

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%	50%	0%	
211	Insects, Mites, and Other Arthropods Affecting Plants	5%	5%	0%	
212	Pathogens and Nematodes Affecting Plants	5%	5%	0%	
601	Economics of Agricultural Production and Farm Management	40%	40%	0%	
	Total	100%	100%	0%	

V(C). Planned Program (Inputs)

1. Actual amount of FTE/SYs expended this Program

Year: 2012	Extension		Research	
	1862	1890	1862	1890
Plan	27.0	2.0	110.0	0.0
Actual Paid Professional	27.0	3.0	0.0	0.0
Actual Volunteer	4.0	0.6	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
590194	168110	0	0
1862 Matching	1890 Matching	1862 Matching	1890 Matching
2081495	168110	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

In 2012, Extension agents and specialists taught row crops producers the following:

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

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

2. Brief description of the target audience

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

3. How was eXtension used?

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

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

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

We were funded as part of a 21 member national USDA/NIA/CAP team from 17 institutions to reverse managed bee decline. As lead institution we formed, certified and maintained the eXtension Bee Health CoP with 38 leaders and 120 members from 37 states who provided 298 pages of content and used the YouTube Bee Health channel to provide 31 videos for stakeholders. In 2012 use of "Bee Health": eXtension website increased 17.4% to 182,761 page views. YouTube channel subscribers increased 49.4% to 1444, and YouTube views increased 54% to 394,510.

V(E). Planned Program (Outputs)

1. Standard output measures

2012	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Actual	92605	28941247	5602	0

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

Patent Applications Submitted

Year: 2012
 Actual: 0

Patents listed

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

2012	Extension	Research	Total
Actual	5	0	0

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

- Number of exhibits displayed to educate producers.

Year	Actual
2012	59

Output #2

Output Measure

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

Year	Actual
2012	96912

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

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, defoliant, 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)
11	Extension's Work Produces Significant Economic Impact for Corn, Soybeans, and Wheat Producers
12	Controlling Diseases of Fruit and Vegetable Crops in Tennessee

Outcome #1

1. Outcome Measures

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

2. Associated Institution Types

- 1862 Extension
- 1890 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2012	350

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 #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
2012	652

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
2012	861

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
2012	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
2012	10

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
2012	3825

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done

Results

4. Associated Knowledge Areas

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

Outcome #7

1. Outcome Measures

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

2. Associated Institution Types

- 1862 Extension
- 1890 Extension

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2012	170

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done

Results

4. Associated Knowledge Areas

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

Outcome #8

1. Outcome Measures

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

Not Reporting on this Outcome Measure

Outcome #9

1. Outcome Measures

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

Not Reporting on this Outcome Measure

Outcome #10

1. Outcome Measures

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

Outcome #11

1. Outcome Measures

Extension's Work Produces Significant Economic Impact for Corn, Soybeans, and Wheat Producers

2. Associated Institution Types

- 1862 Extension
- 1890 Extension

3a. Outcome Type:

Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Actual
2012	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Tennessee farmers use UT Extension information to make decisions about variety selection and crop management.

What has been done

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

Results from the variety testing program have helped farmers increase yields by identifying the varieties that will perform best in their farming operations. The higher yields have resulted in approximately \$170 million in additional income annually to Tennessee farmers. Farmers reported \$3.9 million in reduced pest control costs by following Extension recommendations for controlling insects, weeds, or plant diseases.

4. Associated Knowledge Areas

KA Code	Knowledge Area
205	Plant Management Systems

Outcome #12

1. Outcome Measures

Controlling Diseases of Fruit and Vegetable Crops in Tennessee

2. Associated Institution Types

- 1862 Extension
- 1890 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2012	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Diseases rob Tennessee fruit and vegetable growers of 5 to 10 percent of their crops, with the potential for much greater losses in any given year. There is a need to avoid disastrous losses that can threaten survival of some farms, while reducing the losses to diseases that recur on a regular basis.

What has been done

In 2012, UT and TSU Extension conducted 460 group meetings to educate producers on crop rotations, resistant varieties, how to choose the most appropriate spray materials, and how to implement IPM programs. Growers were alerted to possible impending outbreaks of certain diseases and made aware of the importance of remaining prepared at all times.

Results

Observations and personal interviews were used to determine the outcomes of the educational activities:

*166 fruit and/or vegetable producers adopted an integrated pest management approach to insect, mite and disease control.

*446 fruit and/or vegetable producers learned to identify pest insects, mites and diseases.

*148 fruit and vegetable producers adopted organic and/or sustainable production practices on their farm.

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

V(H). Planned Program (External Factors)

External factors which affected outcomes

- Natural Disasters (drought, weather extremes, etc.)
- Economy
- Appropriations changes

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 900,000 acres in Tennessee in 2012. Early season moisture deficits severely reduced yield potential in most counties across the state and there was a final state average yield of 85 bushels/acre (Jan 2013 USDA crops report). Corn prices were higher than normal with most producers receiving more than \$7.00 per bushel for their crop. Projected cash receipts for corn grain in 2012 are more than \$600 million.

V(I). Planned Program (Evaluation Studies)

Evaluation Results

The following results are from our statewide evaluation of Extension programs that support corn producers:

- Producers increased corn yield by 511,566 bushels/acre by selecting top yielding varieties on 1,113,006 acres of corn increasing their income by \$1,534,698.
- 269,646 acres of corn scouted by a producer or independent crop consultant to help make crop management decisions.
- 87,594 acres of corn scouted by a UT-trained scout to help make crop management decisions.
- 3640 corn producers adopted UT recommended resistance management strategies to control pests (weeds, insects, diseases).
- 959 corn producers increased their knowledge of recommended agronomic practices

and understanding of their benefits and use.

- 373 corn producers report a \$381,586 reduction in pest control costs by following recommended control strategies for insects, weeds or plant diseases.
- 3879 corn producers used data provided by UT publications or UT Internet resources and made changes in their production practices.

Key Items of Evaluation

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- 959 corn producers increased their knowledge of recommended agronomic practices and understanding of their benefits and use.
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