

**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
301	Reproductive Performance of Animals	15%	15%	20%	
302	Nutrient Utilization in Animals	0%	0%	7%	
303	Genetic Improvement of Animals	10%	10%	0%	
304	Animal Genome	0%	0%	6%	
305	Animal Physiological Processes	0%	0%	7%	
306	Environmental Stress in Animals	0%	0%	8%	
307	Animal Management Systems	60%	60%	10%	
311	Animal Diseases	15%	15%	31%	
315	Animal Welfare/Well-Being and Protection	0%	0%	2%	
402	Engineering Systems and Equipment	0%	0%	4%	
712	Protect Food from Contamination by Pathogenic Microorganisms, Parasites, and Naturally Occurring Toxins	0%	0%	2%	
722	Zoonotic Diseases and Parasites Affecting Humans	0%	0%	3%	
	<b>Total</b>	100%	100%	100%	

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

1. Actual amount of FTE/SYs expended this Program

Year: 2012	Extension		Research	
	1862	1890	1862	1890
Plan	37.0	3.5	0.0	0.0
Actual Paid Professional	41.0	5.0	21.3	0.0
Actual Volunteer	2.0	0.2	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
885291	252165	540562	0
1862 Matching	1890 Matching	1862 Matching	1890 Matching
3122242	252165	4051511	0
1862 All Other	1890 All Other	1862 All Other	1890 All Other
200000	0	316661	0

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

### 1. Brief description of the Activity

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

- 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.
- Enhanced the profitability and competitiveness of cow-calf operations by providing essential, technical information.
- Provided participants with a beef production reference manual.
- Allowed producers to interact with trained facilitators and encourage sharing of ideas with other producers.

Goats are an environmentally adaptive species of livestock, extremely opportunistic and afford the small limited resource landowner(s) an alternative enterprise. The goat provides food security, high quality protein (for human nutrition), biological land enhancement and many 'value-added' products to increase revenue generated on a holistically sustainable rural farm. With the decrease in planted tobacco acreage and income from this traditional crop, the production of goats becomes a natural alternative. Tennessee continues to rank second in meat goats in the U.S. 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 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. Brief description of the target audience**

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

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

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

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

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

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

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

### **1. Standard output measures**

2012	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
<b>Actual</b>	260646	9405879	83328	0

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

**Patent Applications Submitted**

Year: 2012

Actual: 1

**Patents listed**

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

**Number of Peer Reviewed Publications**

2012	Extension	Research	Total
<b>Actual</b>	4	30	0

**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
2012	1689

**Output #2**

**Output Measure**

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

Year	Actual
2012	428460

**Output #3**

**Output Measure**

- The new ELISA test was shown to be effective in diagnosis of bovine tuberculosis. (Eda)

<b>Year</b>	<b>Actual</b>
2012	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	Improved Test and Device for Johne's Disease (Eda)
9	Non-Antibiotic Strategy for Dairy Cattle Mastitis (Almeida)

## **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
- 1890 Extension

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

Change in Condition Outcome Measure

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

<b>Year</b>	<b>Actual</b>
2012	40

### **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. Nutritional, reproductive, genetic and health management are the general areas that impact profitability most.

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

Extension agents and specialists taught best management practices in beef cattle production at 4,869 group meetings, 2,808 on-site visits and 3,326 walk-in consultations in the local county office. These direct methods were reinforced by 22,850 newspaper articles, 62 radio programs and 15 television programs.

#### **Results**

\*12095 beef producers sold 294,492 calves managed according to BQA guidelines to increase returns by \$2,355,936.

\*8085 beef producers stored 1127721 large, round bales under some type of cover to increase returns by \$6,766,326.

\*6891 beef producers utilized bulls with greater genetic potential to produce 179,914 head of calves to increase returns by \$4,857,678.

\*9509 beef producers utilized hay feeding rings to feed 923,626 bales and improved feeding methods to reduce wastage/spoilage, saving \$4,618,130.

\*6218 beef producers utilized improved marketing methods to market 225,923 head of calves to increase returns by \$1,129,615.

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

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<b>KA Code</b>	<b>Knowledge Area</b>
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- 303 Genetic Improvement of Animals
- 307 Animal Management Systems

**Outcome #2**

**1. Outcome Measures**

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

**2. Associated Institution Types**

- 1862 Extension
- 1890 Extension

**3a. Outcome Type:**

Change in Action Outcome Measure

**3b. Quantitative Outcome**

Year	Actual
2012	6891

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

**Issue (Who cares and Why)**

**What has been done**

**Results**

**4. Associated Knowledge Areas**

KA Code	Knowledge Area
303	Genetic Improvement of Animals

**Outcome #3**

**1. Outcome Measures**

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

Not Reporting on this Outcome Measure

**Outcome #4**

**1. Outcome Measures**

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

**2. Associated Institution Types**

- 1862 Extension
- 1890 Extension

**3a. Outcome Type:**

Change in Action Outcome Measure

**3b. Quantitative Outcome**

<b>Year</b>	<b>Actual</b>
2012	6218

**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 #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>
2012	6514

**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>
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>
2012	294492

**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>
2012	590

**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**

Improved Test and Device for Johne's Disease (Eda)

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

- 1862 Research

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

Change in Action Outcome Measure

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

<b>Year</b>	<b>Actual</b>
2012	0

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

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

Despite the significant economic impact and high prevalence of Johne's disease in cattle, there is no practical vaccine or chemotherapeutics for control and/or ultimate eradication of the disease.

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

We developed a new diagnostic test, named EVELISA test, which showed much higher sensitivity (approximately 90%) compared to that of current ELISA tests. Further, we are developing on-site (in-field, bed-side) diagnostic device for Johne's disease and other diseases.

#### **Results**

Our new tests are likely to have positive impacts on control of infectious diseases in animals and humans.

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

<b>KA Code</b>	<b>Knowledge Area</b>
311	Animal Diseases
722	Zoonotic Diseases and Parasites Affecting Humans

**Outcome #9**

**1. Outcome Measures**

Non-Antibiotic Strategy for Dairy Cattle Mastitis (Almeida)

**2. Associated Institution Types**

- 1862 Research

**3a. Outcome Type:**

Change in Knowledge Outcome Measure

**3b. Quantitative Outcome**

Year	Actual
2012	0

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

**Issue (Who cares and Why)**

The goal of this research is to develop technology to prevent or reduce the severity and economic impact of mastitis which will help increase production and profitability of dairy farms and ensure an ample supply of safe and nutritious dairy products for consumers throughout the world.

**What has been done**

The research was directed to the identification of virulence factors utilized by *S. uberis* to infect bovine mammary epithelial cells. Such virulence factors often are excellent candidates for elaboration of vaccines.

**Results**

Results from these studies will prove the efficacy of SUAM vaccine and novel data on the bovine mammary immune system that will fuel future research projects and grant applications.

**4. Associated Knowledge Areas**

KA Code	Knowledge Area
307	Animal Management Systems
311	Animal Diseases

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

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

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

### **Brief Explanation**

In FY 2012, state appropriations in Tennessee were reduced across the board for all public agencies. For UT Extension, this was a \$2.5 million reduction from FY 2011 to FY 2012 in operating expenditures. Both UT and TSU Extension made programmatic changes to accommodate reductions. These changes included limiting postage, travel and printing.

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

### **Evaluation Results**

#### **Better Beef Marketing in Tennessee**

In FY 2012, UT Extension entered the seventh year of its evaluation of Tennessee feeder cattle marketing. Feeder cattle buyers prefer to purchase truckload lots of cattle that are similar in age, size, weight, and color, and they are willing to pay premiums to producers who participate in cooperative marketing ventures to assemble cattle to meet their needs. Extension agents and specialists helped beef cattle producers to market feeder cattle through cooperative marketing arrangements, including alliances, graded feeder calf sales, and age and source verification programs. Experts estimate farmers earned an average of \$8 per head more by managing cattle according to Extension's beef quality assurance program and \$25 per head by selecting bulls based on genetic potential. As a result of these FY 2012 programs, farmers realized \$7.2 million in additional sales revenue.

### **Key Items of Evaluation**

#### **Better Beef Marketing in Tennessee**

In FY 2012, UT Extension entered the seventh year of its evaluation of Tennessee feeder cattle marketing. Feeder cattle buyers prefer to purchase truckload lots of cattle that are similar in age, size, weight, and color, and they are willing to pay premiums to producers who participate in cooperative marketing ventures to assemble cattle to meet their needs. Extension agents and specialists helped beef cattle producers to market feeder cattle through cooperative marketing arrangements, including alliances, graded feeder calf sales, and age and source verification programs. Experts estimate farmers earned an average of \$8 per head more by managing cattle according to Extension's beef quality assurance program and \$25 per head by selecting bulls based on genetic potential. As a result of these FY 2012 programs, farmers realized \$7.2 million in additional sales revenue.