

V(A). Planned Program (Summary)

Program # 1

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
201	Plant Genome, Genetics, and Genetic Mechanisms	5%		10%	
205	Plant Management Systems	28%		14%	
216	Integrated Pest Management Systems	5%		10%	
307	Animal Management Systems	36%		19%	
311	Animal Diseases	0%		24%	
501	New and Improved Food Processing Technologies	2%		2%	
502	New and Improved Food Products	0%		1%	
511	New and Improved Non-Food Products and Processes	2%		1%	
601	Economics of Agricultural Production and Farm Management	19%		14%	
603	Market Economics	1%		0%	
606	International Trade and Development	0%		5%	
703	Nutrition Education and Behavior	1%		0%	
704	Nutrition and Hunger in the Population	1%		0%	
	Total	100%		100%	

V(C). Planned Program (Inputs)

1. Actual amount of FTE/SYs expended this Program

Year: 2013	Extension		Research	
	1862	1890	1862	1890
Plan	105.0	0.0	203.0	0.0
Actual Paid Professional	106.0	0.0	203.0	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
1572434	0	1963475	0
1862 Matching	1890 Matching	1862 Matching	1890 Matching
5627323	0	14944659	0
1862 All Other	1890 All Other	1862 All Other	1890 All Other
2461088	0	1851760	0

V(D). Planned Program (Activity)

1. Brief description of the Activity

Sustain Profitable Agricultural Production Systems--

- Develop animal and crop production systems that thrive in the variable conditions of the Great Plains.
- Develop horticulture, forestry, and alternative green enterprises that thrive in the variable conditions of the Great Plains.
- Advance new and improved systems of agricultural production to meet the need of producers and consumers.
- Enhance the value of agricultural products.

Ensure an Abundant Food Supply for All--

- Improve access to high quality foods, especially for consumers with limited resources.
- Increase food variety and value by developing new and enhanced food products.

2. Brief description of the target audience

Farm and ranch managers; agricultural producers and agribusinesses throughout the food industry supply chain with emphasis on producers who want to help themselves; people who influence producers and producer decisions, including educators (veterinarians, media, industry organizations, packers/purchasers); government agencies/ regulators; the lending industry; and policy makers.

3. How was eXtension used?

Our specialists helped create and review content for the eXtension.org website. One of our specialists is leading an update of the Beef eXtension website.

V(E). Planned Program (Outputs)

1. Standard output measures

2013	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Actual	29000	0	1300	0

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

Patent Applications Submitted

Year: 2013
 Actual: 5

Patents listed

Granule Swelling and Starch Saccharification; A Transgene Construct to Improve Fusarium Head Blight Resistance in Wheat and Barley; Transgenic Approach to Increase Seed Weight at Above Optimum Temperatures During the Grain Filling Period of Wheat; Resistance to Viruses that Infect Cereal Plants; Wheat - Triticum Aestivum, KS020319-7-3

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

2013	Extension	Research	Total
Actual	20	60	80

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

- Number of individuals participating in programs

Year	Actual
2013	20000

Output #2

Output Measure

- Number of new/improved varieties, inbreds, germplasm developed and released

Year	Actual
2013	2

Output #3

Output Measure

- Number of educational events (e.g., meetings, demonstrations, field days, press releases, and distributed publications) delivered

Year	Actual
2013	800

Output #4

Output Measure

- Number of producers engaged in one-on-one consultations through Kansas Farm Management Association or Farm Analyst programs
Not reporting on this Output for this Annual Report

Output #5

Output Measure

- Number of presentations at national and international conferences

Year	Actual
2013	220

Output #6

Output Measure

- Number of research papers cited above a threshold (10)--indicative of high impact

Year	Actual
2013	300

Output #7

Output Measure

- Number of research grants received in excess of \$50,000.

Year	Actual
2013	30

Output #8

Output Measure

- Number of soil samples evaluated on Kansas crop acreage
Not reporting on this Output for this Annual Report

Output #9

Output Measure

- Number of hours reported annually by Master Gardener volunteers

Year	Actual
2013	75791

V(G). State Defined Outcomes

V. State Defined Outcomes Table of Content

O. No.	OUTCOME NAME
1	Livestock producers demonstrate best management practices (BMPs) in regard to management and production, including genetic selection, reproduction, nutrition, health, animal care and well-being, livestock safety and quality, environmental management, and optimal marketing strategies (Measured by number of producers adopting BMPs)
2	Kansas farmers and ranchers increase awareness of financial performance (based on number members reported by farm management association)
3	Kansas farmers experience higher yields, more stable yields and/or a higher value of their crop as a result of plant breeders development of new varieties or germplasm (Measured by number of acres planted to KAES-developed materials or materials derived from KSU varieties, inbreds, or germplasm)
4	Kansas farmers increase crop acres using soil testing as a basis for nutrient applications (measured by reported crop acres)
5	Cow/calf producers lower cow feed supplement costs through use of BRaNDS software to make informed, cost-effective purchase decisions (measured by number of participating producers)
6	Improved sustainability of Kansas farms and ranches through membership in the Kansas Farm Management Association program and through assistance received through the K-State Farm Analyst program (Measured by number of members and number receiving assistance through KFMA and Farm Analyst program)
7	Public value communicated by Master Gardener volunteers (measured by number of hours and activities reported annually)
8	Increase food variety and value by developing new and enhanced food products (measured by number of new products developed)

Outcome #1

1. Outcome Measures

Livestock producers demonstrate best management practices (BMPs) in regard to management and production, including genetic selection, reproduction, nutrition, health, animal care and well-being, livestock safety and quality, environmental management, and optimal marketing strategies (Measured by number of producers adopting BMPs)

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Actual
2013	589

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Livestock producers are adjusting to a new reality. Feed, fuel, and other input costs are establishing new benchmarks after breaking through previous historical highs. In fall of 2012, 93% of the state was categorized as a severe or exceptional drought area and 70% of the state remained in those categories in early March, 2013. Forage supplies were extremely tight from prior year drought and feed costs were reaching record highs. Producers needed help dealing with poor quality and limited feed supplies, toxicity issues in forages, lack of water and/or poor water quality, and modification of grazing plans. The shortage of grain and protein sources impacted the swine and dairy industries similarly. These challenges continue to lead to consolidation in the livestock sector. As livestock producers continue to become more specialized, they increasingly rely on experts for answers to their questions as their personal knowledge level increases.

What has been done

The KSRE Livestock Program Focus Team held a drought retreat that included key personnel in related disciplines. Key issues were identified and working groups were developed around the topics of forages, economics, water and measures of last resort. Materials were developed and train the trainer meetings held. Numerous producer meetings across the state focused on drought-related issues such as providing safe and economical rations and maintaining range condition. K-state Research and Extension personnel tested forage samples for nitrate and nutrient quality analysis. A five-year research project was established to monitor range recovery.

We continued to conduct research with alternative feed ingredients for swine, dairy, and beef cattle. Results of these research and extension projects were distributed to producers through livestock magazines, popular press, meetings, you tube videos and through one-on-one

consultation. Extension specialists and local agents also worked with producers to incorporate alternative ingredients and with ammoniation strategies.

Results

For the approximately 600 beef producers surveyed at drought mitigation meetings indicated that early weaning, development of a drought management plan, and changes in stocking rates were tools that they had gained from our efforts that would be applied to their operation. When asked to estimate the economic impact of the information that they gained, 44% of the producers indicated that their bottom line would improve by between \$100 and \$1,000. Another 29% of producers indicated that their return would improve by \$1,000 to \$5,000 with 10% of producers in attendance indicating that they would increase profit by over \$5,000 due to implementing information gained at the meeting.

Producers made appropriate adjustments to feeding plans based on forage nitrate results (i.e., oat field not grazed, forage sorghum hay blended to safe level, sorghum stalks safe to graze). Toxic levels of nitrates were identified in 8% of forages tested and 6% were expected to cause abortions if not managed. As another example, a kit developed and available for check out in one Extension District enabled producers to improve the digestibility of over 1220 tons of low quality forage through ammoniation with an economic impact of \$61,000. Several of these kits were used across the state.

A video produced on the process of ammoniation of low quality forage that was posted on YouTube has allowed more than 1,800 individual viewers to learn about ammoniation. They learned that using anhydrous ammonia to treat low quality roughages increased crude protein content and dry matter digestibility of the forage to greatly increase the feeding value. Of those surveyed, over 70% indicated that they would use ammoniation to help lower feed cost.

4. Associated Knowledge Areas

KA Code	Knowledge Area
307	Animal Management Systems
601	Economics of Agricultural Production and Farm Management

Outcome #2

1. Outcome Measures

Kansas farmers and ranchers increase awareness of financial performance (based on number members reported by farm management association)

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Actual
2013	2332

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

The state of the economy, along with volatile commodity and input prices, make business planning in agriculture increasingly difficult and raises the stakes of each decision a producer must make. Having good information on which to base decisions is critical for producers to remain profitable and sustainable for the future. Education, training and assistance in keeping good records and in the appropriate methods to analyze and use those records will provide the needed knowledge to make informed decisions.

What has been done

2,332 Kansas Farm Management Association members represent 3,047 families in 101 of the 105 counties in Kansas. Additional producers (non-KFMA members) have also been reached through delivery of radio interviews, news articles, the KFMA Newsletter and other meetings. This membership represents over \$1.4 billion in value of farm production including over \$197 million in value of livestock production. The total acreage involved in production by these operations is over 5 million acres. The net income represented by these farms after expense is over \$352 million.

Results

Each of these KFMA members gained increased awareness of the financial performance of their farm operation and of Kansas agriculture. KFMA data was utilized for in class instruction of over 150 students in Department of Agricultural Economics coursed during 2013. KFMA data was utilized in numerous research and extension projects completed during 2013.

4. Associated Knowledge Areas

KA Code	Knowledge Area
601	Economics of Agricultural Production and Farm Management

Outcome #3

1. Outcome Measures

Kansas farmers experience higher yields, more stable yields and/or a higher value of their crop as a result of plant breeders development of new varieties or germplasm (Measured by number of acres planted to KAES-developed materials or materials derived from KSU varieties, inbreds, or germplasm)

2. Associated Institution Types

- 1862 Research

3a. Outcome Type:

Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Actual
2013	6750000

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Kansas Agricultural Experiment Station (KAES) develops new varieties and releases improved germplasm of wheat, soybeans, grain sorghum and canola. New varieties can benefit Kansas farmers directly and new germplasm gives other breeders, and ultimately farmers the advantage of KAES research.

What has been done

One new wheat variety and one new canola variety were released in the past year. New lines were increased to usable quantities in anticipation of release. Lines are screened for resistance to current and potential abiotic and biotic factors.

Results

KAES varieties and germplasm are used extensively by Kansas farmers either directly from a KAES developed variety or indirectly from enhanced germplasm in varieties or hybrids developed by other entities. A majority of the wheat acres in Kansas is planted with KAES varieties or varieties developed with KAES germplasm.

4. Associated Knowledge Areas

KA Code	Knowledge Area
201	Plant Genome, Genetics, and Genetic Mechanisms

Outcome #4

1. Outcome Measures

Kansas farmers increase crop acres using soil testing as a basis for nutrient applications (measured by reported crop acres)

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Actual
2013	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Fertilizer is a primary input for crop production.

Optimum yields require an adequate, balanced supply of nutrients; however, excessive nutrient levels increase the risk of groundwater and surface water contamination. Adequate nutrient management is essential for economical and environmentally sound crop production. Applied research and extension programs on soil fertility and nutrient management help achieve optimum crop production while minimizing the potentially negative environmental effects.

What has been done

K-State Research and Extension offered soil fertility schools in multiple counties during 2012 and 2013. The programs focused on the cost effective and environmentally sound use of fertilizers and by-products for crop production. Demonstration plots provided comparisons of traditional practice versus the use of sensors and slow-release nitrogen sources for improved nitrogen use efficiency. We distributed information through newsletter and magazine articles, publications, and press releases.

Results

Outcomes:

- * Improved nutrient use efficiency by increase in yields while minimizing environmental impact.
- * Increased number of producers implementing nutrient management plans.
- * Increase in the number of producers and acres involved in soil-testing programs.

4. Associated Knowledge Areas

KA Code	Knowledge Area
205	Plant Management Systems

Outcome #5

1. Outcome Measures

Cow/calf producers lower cow feed supplement costs through use of BRaNDS software to make informed, cost-effective purchase decisions (measured by number of participating producers)

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2013	480

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Beef producers have been facing continually rising feed costs, an increasing number of byproducts, and access to more nutritional information about their ingredients. The continued drought during 2013 further increased the need for tools to lower feed cost and spread feed resources. The challenge is for producers to consolidate this information into decisions on how to use the feed ingredients and knowledge to implement practical feeding programs that they can use on their farms and ranches. Feed cost represents 50 to 80% of the cost of production for livestock producers. Thus, tools to lower feed cost while meeting nutritional requirements have been needed.

What has been done

In a partnership with Iowa State University, we made BRANDS, a beef ration formulation package, available to all extension agents in Kansas with a livestock interest. Trainings were conducted to increase agent comfort level in using this tool to help beef producers lower their feed cost with prudent, effective supplementation programs and forage management systems. Specialists and agents worked one-on-one with local producers to use this program to lower feed cost. Several veterinarians also adopted BRANDS as a tool in their clinics and provided services to beef producers to lower their feed costs.

Results

BRANDS has been used with beef producers to lower their feed costs and to examine alternative ingredients. Brands was used to demonstrate the value of ammoniation of forages to increase their feeding value. Several producers were able to incorporate ammoniated wheat straw or ammoniated corn stalks into their feeding program to save \$1,600 to \$23,000 on feed costs. Other producers incorporated wet DDGS. Brands allowed some producers to determine that selling a portion of their cows was required to spread their home-raised forages through the

winter feeding period due to the drought. Some producers learned that their mineral supplement needed to be altered to meet the requirements of their cows for increased reproductive performance. BRANDS has provided a tool for agents, specialists, and veterinarians to make a direct financial impact on the businesses of beef producers.

4. Associated Knowledge Areas

KA Code	Knowledge Area
307	Animal Management Systems
601	Economics of Agricultural Production and Farm Management

Outcome #6

1. Outcome Measures

Improved sustainability of Kansas farms and ranches through membership in the Kansas Farm Management Association program and through assistance received through the K-State Farm Analyst program (Measured by number of members and number receiving assistance through KFMA and Farm Analyst program)

Not Reporting on this Outcome Measure

Outcome #7

1. Outcome Measures

Public value communicated by Master Gardener volunteers (measured by number of hours and activities reported annually)

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2013	75791

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Extension Master Gardeners are a vital part of K-State Research and Extension. Donating time in return for horticultural training, Extension Master Gardeners help Extension agents meet the need for horticultural information in their communities. The Master Gardener program is designed to provide trained volunteers to help meet that need at minimal cost.

What has been done

The means of providing this information is diverse including horticultural "hotlines," demonstration gardens, working garden shows, public presentations and providing tours. Extension Master Gardeners require continual education in best management practices, conservation of natural resources, waste management, integrated pest management, and identification and selection of proper plant materials for healthy people, plants, and the environment.

Results

Nine hundred ten Extension Master Gardeners donated almost 76,000 hours in 2013. The level of enthusiasm and commitment not only impacts our volunteer projects but often results in our EMGs influencing family, friends and neighbors to use proven horticultural practices. Homeowners sometimes over-fertilize and often misdiagnose problems in their landscape and garden resulting in overuse of unneeded or ineffective products. By providing timely, accurate information, our Master Gardeners influence our clientele to use less and more effective inputs resulting in better results and a savings of time and money. Using less fertilizers and pesticides also helps protect the environment.

4. Associated Knowledge Areas

KA Code	Knowledge Area
205	Plant Management Systems

Outcome #8

1. Outcome Measures

Increase food variety and value by developing new and enhanced food products (measured by number of new products developed)

2. Associated Institution Types

- 1862 Research

3a. Outcome Type:

Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Actual
2013	4

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Existing Kansas food companies and entrepreneurs have to keep an edge on the market by continuously developing new and innovative products.

What has been done

Technical and educational support has been provided in the areas of product development, food labeling, food safety and regulatory compliance.

Results

Hundreds of Kansas food products have been analyzed for safety and quality, with ingredient legends and Nutrition Facts panels produced. Four new products were developed from concept to commercialization.

4. Associated Knowledge Areas

KA Code	Knowledge Area
501	New and Improved Food Processing Technologies
502	New and Improved Food Products
603	Market Economics

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 Public priorities
- Competing Programmatic Challenges
- Other (Technological change)

Brief Explanation

{No Data Entered}

V(I). Planned Program (Evaluation Studies)

Evaluation Results

We used pre-planned surveys that were developed in conjunction with the Office of Educational Innovation and Evaluation. The surveys were given at the end of each educational program to determine the knowledge gained by the participants. We also used case study approach to report results from individual producers.

Key Items of Evaluation