3. Provided participants with a beef production reference manual that covers in detail the educational information presented in the sessions.
4. Allowed producers to interact with trained facilitators and encourage sharing of ideas with other producers.

The **Animal Systems** planned program was redirected in two ways. First, the new **UT Beef and Forage Center** provided an integrated approach to research and Extension programming. In FY 2014, the Center placed emphasis on forage analysis and a new integrated beef calendar to help producers improve herd health and management. Second, the **Advanced Master Beef Producer** education program was launched to continue the impact of the original Tennessee Master Beef Producer series (in which 12,000 producers participated). The goal of the new program is to provide the education and outreach needed for an even more productive Tennessee beef industry by improving a producers' profitability, position in the industry, and to be competitive with other states.

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.

UT AgResearch conducts 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 by UT AgResearch throughout the insect season; suspected vectors are tested for appropriate viruses. Risk factor analysis test results are compared between sites where disease risk is high vs. those where disease risk is low. Mastitis susceptible and resistant dairy cows are used to identify potential genes, immune components, and other factors associated with and responsible for mastitis resistance. A series of trials uses pigs to test various feeding regimens and feed additives to determine effects on the number of antibiotic resistant foodborne pathogens occurring in those animals and their environment. Additional studies are detecting the prevalence of antibiotic resistant bacteria associated with cattle and surrounding environments. These studies should help determine strategies to limit such foodborne risks.

## **2. Brief description of the target audience**

Producers, veterinarians, and others associated with the animal industry were targeted for this planned program. Tennessee cattle producers are primarily cow-calf operators. All of the state's cow-calf operators composed the target audience for this planned program.

## **3. How was eXtension used?**

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

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

Tennessee Extension professionals shared program implementation strategies, outcome

measurement, and evaluation protocols with their CoP colleagues.

**V(E). Planned Program (Outputs)**

**1. Standard output measures**

2014	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
<b>Actual</b>	490797	5098892	73477	0

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

**Patent Applications Submitted**

Year: 2014

Actual: 1

**Patents listed**

Antibody for skewing sex ratio and methods of use thereof. Edwards, J.L. L.A. Rispoli and F.N. Schrick.

**3. Publications (Standard General Output Measure)**

**Number of Peer Reviewed Publications**

2014	Extension	Research	Total
<b>Actual</b>	4	57	61

**V(F). State Defined Outputs**

**Output Target**

**Output #1**

**Output Measure**

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

Year	Actual
2014	81

**Output #2**

**Output Measure**

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

<b>Year</b>	<b>Actual</b>
2014	185495

**Output #3**

**Output Measure**

- Tall fescue toxicosis can reduce weight gain, and fertility on beef cattle. The ability to identify genetically resistant cattle could have great impact on the profitability of the beef industry in the Southeastern United States. (Kojima)  
Not reporting on this Output for this Annual Report

**Output #4**

**Output Measure**

- Number of Tennessee beef producers taught by Extension agents and specialists through farm visits.

<b>Year</b>	<b>Actual</b>
2014	8827

**Output #5**

**Output Measure**

- Excitable cattle exhibit behavioral and physiological alterations that can adversely affect health and performance as well as endanger producers. We developed novel methods of measuring these alterations in performance tested bulls (Kattesh).

<b>Year</b>	<b>Actual</b>
2014	0

**Output #6**

**Output Measure**

- Gauged voluntary afforestation and prescribed grazing to reduce cattle GHG emissions (Clark, Jensen, Lambert, Yu).

<b>Year</b>	<b>Actual</b>
2014	0

**Output #7**

**Output Measure**

- Solidified the concept that fatty acid oxidation in adipose tissue can be manipulated in poultry by modifying the diet (Voy).

<b>Year</b>	<b>Actual</b>
2014	0

**Output #8**

**Output Measure**

- Identified and characterized novel sperm biomarkers for reproductive efficiency in cattle (Rispoli).

<b>Year</b>	<b>Actual</b>
2014	0

**Output #9**

**Output Measure**

- Evaluated consumer willingness to pay a premium for beef products that are USDA Angus certified, locally produced, DNA traceable, produced with lower carbon emissions, and from humanely-raised cattle (Clark, Jensen, Lambert).

<b>Year</b>	<b>Actual</b>
2014	0

**V(G). State Defined Outcomes**

**V. State Defined Outcomes Table of Content**

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

## **Outcome #1**

### **1. Outcome Measures**

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

### **2. Associated Institution Types**

- 1862 Extension

### **3a. Outcome Type:**

Change in Condition Outcome Measure

### **3b. Quantitative Outcome**

<b>Year</b>	<b>Actual</b>
2014	10

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

**Issue (Who cares and Why)**

**What has been done**

**Results**

### **4. Associated Knowledge Areas**

<b>KA Code</b>	<b>Knowledge Area</b>
307	Animal Management Systems

## **Outcome #2**

### **1. Outcome Measures**

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

### **2. Associated Institution Types**

- 1862 Extension
- 1890 Extension

**3a. Outcome Type:**

Change in Action Outcome Measure

**3b. Quantitative Outcome**

Year	Actual
2014	4068

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

**Issue (Who cares and Why)**

**What has been done**

**Results**

**4. Associated Knowledge Areas**

KA Code	Knowledge Area
303	Genetic Improvement of Animals

**Outcome #3**

**1. Outcome Measures**

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

**2. Associated Institution Types**

- 1862 Extension

**3a. Outcome Type:**

Change in Condition Outcome Measure

**3b. Quantitative Outcome**

Year	Actual
2014	0

### 3c. Qualitative Outcome or Impact Statement

**Issue (Who cares and Why)**

{No Data Entered}

**What has been done**

{No Data Entered}

**Results**

{No Data Entered}

### 4. Associated Knowledge Areas

KA Code	Knowledge Area
307	Animal Management Systems

### Outcome #4

#### 1. Outcome Measures

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

#### 2. Associated Institution Types

- 1862 Extension
- 1890 Extension

#### 3a. Outcome Type:

Change in Action Outcome Measure

#### 3b. Quantitative Outcome

Year	Actual
2014	3018

### 3c. Qualitative Outcome or Impact Statement

**Issue (Who cares and Why)**

Challenges facing the beef cattle industry in Tennessee range from the adoption of very basic management practices to complicated global market drivers that affect input costs.

**What has been done**

Extension agents and specialists taught best management practices in beef cattle production at 2,026 group meetings, 2,498 on-site visits and 5,935 walk-in consultations in the local county office during 2014.

**Results**

Surveys, sales records, and interviews demonstrated these impacts:

\*3018 beef producers utilized improved marketing methods to market 109,783 head of calves to increase returns by \$548,915.

\*3,292 beef producers sold 94,811 calves managed according to BQA guidelines to increase returns by \$758,488.

**4. Associated Knowledge Areas**

<b>KA Code</b>	<b>Knowledge Area</b>
307	Animal Management Systems

**Outcome #5**

**1. Outcome Measures**

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

**2. Associated Institution Types**

- 1862 Extension
- 1890 Extension

**3a. Outcome Type:**

Change in Action Outcome Measure

**3b. Quantitative Outcome**

<b>Year</b>	<b>Actual</b>
2014	5715

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

**Issue (Who cares and Why)**

**What has been done**

**Results**

**4. Associated Knowledge Areas**

<b>KA Code</b>	<b>Knowledge Area</b>
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- 302 Nutrient Utilization in Animals
- 307 Animal Management Systems

### **Outcome #6**

#### **1. Outcome Measures**

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

#### **2. Associated Institution Types**

- 1862 Extension
- 1890 Extension

#### **3a. Outcome Type:**

Change in Knowledge Outcome Measure

#### **3b. Quantitative Outcome**

<b>Year</b>	<b>Actual</b>
2014	5715

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

**Issue (Who cares and Why)**

**What has been done**

**Results**

#### **4. Associated Knowledge Areas**

<b>KA Code</b>	<b>Knowledge Area</b>
307	Animal Management Systems

### **Outcome #7**

#### **1. Outcome Measures**

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

#### **2. Associated Institution Types**

- 1890 Extension

**3a. Outcome Type:**

Change in Action Outcome Measure

**3b. Quantitative Outcome**

<b>Year</b>	<b>Actual</b>
2014	204

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

**Issue (Who cares and Why)**

**What has been done**

**Results**

**4. Associated Knowledge Areas**

<b>KA Code</b>	<b>Knowledge Area</b>
301	Reproductive Performance of Animals
302	Nutrient Utilization in Animals
303	Genetic Improvement of Animals
307	Animal Management Systems
311	Animal Diseases

**Outcome #8**

**1. Outcome Measures**

My efforts are also focusing on providing farmers with the opportunity to detect the onset of mastitis using behavioral changes. (Krawczel)

Not Reporting on this Outcome Measure

## **Outcome #9**

### **1. Outcome Measures**

Alternative Broiler House Heating Systems

### **2. Associated Institution Types**

- 1862 Extension
- 1862 Research

### **3a. Outcome Type:**

Change in Knowledge Outcome Measure

### **3b. Quantitative Outcome**

<b>Year</b>	<b>Actual</b>
2014	0

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

#### **Issue (Who cares and Why)**

We seek to reduce production, and hence retail, cost and improve farm profitability.

#### **What has been done**

The University of Tennessee has in the past three years become a leader in the applied research effort to establish the cost effectiveness and environmental and production impacts of alternative heating systems for broiler production houses.

#### **Results**

Large, national, scope, applied research projects have been placed on two Tennessee broiler farms.

### **4. Associated Knowledge Areas**

<b>KA Code</b>	<b>Knowledge Area</b>
307	Animal Management Systems
315	Animal Welfare/Well-Being and Protection
402	Engineering Systems and Equipment

## **V(H). Planned Program (External Factors)**

### **External factors which affected outcomes**

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

### **Brief Explanation**

The financial impact of Extension beef programming fluctuates from year-to-year depending on several factors including commodity prices, input costs, and land value. However, these programs continue to enhance the lives and livelihood of Tennessee beef cattle producers.

## **V(I). Planned Program (Evaluation Studies)**

### **Evaluation Results**

- Extension agents emphasized quality assurance, reproductive management, nutrition, and marketing with Tennessee beef producers 2014, increasing returns by \$10 million. Program impact highlights included:
  - 2,499 beef producers stored 400,836 large, round bales under some type of cover to increase returns by \$2,405,016.
  - 2,559 beef producers utilized hay feeding rings to feed 182,088 bales and improved feeding methods to reduce wastage/spoilage, saving \$910,440.
  - Tennessee horse owners depend on Extension's research-based programs for horse health and nutrition. Extension taught rotational grazing to increase forage production, vaccinations, dental care, and correct deworming practices. These practices helped 205 horse owners, owning more than 1,000 horses, to save a combined \$1.3 million.

### **Key Items of Evaluation**

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