V(A). Planned Program (Summary)

Program # 6

1. Name of the Planned Program

Managing Forages for Profitable Animal Production - 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%			
307	Animal Management Systems	40%			
402	Engineering Systems and Equipment	10%			
	Total	100%			

V(C). Planned Program (Inputs)

1. Actual amount of FTE/SYs expended this Program

Year: 2014	Extension		Research	
	1862	1890	1862	1890
Plan	8.0	0.0	0.0	0.0
Actual Paid	14.0	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**
562113	0	0	0
1862 Matching	**1890 Matching**	**1862 Matching**	**1890 Matching**
514779	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

Extension specialists will use multiple delivery methods to reach the target audiences: on-line curriculum, regional grazing schools; core group meetings and "pasture walks"; winter feeding systems and summer pasture programs using demos, clinics, and tours, fescue toxicosis and management workshops; conferences; Ag. Lenders workshops, demonstration plots, grazing symposium field days at outlying research centers; websites, electronic guides; CDs with prepared presentations; in-service training (ISEs); news releases for the general public; and popular press articles.

2. Brief description of the target audience

The primary target audience includes Missouri forage and livestock producers. These are mainly producers of beef and dairy cattle, although the program does address forages for other livestock, such as sheep, goats and horses, and non-livestock forage producers, such as hay producers and wildlife conservationists. The program also targets industry and government, as it presents current science, technology and training to agricultural business and policymakers.

3. How was eXtension used?

eXtension was not used in this program

V(E). Planned Program (Outputs)

1. Standard output measures

2014	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Actual	2700	7200	300	650

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

Patent Applications Submitted

Year:	2014
Actual:	0

Patents listed

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

2014	Extension	Research	Total
Actual	4	8	14

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
2014	2

Output #2

Output Measure

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

Year	Actual
2014	4

Output #3

Output Measure

- Revise Missouri publication M168, Missouri Dairy Grazing Manual.

Year	Actual
2014	1

V(G). State Defined Outcomes

V. State Defined Outcomes Table of Content

O. No.	OUTCOME NAME
1	Nine hundred (900) producers will annually attend a management-intensive grazing (MiG) school.
2	Five thousand (5,000) Missouri producers will increase their awareness of stockpiling and summer pasture management for beef cattle.
3	Increase the number of dairy farms that adopt the Missouri Pasture-based model resulting in increased profitability.

Outcome #1

1. Outcome Measures

Nine hundred (900) producers will annually attend a management-intensive grazing (MiG) school.

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2014	1

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Management-intensive grazing is based on moving a herd of cattle from paddock to paddock, thereby intensifying the grazing pressure on a small area for a few days before allowing it to rest for several weeks. This practice results in more even distribution of manure, more legume persistence, and less application of commercial fertilizers. The benefit to producers is improved economic and environmental status of a livestock operation.

What has been done
In 2014, the University of Missouri teamed up with the Natural Resource Conservation Service to hold 23 multiday workshops for nearly 600 producers. Also, working with our industry partners, we developed a "tall fescue" alliance to help drive education efforts and increase adoption of the best management practices for dealing with tall fescue toxicosis. In 2014, we held four, day-long workshops on tall fescue toxicosis.

Results
Based on our previous evaluations, approximately 98% of the producers that attended the Grazing School will adopt various practices taught in these workshops, and half of these producers will receive cost-share funds to improve their fencing and watering facilities. The investments in pasture improvements as a result of this program in 2014 alone, and only on Missouri farms, are likely to exceed $7 million.

4. Associated Knowledge Areas

KA Code	Knowledge Area
205	Plant Management Systems

307 Animal Management Systems

Outcome #2

1. Outcome Measures

Five thousand (5,000) Missouri producers will increase their awareness of stockpiling and summer pasture management for beef cattle.

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2014	1

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Winter and midsummer feed accounts for about 70% of the cost of producing beef in the north-central United States. Beef producers have little control over output prices, so efforts to substantially improve profitability depend on finding new and innovative ways to reduce input costs, especially those for winter feed and summer pasture. Although the nature of systems-level research is complex, the program strategically attacks the problem from several angles.

What has been done
The curriculum for our winter feeding was expanded to reflect new research results on stockpiled tall fescue for fall calving cow-calf pairs, to the importance of retaining ownership of calves through the stocker phase and ways to cope with high feed prices. In addition, grazing wedge software was revised and refined to help beef producers plan and manage their pasture systems.

Results
More than 27,000 producers have adopted the techniques developed through this program. From 1998 to 2006, the percentage of producers using stockpiled tall fescue for winter feeding doubled, from 26% to more than 54%. The increased use of stockpiled tall fescue and better summer pasture management saved the state's beef producers nearly $80 million in 2014. Additionally, the programmatic efforts on retained ownership of fall-born calves through spring are being implemented on several farms in Missouri.

4. Associated Knowledge Areas

KA Code	Knowledge Area

205	Plant Management Systems
307	Animal Management Systems
402	Engineering Systems and Equipment

Outcome #3

1. Outcome Measures

Increase the number of dairy farms that adopt the Missouri Pasture-based model resulting in increased profitability.

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2014	1

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
There is strong interest in alternative systems of dairying that could lower costs of production. Analysis of data from dairy farms has clearly demonstrated that 55% of the variation in profit on a dairy operation relates to the cost of production and management, and the use of pasture systems has been shown to dramatically reduce the cost of production. A critical component of pasture utilization is weekly measurement and evaluation of paddocks if efficiency of the dairy is to improve.

What has been done
Three existing discussion groups met monthly in 2014, to discuss pasture-based dairy systems, forages and grazing management. In addition, a web-based grazing wedge calculator has been improved and made available for any user. An online pasture-based dairy course was refined and offered to both traditional students and beginning producers. The Missouri Dairy Grazing Manual was revised to include the latest research data and economic models.

Results
The monthly discussion groups have increased the knowledge and understanding of efficient use of pastures. When the project was initiated, about 30% of the total dry matter intake in these systems came from pasture, and now certain producers have been able to increase dry matter intake to 74%. The goal is to reach about 50%. Adoption of the grazing wedge has been a major factor in increasing pasture use. This tool, which also generates daily dry matter growth allows producers to make adjustments in sources of dry matter intake and not only increases efficiency,

but also affects economic returns by being able to achieve optimum, economical milk production. The dairy grazing conference had 267 attendees. The online course was conducted with about 20 students in spring 2014. Programs focused on KA Codes 205 (Plant Management Systems), 601 (Economics of Agricultural Production and Farm Management), and 307 (Animal Management Systems).

4. Associated Knowledge Areas

KA Code	Knowledge Area
205	Plant Management Systems
307	Animal Management Systems

V(H). Planned Program (External Factors)

External factors which affected outcomes

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

Brief Explanation

Input costs and prices received for product affect all agricultural enterprises, but environmental conditions can have particularly adverse effects on pasture-based systems. While conditions in 2014 were generally better than in previous years, localized droughts reduced grazing time by almost 40 days, reducing pasture intake by about 1,000 pounds of dry matter. This necessitated the purchase of forages at approximately $0.05 per pound of dry matter, compared with $0.025 per pound of dry matter pasture (excluding land costs), costing producers $35 per cow during this period. Conversely, this reduced profit by this amount, or $7,000 for the average herd of 200 cows.

V(I). Planned Program (Evaluation Studies)

Evaluation Results

Economic conditions in 2014, resulted in more Missouri livestock producers adopting some level of grazing. Producers implementing grazing experienced savings of about $1.00 per cow per day, with no impact on production. In most cases, production increased slightly. In addition, the University of Missouri pasture-based dairy team used data from the University of Missouri seasonal, pasture-based research dairy to develop forage system models that resulted in more in-take from pastures. Three operations adopted the model and significantly reduced the quantity of purchased feed. Based on discussions at workshops, several other operations will be changing their forage systems to better reflect the environmental conditions experienced in Missouri. This will significantly increase profitability and sustainability of these dairies. Research continues to refine the forage system model that is most efficient in the state.

Key Items of Evaluation

Data has consistently demonstrated that pasture-based dairy systems can produce milk for $1 to $2 less per hundred pounds of milk when compared with conventional dairy

operations and that they represent a viable system that can have major impacts on the state's economy. The development of the Missouri model for pasture-based systems has been adopted and adapted by several other southeastern states. Educational efforts in Missouri have significantly increased investments in these systems statewide, over $100 million during the past five years. As experienced here, significant progress can be made in educating potential implementers when land grant universities are willing to invest in this system of dairying. University of Missouri administration has recognized the potential economic development to the state from pasture-based dairying and has been willing to invest in personnel and programming to some extent. But during tight budget conditions, the full potential of such programs may not be achievable. Enhanced collaboration among states in educational programs to demonstrate the economic viability, sustainability and profitability of pasture-based dairying will have a significant impact on state economies.