

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

**Program # 3**

**1. Name of the Planned Program**

Integrated Crop Management Systems - 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
102	Soil, Plant, Water, Nutrient Relationships	15%			
104	Protect Soil from Harmful Effects of Natural Elements	10%			
205	Plant Management Systems	40%			
216	Integrated Pest Management Systems	25%			
405	Drainage and Irrigation Systems and Facilities	5%			
512	Quality Maintenance in Storing and Marketing Non-Food Products	5%			
	<b>Total</b>	100%			

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

1. Actual amount of FTE/SYs expended this Program

Year: 2012	Extension		Research	
	1862	1890	1862	1890
Plan	21.0	0.0	0.0	0.0
Actual Paid Professional	20.0	0.0	0.0	0.0
Actual Volunteer	0.0	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
806389	0	0	0
1862 Matching	1890 Matching	1862 Matching	1890 Matching
713908	0	0	0
1862 All Other	1890 All Other	1862 All Other	1890 All Other
0	0	0	0

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

**1. Brief description of the Activity**

Campus-based and region-based faculty members will conduct several regional workshops and short courses in partnership with commodity groups and private industry. Venues include commodity district meetings, soil and crop conferences, regional short courses, field days, and on-line and demonstration projects.

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

The primary target audiences are crop producers and their advisers and private and commercial pesticide applicators. Programs will be developed for crop producers with a diversity of farm sizes, crops produced, and land resource bases. Crop advisers and service providers are important targets because of their extensive contact with crop and livestock producers, which makes them ideal intermediates in passing on University of Missouri Extension programming to a wider range of producers than could be reached by Extension personnel alone. Because the future of Missouri agriculture depends on young professionals replacing retiring farmers and personnel, youth organizations such as FFA, 4-H, Young Farmers, and their teachers will receive specially designed programs.

**3. How was eXtension used?**

eXtension was not used in this program

**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>	6510	28096	540	5574

**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	8	0	0

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

**Output Target**

**Output #1**

**Output Measure**

- Provide in-service training session(s) for regional Extension specialists on an annual basis.

Year	Actual
2012	4

**Output #2**

**Output Measure**

- Develop or revise guide sheets annually for regional Extension specialists to use in producer meetings.

Year	Actual
2012	10

**Output #3**

**Output Measure**

- Develop or revise manuals on an annual basis for regional Extension specialists to use in producer meetings.

Year	Actual
2012	1

**Output #4**

**Output Measure**

- Print and electronic newsletters devoted to pest and crop management will be developed and distributed to regional specialists and other clientele.

Year	Actual
2012	40

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

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

O. No.	OUTCOME NAME
1	Producers and crop advisors improve their knowledge related to crop management practices and systems such as new cultivars, pest control, IPM, irrigation and new practices.
2	50% of Missouri producers and crop advisors will indicate they have increased knowledge and plan to adopt at least one IPM strategy and/or system(s) into their operation.
3	Two thousand (2,000) private pesticide applicators will meet the legal need of certification by improving their knowledge of pesticides and their use.

## **Outcome #1**

### **1. Outcome Measures**

Producers and crop advisors improve their knowledge related to crop management practices and systems such as new cultivars, pest control, IPM, irrigation and new practices.

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

- 1862 Extension

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

Change in Knowledge Outcome Measure

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

<b>Year</b>	<b>Actual</b>
2012	7650

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

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

Income from crops represents more than 50% of all agricultural receipts in Missouri. As seen by recent food riots in other parts of the globe, net gains in crop productivity in the US are essential for continued economic development. In addition, use of traditional food crops for biofuel production places additional demands cropping systems. Our goal is to prevent hungry people worldwide by developing and promoting efficient crop management systems in Missouri.

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

Though a series of conferences, workshops, and meetings (more than 100 events statewide) we continue to train producers and advisors on efficient, responsible, and profitable crop production. Specific topics included fertilizer management, energy savings, disease management, herbicide injury, biofuels, resistant pests, pasture allocation, marketing, row-crop management practices, and weather information. The team of state and regional extension specialists collaborated in each of the regions to provide interactive presentations on the theme of "Crop Management Strategies in an Era of Uncertainty."

#### **Results**

The 200 crop advisers who attended the 2012 Crop Management Conference influence decisions on more than 9.5 million acres and will have an impact on production efficiency, economic development and environmental quality. The 7650 producers who attended regional events grow more than 14.9 million acres of corn, soybean, and pasture. Across all programs, attendees rated our educational content at 8.7 on a scale of 1 to 10. Many positive comments were returned on written evaluation forms pertaining to the use of audience response systems, interactive presentations, and hands-on demonstrations.

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

<b>KA Code</b>	<b>Knowledge Area</b>
102	Soil, Plant, Water, Nutrient Relationships
104	Protect Soil from Harmful Effects of Natural Elements
205	Plant Management Systems
405	Drainage and Irrigation Systems and Facilities
512	Quality Maintenance in Storing and Marketing Non-Food Products

## **Outcome #2**

### **1. Outcome Measures**

50% of Missouri producers and crop advisors will indicate they have increased knowledge and plan to adopt at least one IPM strategy and/or system(s) into their operation.

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

- 1862 Extension

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

Change in Action Outcome Measure

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

<b>Year</b>	<b>Actual</b>
2012	24000

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

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

Pests (weeds, insects, pathogens) cost Missouri's crop industry at least \$450 million annually. Integrated pest management (IPM) is a sustainable approach to managing insect, pathogen, and weed pests through a coordinated decision-making/action-taking process. The goal of IPM is mitigate pest damage while protecting human health, environmental quality, and economic viability.

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

The two fundamental parts of MU's IPM program are its pest monitoring network and its newsletters, Integrated Crop and Pest Management and Missouri Environment and Garden. With observation stations located throughout the state, the pest monitoring network follows 11 of the most destructive crop insects. Pest alerts are sent to subscribers as populations reach critical levels. In addition, weekly updates provide producers with proactive management options throughout the growing season. The newsletters (print, email, and web) provide in-depth educational materials on IPM to thousands of producers annually.

#### **Results**

Consistent with the goals of IPM, we have examined pesticide use per unit of food produced. Using this metric, we show that pesticide use has dropped 7% per unit of food produced since

2002. A phone survey of 3.0% of randomly selected Missouri rice farmers was conducted in 2011 to determine the percent of Missouri rice acres scouted by professionals. The acres of Missouri rice scouted by professionals had increased from 11% in 1996 to 40% in 2006 to 54% in 2011.

#### 4. Associated Knowledge Areas

KA Code	Knowledge Area
216	Integrated Pest Management Systems

#### Outcome #3

##### 1. Outcome Measures

Two thousand (2,000) private pesticide applicators will meet the legal need of certification by improving their knowledge of pesticides and their use.

##### 2. Associated Institution Types

- 1862 Extension

##### 3a. Outcome Type:

Change in Knowledge Outcome Measure

##### 3b. Quantitative Outcome

Year	Actual
2012	5600

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

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

Pesticide applicator training helps reduce the harmful effects of improper pesticide use. The University of Missouri Extension Pesticide Applicator Training Program provides educational outreach for individuals who wish to become licensed pesticide applicators. Licensed applicators must pass an exam and participate in continuing education courses on environmentally sound uses of pesticides.

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

The University of Missouri Extension Pesticide Applicator Training Program provides educational outreach for individuals who wish to become licensed pesticide applicators. Licensed applicators must pass an exam and participate in continuing education courses on environmentally sound uses of pesticides.

###### **Results**

In year 2012, the University of Missouri Pesticide Applicator Training Program provided more than 75 initial certification training or recertification training sessions for a total of 1967 commercial pesticide applicators and approximately 3850 private pesticide applicators. Commercial applicator training was delivered by a cadre of 12 University of Missouri State Extension specialists with assistance of personnel from the Missouri departments of Agriculture,

Conservation, Natural Resources, and Public Health. Private pesticide applicator training was delivered by either formal training sessions presented by 23 University of Missouri regional extension specialists or by applicators viewing a 2 hour and 15 minute training DVD at county extension centers. Clientele evaluations for the commercial training found 98% of those responding gave the program an excellent or good rating. Many comments were received and found the training program to be more focus, more relevant, or more enjoyable to those attended in the past. Private applicators were not surveyed in 2012, although a new assessment vehicle will be utilized for the 2012 training period. Certified commercial applicators are required to recertify every three years and private applicators every 5 years. As a direct result of MU Extension commercial applicator educational efforts, there were 17222 jobs retained, resulting in a conservative estimate of more than \$54.5 million dollars of economic impact.

#### 4. Associated Knowledge Areas

KA Code	Knowledge Area
216	Integrated Pest Management Systems

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

##### External factors which affected outcomes

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

##### Brief Explanation

The severe drought of 2012 was difficult for many farm families. From an reporting perspective, MU Extension was a sought-after resource for the best information in a difficult situation.

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

##### Evaluation Results

The wide range of climate and topography and the availability of irrigation water in the state results in a considerable diversity in the forages and crops produced - corn, rice, soybeans, wheat, cotton, horticulture crops... The Missouri Pesticide Use Act requires that anyone using restricted use pesticides, must be trained and certified. This past year, MU Extension faculty provided certification and recertification training for more than 3850 private and 1967 commercial pesticide applicators. A random sample survey of rice producers found that as a result of educational efforts by extension faculty, the acres scouted by professionals increased from 11% in 1996 to 54% in 2011. Educating producers about better irrigation management resulted in increased production valued at an estimated \$40 million last year. Crop advisers and managers that attended the 2011 Crop Management Conference, manage more than 9.5 million acres throughout the Midwest, were educated on current research findings related such topics as pest management, soil health, nutrient management, climate variability, land economics.

**Key Items of Evaluation**

Listed above