V(A). Planned Program (Summary)

Program # 10

1. Name of the Planned Program

Global Food Security and Hunger

☑ 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
205	Plant Management Systems	50%	0%	0%	
211	Insects, Mites, and Other Arthropods Affecting Plants	5%	0%	0%	
212	Pathogens and Nematodes Affecting Plants	5%	0%	0%	
213	Weeds Affecting Plants	0%	5%	0%	
216	Integrated Pest Management Systems	0%	10%	0%	
307	Animal Management Systems	0%	35%	0%	
601	Economics of Agricultural Production and Farm Management	40%	50%	0%	
	Total	100%	100%	0%	

V(C). Planned Program (Inputs)

1. Actual amount of FTE/SYs expended this Program

Year: 2013	Extension		Research	
	1862	1890	1862	1890
Plan	23.0	2.0	101.0	0.0
Actual Paid Professional	23.0	3.1	0.0	0.0
Actual Volunteer	7.0	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**
400084	129261	0	0
1862 Matching	**1890 Matching**	**1862 Matching**	**1890 Matching**
1833531	129261	0	0
1862 All Other	**1890 All Other**	**1862 All Other**	**1890 All Other**
49992	0	0	0

V(D). Planned Program (Activity)

1. Brief description of the Activity

Various needs assessments conducted by Extension specialists have shown 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.

Note: all UT Agresearch inputs, funding, and reporting for this planned program have been re-allocated to "Agronomic Crops" and "Animal Systems".

2. Brief description of the target audience

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

3. How was eXtension used?

The Global Food Security and Hunger planned program was enhanced through the service of:

- four Tennessee Extension personnel on the "Bee Health" CoP, including the CoP Leader;
- two Tennessee Extension personnel on the "Corn and Soybean" CoP;
- one Tennessee Extension personnel on the "eOrganic" CoP; and
- three Tennessee Extension personnel on the "Grapes" 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

2013	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Actual	46028	4508845	853	0

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

Patent Applications Submitted

Year: 2013

Actual: 0

Patents listed

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

2013	Extension	Research	Total
Actual	5	0	5

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

- Number of exhibits displayed to educate producers.

Year	Actual
2013	39

Output #2

Output Measure

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

Year	Actual
2013	45784

Output #3

Output Measure

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

Output #4

Output Measure

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

Output #5

Output Measure

- Develop avenues to protect Tennessee forests from attack by the sudden oak death pathogen Phytophthora ramorum. (Lamour)
  Not reporting on this Output for this Annual Report

Output #6

Output Measure

- Identify virulence factors utilized by S. uberis to infect bovine mammary epithelial cells. (Oliver, Almeida, Prado, Luther)
  Not reporting on this Output for this Annual Report

Output #7

Output Measure

- Continue to exploit pesticides not only for their weed-killing potential, but also for their nutritional enhancement potential (Armel and Kopsell).
  Not reporting on this Output for this Annual Report

V(G). State Defined Outcomes

V. State Defined Outcomes Table of Content

O. No.	OUTCOME NAME
1	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).
8	Agronomic testing of corn, soybean, wheat, grain sorghum and oats, varieties tested. (Allen)
9	Target number of research laboratories using our reverse-genetic tool for Phytophthora gene function analysis (Lamour).
10	Production of a 'hand-held' diagnostic device for Johne's disease by merging our diagnostic method and microfluidic technology. (Eda)

Outcome #1

1. Outcome Measures

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

Not Reporting on this Outcome Measure

Outcome #2

1. Outcome Measures

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

2. Associated Institution Types

- 1862 Extension
- 1890 Extension

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2013	516

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done

Results

4. Associated Knowledge Areas

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

Outcome #3

1. Outcome Measures

Soybeans: Number of producers who learned soybean best management 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. Associated Institution Types

- 1862 Extension
- 1890 Extension

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2013	3756

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done

Results

4. Associated Knowledge Areas

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

Outcome #4

1. Outcome Measures

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

2. Associated Institution Types

- 1862 Extension
- 1890 Extension

3a. Outcome Type:

Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Actual
2013	8

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done

Results

4. Associated Knowledge Areas

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

Outcome #5

1. Outcome Measures

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

2. Associated Institution Types

- 1862 Extension
- 1890 Extension

3a. Outcome Type:

Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Actual
2013	8

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done

Results

4. Associated Knowledge Areas

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

Outcome #6

1. Outcome Measures

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

2. Associated Institution Types

- 1862 Extension
- 1890 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2013	1174

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done

Results

4. Associated Knowledge Areas

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

Outcome #7

1. Outcome Measures

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

2. Associated Institution Types

- 1862 Extension
- 1890 Extension

3a. Outcome Type:

Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Actual
2013	196

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Tennessee farmers produce about 2.85 million acres of oilseed, grain and cotton crops. UT Extension crop variety testing data is used extensively by 80% of these farmers to select the seed that they use to plant their crops.

What has been done
County Standardized Variety Trials were conducted on corn(52 hybrids), soybeans(72 varieties) and wheat(18 varieties) in large strip-trials on producers' farms in approximately 28 counties throughout Tennessee as well as 5 Kentucky counties. Data from all of these crop trials were compiled and published together on the variety trial website (http://varietytrials.tennessee.edu) and on http://UTCrops.com. Additionally, hard copies were distributed to farmers, extension agents, seed industry reps, consultants and other interested clientele.

Results
Results from the variety testing program have helped farmers increase yields by identifying the varieties that will perform best in their farming operations. In 2013, the higher yields resulted in approximately $196.8 million in additional income to Tennessee farmers.

4. Associated Knowledge Areas

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

Outcome #8

1. Outcome Measures

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

Not Reporting on this Outcome Measure

Outcome #9

1. Outcome Measures

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

Not Reporting on this Outcome Measure

Outcome #10

1. Outcome Measures

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

Not Reporting on this Outcome Measure

V(H). Planned Program (External Factors)

External factors which affected outcomes
- Natural Disasters (drought, weather extremes, etc.)
- Economy
- Public Policy changes
- Competing Programmatic Challenges

Brief Explanation

Challenges facing the row crops industry include understanding and adopting changes in technology, integrated pest management, sustainable agronomic practices and profitability. Corn was planted and harvested on more than 950,000 acres in Tennessee in 2013. The 2013 growing season was optimal in both temperature and rainfall for high corn yields and many growers reported some of the best yields ever in non-irrigated fields. The final state average yield was 156 bushels/acre (Jan 2014 USDA crops report). Corn prices were lower than in recent years due to the large U.S. crop with producers receiving less than $5.00 per bushel for their crop on average.

Soybeans were planted and harvested on more than 1.3 million acres in Tennessee in 2013. Moderate temperatures and above normal rainfall created good to excellent yields in most counties across the state and there was a final state average yield of 46 bushels/acre (Jan 2014 USDA crops report). Soybean prices were good and most producers received more than $12.00 per bushel for their crop. Projected cash receipts for soybeans in 2013 are more than 660 million dollars.

V(I). Planned Program (Evaluation Studies)

Evaluation Results

Crop Variety Trials, Pest Control, and Marketing

UT Extension crop variety testing data is used extensively by 80% of these farmers to select the seed that they use to plant their crops. Results from the variety testing program have helped farmers increase yields by identifying the varieties that will perform best in their farming operations. In 2013, the higher yields resulted in approximately $196.8 million in additional income to Tennessee farmers. Farmers reported $3.9 million in reduced pest control costs by following Extension recommendations for controlling insects, weeds, or plant diseases. Row crop producers increased returns by $3.6 million on 132,000 acres by using forward pricing market opportunities as compared to selling at harvest.

Key Items of Evaluation

Crop Variety Trials, Pest Control, and Marketing

UT Extension crop variety testing data is used extensively by 80% of these farmers to select the seed that they use to plant their crops. Results from the variety testing program have helped farmers increase yields by identifying the varieties that will perform best in their farming operations. In 2013, the higher yields resulted in approximately $196.8 million in additional income to Tennessee farmers. Farmers reported $3.9 million in reduced pest control costs by following Extension recommendations for controlling insects, weeds, or plant diseases. Row crop producers increased returns by $3.6 million on 132,000 acres by using forward pricing market opportunities as compared to selling at harvest.