2015 Kansas State University Combined Research and Extension Annual Report of Accomplishments and Results

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I. Report Overview

1. Executive Summary

K-State Research and Extension's statewide presence lends itself to collaborative efforts with organizations, private business and industry, local groups, state and federal organizations, and colleagues in other states. Great examples of such collaboration can be seen through the work of our Centers and Institutes. In addition to traditional one-on-one methods of communication, our faculty and staff use technology to deliver research-based programs to clients across the state and beyond, including web-based smart phone applications that help our audiences to have the information needed to make management decisions. In 2015, over 47,000 public presentations of all forms were provided as a means of delivering innovation, discovery, and knowledge on critical issues. Top-notch research facilities and quality faculty draw businesses and funding to K-State and to Kansas. Several high-profile projects are under way in the Biosecurity Research Institute, and infrastructure development for the National Bio and Agro-Defense Facility is in progress.

We continually evaluate our programs to ensure we are making the best use of our resources and reaching out to Kansas' citizens. We have many more tools because of technology, but the purpose has not changed to serve the wants, desires, needs, and dreams of Kansas' citizens. We have established valuable partnerships around the state, the nation, and the world. We accomplish our goals when we have positive impact on individuals, but our ultimate goal is achieved when we also provide social impact. We view new discoveries and engaging people we serve as benefiting both individuals and society.

Studies for Kansas have shown a long-term benefit-cost ratio of 33.6:1 for agricultural research and outreach education, yielding a 10.2 percent average annual return to productivity that can be directly correlated with a long term benefit of $5.5 billion to the state of Kansas.

The demographics of Kansas continue to change. K-State Research and Extension is successfully reaching out to both underserved and traditional audiences through new venues. To increase multicultural competency and sensitivity among our workforce, the COA/KSRE Diversity Programs Office promotes quarterly Navigating Difference training. This program brings systemic change and diversity to the KSRE team and provides cultural competency awareness and skills that they can practically apply in their day to day work.

An emerging and growing effort within KSRE is the Multicultural Undergraduate and Graduate Summer Research Fellowship. This program specifically targets under-represented populations of students to establish networking relationships back to their respective home institutions, as well as, faculty mentoring by KSRE. Although the undergraduate institutions of these students have not exclusively been from 1890 Land Grants, those institutions have heavily dominated the applicant pool to date. Other schools are 1994s, Hispanic serving institutions and historically Black Colleges and Universities. The KSRE fellow program places these students in a laboratory or field setting with a K-State Research and Extension scientist to work on a focused set of research goals that can be accomplished in the eight-week program. This program has a specific goal of growing the minority populations of students within graduate programs in the College of Agriculture and across other partner Colleges represented within K-State Research and Extension.

Hispanic youth and their families are actively participating in 4-H in Southwest Kansas. They are discovering the value of 4-H as an organization that empowers young people to learn new skills, build their confidence and grow into capable, responsible adults. The purpose of the project is to engage Hispanic

youth and their families, primarily in Southwest Kansas, in safe and active learning experiences that are grounded in positive youth development. The project is helping to establish new clubs in which the youth fully participate in 4-H and engage in relevant and age appropriate programming in science, health, citizenship, and leadership development. In addition, support and guidance is being provided to parents in helping their children set and achieve their goals and aspirations for the future. A new specialist position was added in the Department of 4-H Youth Development with a focus on reaching new youth and adult audiences.

Kansas 4-H has a long tradition of training leaders for the future. The Citizenship in Action program encourages teenagers to learn more about how government functions and how to actively participate in the legislative process. Also, the 4-H SET program focuses on preparing more youth who are proficient in science, engineering, and technology. Youth are learning skills in such areas as global positioning systems and computer interface.

Climate change and its influences on management decisions for agricultural systems in Kansas is a collaborative research initiative with partners like Wichita State University, University of Kansas, and the overall Global Research Alliance on Agricultural Greenhouse Gases. A project is underway to develop educational programs on climate-related information to rural Kansans.

FTEs have been adjusted with reduced numbers in extension positions. This occurs through elimination of positions through vacancies and realignment of specializations through formation of districts. Over the past decade, faculty positions supported through state and federal appropriations have declined by approximately 10% forcing our system to focus its priorities. At this time, 45 counties have formed 16 districts.

The extreme and continuing drought took a heavy toll on summer crops in most of Kansas. In addition to efforts to increase yields through plant breeding trials, K-State researchers have made other important contributions recently to grain sorghum profitability.

Sugarcane aphid, a new, serious pest affecting sorghum, erupted in at least 36 Kansas counties in 2015. Research demonstrates that if this pest is left uncontrolled, the aphid will cause 10 to 60 percent yield loss. Six targeted regional workshops in intense sorghum production areas were conducted to help farmers scout and manage the pest by focusing on best management practices to maximize efficacy in insecticide use. The affected area represents 50 percent of sorghum production for the state. Through learning at these workshops, management decisions likely reduced crop damage and subsequent yield loss resulting in a public benefit value estimated at **$38 million** in grain sorghum production in this one year. The value of federal capacity funding for the purpose of integrated pest management cannot be overstated in this example.

Herbicide-resistant sorghum technology will help with in-season grass control in sorghum; nitrogen fertilizer management research allows producers to reduce nitrogen use while maintaining yields; improved stalk quality will support the weight of higher yields; greater cold tolerance would allow sorghum producers to plant earlier and use longer season hybrids than they currently grow and increase yields. Research efforts through K-State's Great Plains Sorghum Improvement and Utilization Center help increase sorghum acreage in Kansas so producers can make better use of water and other valuable resources now and in the future.

We are effectively using our statewide network of offices to share research-based information related to the environment, families, communities, and production agriculture. We used input from external and internal groups to develop a strategic plan for K-State Research and Extension to begin addressing five grand challenges: global food systems, water, health, developing tomorrow's leaders, and community vitality. These challenges directly or indirectly affect all Kansans and we are not going to solve these challenges alone. By developing partnerships within Kansas, across the United States, and internationally, we are educating and working with the next generation of students, scientists, and extension educators. The new ideas and knowledge developed through research and shared by extension will be used to solve the five grand challenges. This plan will provide direction and closely align with the university's plan to be a Top 50 research institution by 2025.

Environmental stewardship remains a critical focus. In one example of our engaged work, poultry litter imported into Southeast Kansas from Arkansas, Missouri and Oklahoma has the potential to reduce the

fertilizer costs of crops and forage. Through K-State Research and Extension research-based educational programs, Southeast Kansas producers are increasingly viewing poultry litter as a favorable soil amendment for supplying phosphorus, potassium, micronutrients and organic matter. Utilizing poultry litter through research-verified management practices, Kansas farmers can accrue an annual savings of **$2 million** in farm nutrient input costs.

Congruently, Kansas citizens voiced concerns about potential environmental impacts (i.e. odor and water quality) from the utilization of poultry litter. A partnership between Kansas Farm Bureau, Kansas Department of Health and Environment, Kansas Department of Agriculture, Kansas Department of Commerce, USDA Natural Resources Conservation Service and K-State Research and Extension formed to identify best management practices for the storage and utilization of poultry litter to protect the air and water quality of Kansas. From 2013 - 2015, 10 demonstration-learning sites on improved temporary storage for environmental benefit were developed for farmer education.

K-State Research and Extension professionals worked to clarify the 2014 Farm bill information through meetings and one-on-one consultations to help some **23,732 landowners, farmers and ranchers** make research-based, informed decisions for their operation and for the economic strength of the communities in which they reside.

Total Actual Amount of professional FTEs/SYs for this State

Year: 2015	Extension		Research	
	1862	1890	1862	1890
Plan	422.0	0.0	266.0	0.0
Actual	388.0	0.0	292.0	0.0

II. Merit Review Process

1. The Merit Review Process that was Employed for this year

- Internal University Panel
- Combined External and Internal University Panel
- Expert Peer Review

2. Brief Explanation

All new and renewing K-State Research and Extension Action Plans/Projects undergo a review process coordinated locally at the department or unit level, with input, as needed or requested from the experiment station grants and contracts office. Department heads and unit leaders are given latitude to employ strategies for evaluation of new plans and projects for their scientific merit and their relevance to programmatic focus. Guidance is provided to unit heads and unit leaders regarding the process by which review may take place. Most employ on-campus reviewers; some use a combination of on and off-campus expert reviews; and a few choose to utilize completely external off-campus review. Usually, at least two model review outlines were made available for review of new and continuing projects. Department heads and unit leaders could utilize these review templates as written or add/modify elements of the review to fit unique nuances specific to their respective discipline or to accommodate special input from stakeholders. When reviews are complete, the Department Head or Unit Leader meets with the applicant(s) to discuss the reviews and identify necessary revisions. A final revised version of the proposal is reviewed by the Associate Director for Research and/or Extension, and approved as appropriate for final review by National Program Leaders at USDA/NIFA. This process ensures that action plans adequately and

appropriately address issues that make a positive difference in the lives of stakeholders. On a regular basis, as projects are conducted, investigators and team leaders meet with stakeholders from all sectors to validate the goals, objectives, and on-course progress of the program. This process does not change from year to year.

III. Stakeholder Input

1. Actions taken to seek stakeholder input that encouraged their participation

- Survey of traditional stakeholder groups
- Survey of selected individuals from the general public
- Other (Survey of underserved, minority groups)

Brief explanation.

K-State Research and Extension is rich with advisory panels, teams, councils, and committees through every discipline of research and extension work. In Kansas, local Cooperative Extension is organized with elected Program Development Committees (PDCs). Individuals throughout the community are targeted to seek election for their experience and interest broadly in needs and issues of agriculture, family, youth, and community. Six individuals are elected to each of the four committees in all counties across the state. This equates to roughly 2500 private citizens taking an active role as stakeholders in setting priorities for extension programming at the local level. Each year, the individuals involved in leadership activities of these local councils are invited to a one-day training and dialog event at four locations across Kansas. This all day meeting includes updates on their roles and responsibilities as stakeholders for the extension program.

In 2009, a system-wide survey was conducted to focus on issues of agreed importance for which K-State Research and Extension must focus. Stakeholders from all 105 counties in Kansas provided feedback and input into the prioritization process. The survey consisted of a series of seven strategic opportunities and several statements within each opportunity to describe the work plan focus. Stakeholders provided feedback on those statements as to their relative importance to Kansas. That process has resulted in areas of emphasis for our on-going research and extension plans. Every academic discipline and our outstate research and extension centers also operate with advisory groups. Those advisory groups are recruited through defined criteria to see that a broad set of interests and backgrounds are represented. Typically, advisories meet with administration and faculty once or twice annually to review progress on key initiatives and to gather input on future directions and priorities for the discipline or the center. No changes in 2015.

2(A). A brief statement of the process that was used by the recipient institution to identify individuals and groups stakeholders and to collect input from them

1. Method to identify individuals and groups

- Use Advisory Committees
- Use Surveys

Brief explanation.

Following are three examples of processes used to select advisories. First, the Director of K-State Research and Extension and Dean of the College of Agriculture has an advisory that is carefully selected through a nomination process. The individuals invited to serve are selected based upon the target audience represented, gender, race, ethnicity, and leadership. This group meets three times annually to review programs and provide advice to the Dean and Director on key initiatives to strengthen the programs in research, extension, and teaching. A second example is with the State Extension Advisory Council. This group is elected through their leadership on local Extension Boards. Individuals are approached and encouraged to accept nomination to the process.

Then their peers go through an election process to identify the representatives they wish to serve on this advisory. This advisory meets twice annually with the Extension director and the administrative team to identify priorities and opportunities to fulfill the mission. Additionally, the Associate Director for Research actively participates on stakeholder boards with direct contact to commodity groups within the state. For example, the Associate Director participates in the Kansas Wheat Alliance and the Kansas Wheat Research Foundation boards. This connection provides guidance to researchers developing varieties and studying problems key to Kansas' wheat production.

The Southwest Kansas Research and Extension Center (SWREC) located in Garden City, Kansas holds a meeting annually with their research advisory committee. The SWREC Advisory Committee is made up of one producer from each county in the Southwest Extension Area (essentially the SW quarter of Kansas) for a total of 24 members. This group is selected by their county extension committees. They serve 3 year terms which can be renewed as long as they are interested. This means one-third of the committee is up for reappointment each year. Besides the core committee, the following are invited to participate: each county agent; three commercial crop consultants; and any members of the corn, wheat, sorghum, soybean or sunflower commissions who reside within the southwest extension area.

The SWREC Advisory Committee meets one day annually, usually the first Thursday in January. In general, the morning session consists of brief presentations by station scientists, while the late morning and afternoon sessions consists of a series of break out sessions where attendees can interact with station scientists in a small group session to ask questions and share production challenges. The day concludes with attendees using a voting process to identify the highest priority targets for research. Without exception, the advisory attendees and station scientists reach consensus around ongoing production challenges. This process helps ensure that work at this branch station appropriately serves its local clientele.

In our family programming areas, Program Development Committee (PDC) members were asked to identify people to survey that reflected the demographics of their communities, based on age, gender, race/ethnicity and income. They were asked to identify people that were not familiar with Extension as well as those who were. Each PDC member was asked to deliver a survey to six individuals. Those surveyed were asked to rate on a 1 to 5 scale the need for selected topics within their community. Completed surveys were received from more than 2,000 people and the results are being used locally and at the state level to prioritize work for the next few years.

We provide all of our Extension agents and local Executive Boards with a web-based training tool on techniques for recruiting new Board and PDC members to ensure diversity of interests and experiences with new members.

2(B). A brief statement of the process that was used by the recipient institution to identify individuals and groups who are stakeholders and to collect input from them

1. Methods for collecting Stakeholder Input

- Meeting with traditional Stakeholder groups
- Survey of traditional Stakeholder individuals
- Survey specifically with non-traditional individuals
- Survey of selected individuals from the general public

Brief explanation.

Stakeholder input is a continuous process across the breadth of programming for research and extension educational programs in an effective grass-roots organization like K-State Research and Extension. Stakeholder input happens through local, regional, state, multi-state, and national input processes. The stakeholder input process is a comprehensive effort to seek focus on critical issues and problems needing research and answers that fit well within our defined mission priorities. This input continues throughout planning, project implementation, and program delivery. Specifically,

face-to-face meetings that include strategic planning, small group process, and reporting back to the recipient institution are commonly used. Nominal group processes are employed to assure hearing of all voices. With the State Extension Advisory Council, that group is given the task to seek input from others outside of the face-to-face meeting, and to bring that knowledge and experience to the meetings through their sharing of such input. In seeking specific input, we have employed telephone random survey processes to help us understand how well we market our information, education, and programs as an organization. This information goes into a strategic market planning process to help us to reach a broader clientele, especially minority and under-served audiences. We have stakeholder groups who focus on our non-traditional audiences and programming. Specifically, the Kansas Center for Sustainable Agriculture and Alternative Crops operates with an advisory council for the expressed purpose of providing input on projects and ideas across both research and extension. This group assists in identifying opportunities for directing seed grant funds to research and extension faculty to better reach nontraditional needs and audiences. The breadth of advisory groups giving input and sharing needs and ideas range from the traditional Dean's advisory council to advisories working through every academic department and research/extension center to every local Extension office. Within program areas, we have advisors made up of stakeholders in areas of family nutrition, meat science, food science, crop commodity groups, livestock commodity groups, agricultural bankers, and the list goes on. We estimate that at any given time K-State Research and Extension has formal relationships with more than 200 advisory stakeholder groups who provide continuous input and feedback on research and extension initiatives, priorities, and direction. No new processes were employed in 2015.

3. A statement of how the input will be considered

- To Identify Emerging Issues
- Redirect Extension Programs
- Redirect Research Programs
- In the Action Plans
- To Set Priorities

Brief explanation.

One example of how input shapes our research and extension programs is exemplified in our wheat breeding program. We maintain wheat variety development on both our main campus and at our Agriculture Research Center in Hays. Both of our faculty breeders have close contact and relationships with the Kansas Wheat Commission, the Kansas Association of Wheat Growers, seedsmen, milling and baking companies, etc. They continually receive input as to the direction of their breeding programs and the breeders listen and adjust accordingly. Moreover, wheat breeders continually are forward looking for the next disease or other challenge and seeking to genetic solutions to those unending challenges.

Budget priorities are established through input on creating or redirecting funds to a new position or program direction based in part upon discussions with stakeholder groups as we identify priorities they have that match with our funding opportunities. For example, grape and wine industry developments are small in Kansas. Yet, through discussions with that interest group, we have placed resources in a multi-state initiative to bring greater expertise and problem solving to the grape producers and wine makers in Kansas. In 2005, a strategic planning process for the Cooperative Extension mission of K-State Research and Extension was completed. The 34-member task force that worked to complete this process was carefully constructed to involve a balance of key leadership among our broad stakeholders and personnel within our faculty and agent ranks. The purpose of the strategic planning was to identify key principles that must be given attention to assure the future to a relevant, sustainable, quality Extension Service in Kansas. The process included three facilitated all day meetings and interim reports posted on our website to solicit further

external input. Focus was given to organizational structure and staffing, resource development, systems of education and information dissemination, and constituent development and marketing. The task force identified a series of recommendations. In 2006, the strategic planning recommendations were distributed widely within and outside the organization and planning and implementation processes developed to address key issues. Some of those issues include strengthening professional development, increasing program depth and focus of our local extension programs, moving forward on multi-county models of program delivery, multistate programming initiatives, and enhanced training for stakeholders in the advocacy process.

In 2007, that strategic planning process resulted in targeting $275,000 annually over three years toward enhanced professional development for our faculty in becoming more effective Extension professionals. A redesign of our employee resource website was undertaken to make it easier for our faculty and staff to organize and plan for their personal professional development. We targeted hires of Extension faculty who are multi-lingual and able to interact more directly with our Latino families. We organized a new Center for Engagement to bring the broader resources of the campus to the issues and needs of the people of Kansas. We streamlined our hiring process to refill positions in a shorter time frame while at the same time maintaining our high standards of affirmative action process. We brought faculty together to address critical emerging issues in energy, bio-security, immigration, rural development, and our aging populations in rural Kansas.

While significant budget reductions have resulted in loss of faculty and staff positions, we continue to use the priorities set forth in that strategic plan to provide guidance on communication, professional development, and structural reorganization to meet those goals, along with budget realities. No changes in 2015.

Brief Explanation of what you learned from your Stakeholders

Industry trends, entrepreneurial interests, gaps in knowledge and understanding, problems and pitfalls in adaptations of knowledge and technology, lack of information within a given commodity production or processing system are all common learning experiences for faculty and administration in our listening relationship with key stakeholders. In times of budgetary strain, stakeholders continue to emphasize the importance of local presence, attention to the long-term issues and problems of Kansas, and finding ways to improve our efficiency without sacrificing the effectiveness. The result has been in deeper discussions and development of multi-county Extension units, greater use of technology to deliver training, updates, and public education. We are dramatically increasing the use of computer-based educational delivery, while still finding ways to maintain the desires of interaction and connectedness to our clientele. An example has been in our listening to the interests and needs of the grape and wine producers in Kansas. While research and extension within Kansas State University does not have an investment of human resource to address the knowledge and technology needs of the grape producers, we have listened to their interests and needs and we are currently working out an agreement among Kansas State University, the University of Missouri, Kansas Department of Agriculture, and Kansas Department of Commerce to bring educational programs and support to that industry through a joint agreement where the University of Missouri has that expertise. We have similar discussions ongoing with the fruit growers and industry interests. No changes in 2015.

IV. Expenditure Summary

1. Total Actual Formula dollars Allocated (prepopulated from C-REEMS)			
Extension		Research	
Smith-Lever 3b & 3c	1890 Extension	Hatch	Evans-Allen
5626230	0	4387011	0

2. Totaled Actual dollars from Planned Programs Inputs				
	Extension		Research	
	Smith-Lever 3b & 3c	1890 Extension	Hatch	Evans-Allen
Actual Formula	3210448	0	5023949	0
Actual Matching	14371262	0	35592460	0
Actual All Other	20400510	0	6247229	0
Total Actual Expended	37982220	0	46863638	0

3. Amount of Above Actual Formula Dollars Expended which comes from Carryover funds from previous				
Carryover	0	0	0	0

V. Planned Program Table of Content

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: 2015	Extension		Research	
	1862	1890	1862	1890
Plan	98.0	0.0	131.0	0.0
Actual Paid	152.0	0.0	128.0	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**
1523925	0	2202329	0
1862 Matching	**1890 Matching**	**1862 Matching**	**1890 Matching**
6808891	0	15602172	0
1862 All Other	**1890 All Other**	**1862 All Other**	**1890 All Other**
5260489	0	2738449	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
- Policy makers

3. How was eXtension used?

eXtension was used as a source of information.

V(E). Planned Program (Outputs)

1. Standard output measures

2015	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Actual	50000	0	3500	0

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

Patent Applications Submitted

Year:	2015
Actual:	14

Patents listed

Probiotic Culture for Non-Ruminant Animals;Prodrugs of Bisulfite Adducts of Transition State Inhibitors of Serine and Cysteine Proteases: A General Strategy for Optimizing Physiochemical Properties and Pharmacokinetics; Griffin Winter Canola (KS4022; Discovery of a Novel Porcine Pestivirus in Pigs; High-throughput Fluorescent Screening Assay for Inhibitors of Gram-Negative Bacterial Iron Uptake; Discovery of a Novel Porcine Circovirus; Biobased Epoxy Monomers Composition, Synthesis Route, and Potential Applications; Multigenic Broad Spectrum Transgenic Resistance to Barley Yellow Dwarf Virus (BYDV) and Wheat Streak Mosaic Virus (WSMV) by RNA-Interference; Canola KSR07352S; Novel Vaccines for Porcine Epidemic Diarrhea Virus (PEDV) Infections; Hot Rod (KS061406LN~37) Wheat Variety; KanMark (KS030887K-6) Wheat Variety; Enterotoxigenic Escherichia Coli Vaccine Antigens; Attenuated Vaccines to Protect Vertebrate Animals and People Against Tick-Borne Ehrlichia Species Infections and the Discovery of a Novel Genomic Region Involved in Pathogenesis with Potential to Develop New Class of Drugs

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

2015	Extension	Research	Total
Actual	20	83	103

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

- Number of individuals participating in programs

Year	Actual
2015	28500

Output #2

Output Measure

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

Not reporting on this Output for this Annual Report

Output #3

Output Measure

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

Year	Actual
2015	850

Output #4

Output Measure

- Number of producers engaged in one-on-one consultations through Kansas Farm Management Association or Farm Analyst programs

Year	Actual
2015	2860

Output #5

Output Measure

- Number of presentations at national and international conferences

Year	Actual
2015	175

Output #6

Output Measure

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

Year	Actual
2015	225

Output #7

Output Measure

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

Year	Actual
2015	22

Output #8

Output Measure

- Number of soil samples evaluated on Kansas crop acreage

Year	Actual
2015	12000

Output #9

Output Measure

- Number of hours reported annually by Master Gardener volunteers

Year	Actual
2015	96763

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)
9	Improve access to high quality food, especially for consumers with limited resources (measured by improvement in food budgeting)
10	Kansas farmers adopt best management practices in crop production that results in increased profitability (measured by total dollar savings)

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 Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2015	1830

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Kansas livestock producers must continue to improve production efficiency to help meet global food demand in an economically and environmentally sustainable fashion. In the context of rising production costs, higher capital investment, and volatile markets, individual management choices have a larger financial impact and producers face greater risks. The profitability from 2014 encouraged swine and cow/calf producers to increase production through herd expansion. As commodity prices for crops have softened, positive returns in the cow/calf and swine sectors have softened which has financial impacts on rural communities. Lower profit margins increase the focus on controlling feed and other production costs.

What has been done
Forage supplies were much improved over previous drought years enabling cow/calf producers to retain more heifers and rebuild herds. Programs on heifer development and calving schools were delivered statewide. Information on cow/calf management was provided to producers in various ways, most frequently through extension publications, newsletters, popular press articles, one-on-one consultations, and public meetings. Evaluations were used to collect information at public meetings and a follow-up evaluation tool asking about specific changes made by producers.

Specialized efforts toward dairy and swine enterprises targeted topics, such as biosecurity, reducing feed cost, employee management, and improved antibiotic usage programs to eliminate residues and decrease antimicrobial resistance.

Results

In the follow-up evaluation, animal/herd health, cow/calf management, and range management (65% of responses each) were most frequently cited by producers as areas in which they had made or were currently making changes. Specifically, they noted decreased feed costs, increased forage utilization and improved profitability as benefits of educational programming.

As a result of educational programs, body condition of cows was improved at breeding and calving, weaning time was altered to hold cow condition without extra feed and weaning methods were changed. Evidence of reduced feed costs were apparent from producers who reported that they were testing their forages to determine appropriate supplementation and improving management of pastures. Production efficiency improvements from using ionophores and implants, paying more attention to genetics, and herd health improvements were reported. Producers adopted best management practices for heifer development to optimize development costs, improve reproductive efficiency and target genetic goals.

Implementation of new amino acid recommendations and mitigation strategies for disease introduction improved productivity on Kansas swine farms. Reproductive management and employee retention programs improved production on Kansas dairy farms impacting over 45,000 cows.

These changes are critical for the long-term economic success of livestock operations facing widely variable market conditions. They reduce the global footprint of livestock production and strengthen the agriculture economy in Kansas.

Outcome #5 is being reported with Outcome 1 in this and future years.

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
2015	2860

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 important 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
The goal of the Kansas Farm Management Association(KFMA)is to provide each member with farm business and family financial information for improved organization and decision making so that Kansas farms can minimize risk while increasing farm sustainability and profitability. Making the information available publicly can help to accomplish the same for many involved in agriculture in Kansas and around the country. Activities included: 8,000 face to face meetings with 2,764 producers; 43 presentations to 1,200 individuals; 2,319 farm business analyses; 2,151 individual crop and livestock enterprise analyses; 10 radio interviews; numerous newsletter and newspaper articles; presentations to more than 300 students in classes at KSU; a large number of hits to the KFMA Newsletter on the website; and over 96 cash flow analyses with Finpack.

Results
Through one-on-one consultations 2,764 Kansas producers have increased awareness of their current financial position and their financial performance during the past year. Of these producers 2,319 are able to benchmark their performance against other farms in their region, farms of similar type, as well as the most economically profitable farms. This allows producers to identify strengths and weakness in their operation and to take action to build on the strengths, and address the weaknesses, vastly increasing the operation's sustainability and profitability for the future. Through enterprise analysis these operations have also identified those enterprises that are the most profitable and they clearly understand their cost of production for each enterprise allowing them the opportunity to make informed marketing decisions when selling the products they have produced. Additionally, at least 96 producers in poor financial condition, or with family conflict, gained an improved understanding of how to address their situation in a sustainable manner.

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
2015	3800000

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
More than 40% of wheat acres in Kansas are planted with KAES varieties or varieties developed with KAES germplasm. One hard white winter wheat variety (Joe) was released this past year. Everest, No. 1 variety in Kansas in 2015 was planted on 15.8% of Kansas wheat acres.

Results
According to a KSU Plant Pathology Professor, Everest saved 25 million bushels of wheat in 2015 due to it resistance to Fusarium head blight.

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
2015	200000

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Optimum yields require an adequate and balanced supply of nutrients; however, excessive nutrient levels can increase the risk of ground and surface water contamination. Adequate management of nutrients is essential for economical and environmentally sound crop production. Extension programs and applied research on soil fertility and nutrient management will be increasingly important to achieve optimum crop production while minimizing the potential environmental impact.

What has been done
Soil Fertility School programs continued in 2015 with a total of 8 soil fertility schools in different counties/districts. Topics included: soil basics, soil pH,soil nutrients (N, P, K and micro nutrients), soil sampling and testing, and manure nutrient management.

Results
Producers improved nutrient use efficiency resulting in an increase in yields while minimizing environmental impact.

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)

Not Reporting on this Outcome Measure

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)

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Actual
2015	2860

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
This improved sustainability was achieved through providing producers reliable and accurate information on which to base decisions, along with the necessary education, tools, training and assistance in keeping good records and the appropriate methods to analyze and use those records to acquire the needed knowledge to make the best decisions possible in each situation.

Results
Through one-on-one consultations 2,860 Kansas producers have improved sustainability for the future due to their involvement with the KFMA and Farm Analyst programs during the past year. Of these producers 2,319 are able to benchmark their performance against other farms in their region; farms of similar type; as well as, the most economically profitable farms. This allows these producers to identify strengths and weakness in their operation and to take action to build on the strengths, and address the weaknesses, vastly increasing the operation's sustainability and profitability for the future. Through enterprise analysis these operations have also identified those enterprises that are the most profitable and they clearly understand their cost of production for each enterprise allowing them the opportunity to make informed marketing decisions when selling the products they have produced. This greatly increases the sustainability of each of these

operations. Additionally, at least 96 producers in poor financial condition, or with family conflict, gained an improved understanding of how to address their situation in a sustainable manner.

4. Associated Knowledge Areas

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

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
2015	96763

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, garden shows, public presentations and public 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
Extension Master Gardeners donated more than 96,000 hours with a value over $2.1 million in 2015. 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 Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2015	30

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. More than 30 new food products were developed by Kansas companies with assistance from K-State, including numerous gluten-free baked goods.

4. Associated Knowledge Areas

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

603 Market Economics

Outcome #9

1. Outcome Measures

Improve access to high quality food, especially for consumers with limited resources (measured by improvement in food budgeting)

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Actual
2015	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Where a person lives affects how they live - you can't make healthy decisions if healthy options aren't available. Policy, systems and environmental changes make healthier choices an option for community members by looking at the policies, rules, common practices, community norms and environments that affect behavior.

What has been done
Family and Consumer Sciences agents worked with local health and wellness coalitions, food policy councils, school wellness committees, active transportation boards, and others to develop policy and systems changes around healthy food choices or food access in schools and communities. Agents partnered with the Kansas State Department of Education-Child Nutrition and Wellness staff to expand the Summer Meal Program. Agents and specialists worked to provide farmer's market vendors and farm-to-school workshops to encourage easier access to local foods, especially fruits and vegetables, and improve food security.

Results
Family and Consumer Sciences agents in 25 local units reported the following:
- Six agents helped establish summer youth feeding programs.
- Eight agents helped expand access to healthy foods by helping establish community/school gardens, farmer's markets, and establish local food policy councils.
- Thirteen agents were active in school wellness committees ensuring healthy food is available during the school day.

4. Associated Knowledge Areas

KA Code	Knowledge Area
703	Nutrition Education and Behavior
704	Nutrition and Hunger in the Population

Outcome #10

1. Outcome Measures

Kansas farmers adopt best management practices in crop production that results in increased profitability (measured by total dollar savings)

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Actual
2015	6200000

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Kansas ranks first in the nation for sorghum and wheat production; and also rank in the top 10 for Sunflowers, Canola, Hay, and Corn; and 11th for soybean production (Kansas Ag Statistics).

What has been done
In 2015,10 intensive crop production workshops were held across the state to encourage understanding and adoption of the latest crop production research.

Results
Based on participant evaluation data, the learning that took place provided the necessary information to influence management decisions resulting in an anticipated net economic gain of $6.2 million as reported by those participants completing the survey.

4. Associated Knowledge Areas

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

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

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

V(A). Planned Program (Summary)

Program # 2

1. Name of the Planned Program

Food Safety

☑ 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
702	Requirements and Function of Nutrients and Other Food Components	15%		15%	
703	Nutrition Education and Behavior	30%		20%	
711	Ensure Food Products Free of Harmful Chemicals, Including Residues from Agricultural and Other Sources	15%		15%	
712	Protect Food from Contamination by Pathogenic Microorganisms, Parasites, and Naturally Occurring Toxins	30%		30%	
723	Hazards to Human Health and Safety	0%		10%	
724	Healthy Lifestyle	10%		0%	
802	Human Development and Family Well-Being	0%		10%	
	Total	100%		100%	

V(C). Planned Program (Inputs)

1. Actual amount of FTE/SYs expended this Program

Year: 2015	Extension		Research	
	1862	1890	1862	1890
Plan	57.0	0.0	34.0	0.0
Actual Paid	44.0	0.0	48.0	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**
52260	0	825840	0
1862 Matching	**1890 Matching**	**1862 Matching**	**1890 Matching**
457480	0	5850816	0
1862 All Other	**1890 All Other**	**1862 All Other**	**1890 All Other**
4286620	0	1026960	0

V(D). Planned Program (Activity)

1. Brief description of the Activity

• Develop new rapid methods for the surveillance, detection, isolation, and quantification of microbes and chemical residues in animals, plants, and food products.
• Develop risk monitoring techniques to detect potential hazards in the distribution chain.
• Validate the efficacy of techniques in controlling and eliminating microbial and chemical hazards.
• Disseminate food safety and bio-security information through extension and research seminars, workshops, and resident and distance education programs, using a variety of media options and communication tools.
• Offer safe food production, handling, and sanitation education to groups involved in all levels of food production and service.
• Identify best management practices to prevent foodborne illness and to enhance the security of the food supply throughout the food chain.
• Develop technology to reduce the hazards and improve the quality of animal food products, which will complement the development of HACCP programs by USDA.
• Develop, complement, and maintain an aggressive technology transfer system that effectively communicates work about Food Safety to consumers, students, industry, government, and other scientific investigations.

2. Brief description of the target audience

• Growers and processors of agricultural commodities, commercial and non-commercial food service personnel, market and home gardeners, other food handlers, retail markets, consumers, and educator;
• Families and individuals of all ages living in Kansas, including populations with limited resources; low literacy skills; varying ethnicities; disabilities, diseases, or impairments; and documented or identifiable health disparities;
• Economic stakeholders, and policy and funding agencies;
• Health care, education, and nutrition professionals;
• K-State Research & Extension faculty and staff with responsibilities for food and/or nutrition;
• Government; and
• Consumer groups (i.e., STOP).

3. How was eXtension used?

eXtension was not used in this program

V(E). Planned Program (Outputs)

1. Standard output measures

2015	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Actual	1317	0	67	0

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

Patent Applications Submitted

Year: 2015

Actual: 0

Patents listed

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

2015	Extension	Research	Total
Actual	0	8	8

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

- Number of rapid methods developed for the surveillance, detection, isolation, and quantification of microbes and chemical residues in animals, plants, and food products

Year	Actual
2015	1

Output #2

Output Measure

- Number of therapeutic, chemical, and physical treatments developed for animals and plants and their products to eliminate or reduce contamination with potential hazards

Year	Actual
2015	17

Output #3

Output Measure

- Number of ServSafe certification workshops

Year	Actual
2015	55

V(G). State Defined Outcomes

V. State Defined Outcomes Table of Content

O. No.	OUTCOME NAME
1	Increase knowledge level and improve attitude of clientele in safe food production, handling, and sanitation programs; best management practices to prevent foodborne illness; and social, economic, and communications issues related to food safety and agricultural bio-security (Measured by number of participants increasing knowledge)
2	Increase adoption of recommended safe food handling practices at the individual, family, community, production, and supply system levels (Measured by number of participants in food service manager certification class who successfully complete the exam)
3	Reduce incidence of foodborne illness (Measured by number of foodservice facilities with trained employees)
4	Increase number of viable technologies to improve food safety (Measured by number of viable technologies developed or modified for the detection and characterization of food supply contamination from foodborne threats)
5	Increase understanding of the ecology of threats to food safety from microbial and chemical sources (Measured by number of students enrolled in Food Safety and Defense graduate certification)

Outcome #1

1. Outcome Measures

Increase knowledge level and improve attitude of clientele in safe food production, handling, and sanitation programs; best management practices to prevent foodborne illness; and social, economic, and communications issues related to food safety and agricultural bio-security (Measured by number of participants increasing knowledge)

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2015	108

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Food safety education programs are necessary to help consumers,especially high-risk groups, and foodservice personnel become more aware of foodborne illness risks, to reduce risky food consumption and preparation behaviors, and to develop safe food handling practices.

What has been done
A variety of educational opportunities were provided including workshops for secondary school teachers; food safety training for students, and intern opportunities.

Results
Over the past four years, 121 (41 this year) secondary school teachers have attended summer workshops to learn about safe food production, processing, handling, and sanitation practices that is then taught to their students.

Over the past 4 years, 209 students have been provided with food safety training and experiences, an average of over 50 per year.

Over the past four years, 68 interns have spent 200-500 hours over 2-4 month periods working with researchers on food safety related research projects, an average of 17 per year.

4. Associated Knowledge Areas

KA Code	Knowledge Area
712	Protect Food from Contamination by Pathogenic Microorganisms, Parasites, and

	Naturally Occurring Toxins
723	Hazards to Human Health and Safety

Outcome #2

1. Outcome Measures

Increase adoption of recommended safe food handling practices at the individual, family, community, production, and supply system levels (Measured by number of participants in food service manager certification class who successfully complete the exam)

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2015	364

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Foodborne illness is a common, costly--yet preventable--public health problem. Each year, one in six Americans get sick from contaminated foods or beverages; 3,000 die. Salmonella, a bacteria that commonly causes foodborne illnesses, results in more hospitalizations and deaths than any other bacteria found in food and incurs $365 million in direct medical costs annually. (CDC-Food Safety)

What has been done
ServSafe Food Safety training was provided to foodservice managers, entry-level food handlers, and community organizations who provide food to the public. Twenty-one ServSafe Manager Level trainings were held resulting in 178 contact hours of food safety education.

Results
Servsafe Manager level trainings involved 444 foodservice employees with 364 receiving Manager Certification reaching an estimated 57 facilities; 10 proctored exams.

4. Associated Knowledge Areas

KA Code	Knowledge Area
712	Protect Food from Contamination by Pathogenic Microorganisms, Parasites, and Naturally Occurring Toxins

Outcome #3

1. Outcome Measures

Reduce incidence of foodborne illness (Measured by number of foodservice facilities with trained employees)

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2015	118

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
The U.S. Centers for Disease Control and Prevention estimates that roughly one in six people in the U.S., about 48 million get sick, 128,000 are hospitalized, and 3,000 die of foodborne illness year year.

What has been done
569 participants completed one of 34 ServSafe Food Handler classes. This resulted in 102 contact hours of food safety education.

Thirty-two percent of the participants in the ServSafe Food Handler classes self-reported being Hispanic, Black/African American or other minority group.

Results
Participants indicated they had increased knowledge and skills of best food safety practices. More than 89% of the participants indicated they plan to use what they learned at work and/or at home. Participants reported they intend to wash their hands, check food temperatures and use food thermometers more often, and to be more cautious of cross contamination and food left out at room temperature.

This educational effort resulted in a reported 118 Kansas food establishments, volunteer/community groups and organizations, schools, nursing homes or day care facilities having staff how are food safety trained.

4. Associated Knowledge Areas

KA Code	Knowledge Area
712	Protect Food from Contamination by Pathogenic Microorganisms, Parasites, and

	Naturally Occurring Toxins
723	Hazards to Human Health and Safety

Outcome #4

1. Outcome Measures

Increase number of viable technologies to improve food safety (Measured by number of viable technologies developed or modified for the detection and characterization of food supply contamination from foodborne threats)

2. Associated Institution Types

- 1862 Research

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2015	1

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Consumers, food industries, regulatory agencies and technology are all concerned about microbial detection, quantification and elimination.

What has been done
Detection, enumeration and elimination of E. Coli has been the primary focus. The food industry has been provided with additional strategies to control E. coli. Information and technology transfer efforts to all interested groups have been implemented.

Results
The strategies and technologies listed above improve food safety in the food system.

4. Associated Knowledge Areas

KA Code	Knowledge Area
711	Ensure Food Products Free of Harmful Chemicals, Including Residues from Agricultural and Other Sources
712	Protect Food from Contamination by Pathogenic Microorganisms, Parasites, and Naturally Occurring Toxins
723	Hazards to Human Health and Safety

Outcome #5

1. Outcome Measures

Increase understanding of the ecology of threats to food safety from microbial and chemical sources (Measured by number of students enrolled in Food Safety and Defense graduate certification)

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2015	40

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Because of the recently mandated Food Safety and Modernization Act, food safety and defense programs are required for the food industry.

What has been done
Food Safety and Defense certificate students (including undergraduate and graduate students on campus and by distance)have received training in food safety, protection and defense. In addition, 13 students worked as interns in 2015.

Results
A total of 72 students have completed internship in the past four years.

4. Associated Knowledge Areas

KA Code	Knowledge Area
711	Ensure Food Products Free of Harmful Chemicals, Including Residues from Agricultural and Other Sources
712	Protect Food from Contamination by Pathogenic Microorganisms, Parasites, and Naturally Occurring Toxins
723	Hazards to Human Health and Safety

V(H). Planned Program (External Factors)

External factors which affected outcomes

- Appropriations changes
- Public Policy changes
- Government Regulations
- Competing Public priorities
- Competing Programmatic Challenges

Brief Explanation

V(I). Planned Program (Evaluation Studies)

Evaluation Results

Short-Term:

1. Program participants improve their attitudes toward, and awareness of, issues related to food safety
2. Participating Extension agents, Master Food Volunteers, foodservice professionals and foodservice volunteers increase their knowledge and skills of safe food handling from production to consumption.
3. Public program participants increase their knowledge of and skills in safe food handling practices and home food preservation techniques.

Evaluation Questions:

- What awareness, knowledge, skills or change in attitudes did program participants gain regarding food safety?
- What awareness, knowledge, skills or change in attitudes did program participants gain regarding home food preservation?

Medium-Term:

1. Participating Extension agents, Master Food Volunteers, foodservice professionals and foodservice volunteers demonstrate increased safe food handling practices from production to consumption.
2. More venues serving food in Kansas have food-safety trained employees or volunteers.
3. Program participants demonstrate increased use of safe food handling practices and home food preservation techniques.

Evaluation Questions:

- Three to six months after a program, what changes do program participants report regarding safe food handling practices from production to consumption and in home food preservation?
- How many and what types of organizations and foodservice professionals or

volunteers have completed food safety programs, the "food safety employee" level of a food safety course, and successfully completed the ServSafe exam?

Long-Term:

1. Fewer Kansans experience foodborne illness.
2. Foodborne illnesses reported by the Kansas Department of Agriculture and KDHE Office of Epidemiology decrease.
3. Kansas Department of Agriculture foodservice code violations in various kinds of food service operations decrease.
4. Fewer incidences of foodborne illness from home food handling and preservation are reported.

Evaluation Questions:

- Have foodborne illnesses reported by the Kansas Department of Agriculture and KDHE Office of Epidemiology decreased?
- Have Kansas Department of Agriculture foodservice code violations in various kinds of food service operations decreased?
- Has the reported incidence of foodborne illness from home food handling and preservation decreased?

Key Items of Evaluation

V(A). Planned Program (Summary)

Program # 3

1. Name of the Planned Program

Natural Resources and Environmental Management

☑ 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	12%		12%	
104	Protect Soil from Harmful Effects of Natural Elements	13%		8%	
111	Conservation and Efficient Use of Water	19%		15%	
112	Watershed Protection and Management	10%		7%	
121	Management of Range Resources	5%		7%	
132	Weather and Climate	2%		7%	
141	Air Resource Protection and Management	3%		5%	
205	Plant Management Systems	8%		8%	
511	New and Improved Non-Food Products and Processes	15%		12%	
601	Economics of Agricultural Production and Farm Management	3%		3%	
603	Market Economics	7%		3%	
605	Natural Resource and Environmental Economics	3%		13%	
	Total	100%		100%	

V(C). Planned Program (Inputs)

1. Actual amount of FTE/SYs expended this Program

Year: 2015	Extension		Research	
	1862	1890	1862	1890
Plan	55.0	0.0	23.0	0.0
Actual Paid	43.0	0.0	81.0	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**
1039632	0	1393605	0
1862 Matching	**1890 Matching**	**1862 Matching**	**1890 Matching**
3574263	0	9873252	0
1862 All Other	**1890 All Other**	**1862 All Other**	**1890 All Other**
1398150	0	1732995	0

V(D). Planned Program (Activity)

1. Brief description of the Activity

• Understand the sources, fate, and transport of important water contaminants (i.e., fecal coliform bacteria, nutrients, sediment, and pesticides [especially atrazine herbicide]), and develop and determine the environmental and economic effectiveness of best management practices for these potential contaminants.
• Quantify the environmental and economic effectiveness of best management practices for improving water quality at the watershed level.
• Disseminate science-based information through environmental education programs for both youth and adults, and deliver extension programs aimed at stakeholders that focuses on adoption of best management practices in targeted areas for water quality improvement.
• Develop and test new crop, livestock, bioenergy, and riparian forest systems that will reduce water use while optimizing productivity, environmental quality, and profitability, including water saving technologies for concentrated animal feeding operations (CAFOs) and industries that process agricultural commodities.
• Develop an information and education program for policy makers, producers, water professionals, and youth audiences with respect to the Ogallala Aquifer, including assessment of the potential impacts of climate change on this important water resource.
• Develop an understanding of air quality impacts of rangeland burning, including extent and timing of burn events, influence of fuel load on emissions, modeling the downwind transport of particulate matter, and developing a climatology of extreme events.
• Disseminate science-based information and transfer technologies to stakeholders, and implement youth education programs focused on air quality.
• Disseminate science-based information regarding the sustainability of biofuel production and processing.
• Develop new processes to modify agricultural-based materials into higher value products.
• Develop resources and pathways to increase climate literacy.
• Provide decision tools for adaptive best management practices that address the effects of climate change.

2. Brief description of the target audience

• Agricultural producers, youths, policymakers/regulators, crop and livestock consultants.
• Growing industry based on bioprocessing and bioconversion, including the existing ethanol and biofuels industry.

- International grain processors.
- Industrial products manufacturers: adhesives, composites, bio-based chemicals, solvents and lubricants.
- Entrepreneurs and investors seeking to enter this industry.
- Audiences whose production systems will be influenced by climate change, as well as those who consult or influence the decision-makers of these producers. Secondary audiences will be decision-makers and leaders responsible for preparing communities for change (e.g., state and local elected officials, environmental groups).

3. How was eXtension used?

eXtension was not used in this program

V(E). Planned Program (Outputs)

1. Standard output measures

2015	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Actual	16000	0	1560	0

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

Patent Applications Submitted

Year:	2015
Actual:	0

Patents listed

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

2015	Extension	Research	Total
Actual	16	12	28

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

- Number of educational programs delivered

Year	Actual
2015	754

Output #2

Output Measure

- Number participating in educational programs

Year	Actual
2015	16960

Output #3

Output Measure

- Number of refereed research publications

Year	Actual
2015	22

Output #4

Output Measure

- Number of presentations at national and international conferences

Year	Actual
2015	23

Output #5

Output Measure

- Number of workshops, web-based curricula, and field days/tours related to climate change

Year	Actual
2015	1

V(G). State Defined Outcomes

V. State Defined Outcomes Table of Content

O. No.	OUTCOME NAME
1	Producers adopt BMPs that protect environmental quality (measured by number adopting BMPs)
2	Producers adopt BMPs for atrazine and soil erosion (measured by number of acres)
3	Measurable improvement in water quality (percent reduction atrazine) in Little Arkansas River Watershed
4	Improve utilization of biological raw materials as bioconversion substrates (measured by number of new processes developed).
5	An enhanced or improved economy as a result of bioenergy development (measured by number of new bio-based businesses created)
6	Improved environmental conditions through sustainable biofuel production and utilization (measured by: gallons biofuel; gallons of cellulosic ethanol; gallons of biodiesel . . . produced in KS)
7	Improved environmental conditions through sustainable biofuel production and utilization (measured by: PPM OF CO2 in atmosphere; water quality; average temperature during year)
8	Agricultural/natural resource producers, and/or business representatives modify existing practices or technologies and/or adopt new practices to protect/enhance natural resources and/or enhance biodiversity (Measured by # documented)
9	Development of new knowledge and technologies (Measured by percentage of participants who increase knowledge of management practices under climate variability and change)
10	Improve climate mitigation strategies and their adoption (Measured by number of farms and landowners reducing carbon and energy footprints)
11	Kansas farmers adopt best management practices that result in increased profitability while protecting the environment (measured by strategies adopted)

Outcome #1

1. Outcome Measures

Producers adopt BMPs that protect environmental quality (measured by number adopting BMPs)

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2015	167

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
The K-State Watershed Specialist program began in 2000, as a partnership with the Kansas Department of Health and Environment and other agricultural groups. This partnership assigned specialists to high-priority watersheds. The specialists work closely with local Watershed Restoration and Protection Strategy (WRAPS) groups as service providers and coordinators to develop and implement plans to improve surface water quality and to meet state water quality standards.

What has been done
The K-State watershed specialist team provided a broad array of educational services.
- On-farm consultations: 255 consultations and technical assistance responses helped develop water-quality plans and obtain financial assistance.
- Education and awareness: 670 events reaching 12,686 people.
- Water monitoring: more than 450 water samples have been collected and analyzed for pollutant information by two WRAPS groups.

Results
Best Management Practice (BMP) Implementation: 255 one-on-one farm consultations were completed resulting in 167 producers implementing 249 BMPs on more than 37,000 acres (cropland 36,482 and livestock 997 acres) affecting over 3,800 animal units.

4. Associated Knowledge Areas

KA Code	Knowledge Area

102	Soil, Plant, Water, Nutrient Relationships
111	Conservation and Efficient Use of Water
112	Watershed Protection and Management
121	Management of Range Resources

Outcome #2

1. Outcome Measures

Producers adopt BMPs for atrazine and soil erosion (measured by number of acres)

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2015	20545

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
The project goal is to assist farmers to voluntarily implement atrazine herbicide best management practices (BMPs) to meet surface water quality standards of 3 micrograms per liter, with no seasonal spikes. A decision was made to target specific sub-watersheds within the Little Arkansas River watershed in order to document water quality improvements.

What has been done
Four watersheds within the Little Arkansas River watershed were targeted for implementation of BMPs for atrazine herbicide. Atrazine runoff vulnerable fields outside of the four targeted watersheds were also made eligible for incentive payments. Corn and grain sorghum fields were targeted.

Results
Farmers committed to implementing atrazine BMPs on 20,545 acres of corn and grain sorghum.

4. Associated Knowledge Areas

KA Code	Knowledge Area
102	Soil, Plant, Water, Nutrient Relationships

111	Conservation and Efficient Use of Water
112	Watershed Protection and Management
121	Management of Range Resources
141	Air Resource Protection and Management

Outcome #3

1. Outcome Measures

Measurable improvement in water quality (percent reduction atrazine) in Little Arkansas River Watershed

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Actual
2015	65

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
The project goal is to assist farmers to voluntarily implement atrazine herbicide best management practices (BMPs) to meet surface water quality standards of 3 micrograms per liter,with no seasonal spikes. A decision was made to target specific sub-watersheds within the Little Arkansas River watershed in order to document water quality improvements.

What has been done
Four watersheds within the Little Arkansas River watershed were targeted for implementation of BMPs for atrazine herbicide. Atrazine runoff vulnerable fields outside of the four targeted watersheds were also made eligible for incentive payments.

Results
Atrazine BMP implementation was predicted to reduce atrazine runoff by 65% on 20,542 acres and a total load reduction of 1067lbs a.i. in targeted acres.

4. Associated Knowledge Areas

KA Code	Knowledge Area
102	Soil, Plant, Water, Nutrient Relationships
111	Conservation and Efficient Use of Water

112 Watershed Protection and Management

Outcome #4

1. Outcome Measures

Improve utilization of biological raw materials as bioconversion substrates (measured by number of new processes developed).

2. Associated Institution Types

- 1862 Research

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2015	1

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
The U.S. consumes more than 140 billion gallons of transportation fuels annually. Due to finite reserves, non-uniform distribution, and volatile prices of fossil fuels, renewable fuels from biomass could make a significant contribution toward a more sustainable future. Recent legislation has called for this nation to annually produce 36 billion gallons of renewable fuel by 2022 to help offset impending concerns over climate change and energy security. Such targets have implications of national security, economic development, and sustainable practices for the future.

What has been done
Both fundamental and applied research has been conducted in the area of biofuel production. Key projects include 1) grain sorghum, sorghum biomass and sweet sorghum as a viable renewable resource for biofuels; 2) potential of big bluestem for biofuel production; 3) full utilization of free sugars and starch in sweet sorghum through diffusion process; 4) biobased product development; 5) development of NIR models for quick analysis of biomass composition and physical properties.

Results
Our mean results include: 1) multi-seeded (msd) mutants sorghums have a great potential as an excellent feedstock for bioethanol production with high grain yield, high starch content, and high fermentation efficiency; 2) developed a diffusion method to fully utilize free sugars and starch in sweet sorghum; 3) developed NIR methods for quick analysis of biomass composition and physical properties; 4) further confirmed the potential of big bluestem for biofuel production; and biobased product such as adhesives and resins from plant based oil and proteins. As research results, we published 17 peer reviewed papers and presented 11 meeting papers.

4. Associated Knowledge Areas

KA Code	Knowledge Area
511	New and Improved Non-Food Products and Processes

Outcome #5

1. **Outcome Measures**

An enhanced or improved economy as a result of bioenergy development (measured by number of new bio-based businesses created)

Not Reporting on this Outcome Measure

Outcome #6

1. **Outcome Measures**

Improved environmental conditions through sustainable biofuel production and utilization (measured by: gallons biofuel; gallons of cellulosic ethanol; gallons of biodiesel . . . produced in KS)

Not Reporting on this Outcome Measure

Outcome #7

1. **Outcome Measures**

Improved environmental conditions through sustainable biofuel production and utilization (measured by: PPM OF CO2 in atmosphere; water quality; average temperature during year)

Not Reporting on this Outcome Measure

Outcome #8

1. **Outcome Measures**

Agricultural/natural resource producers, and/or business representatives modify existing practices or technologies and/or adopt new practices to protect/enhance natural resources and/or enhance biodiversity (Measured by # documented)

2. **Associated Institution Types**

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual

2015	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

The 8th Annual Kansas Natural Resources Conference focuses on developing partnerships in conservation. The conference is held in cooperation among natural resource professionals, students and managers representing more than six professional societies to discuss the advancements and research surrounding the field of natural resources at this annual conference.

Research projects, papers and posters on all natural resource topics were presented, including: Forestry, Wetlands, Fisheries, Wildlife, Range Management, Soil and Water Conservation, and Natural Resource Education.

What has been done

Topics discussed included prescribed fire, water quality, range, wildlife, fisheries and riparian forest management.

Results

More than 300 people attended the conference to learn the latest advancements and research around forestry stewardship

4. Associated Knowledge Areas

KA Code	Knowledge Area
102	Soil, Plant, Water, Nutrient Relationships
111	Conservation and Efficient Use of Water

Outcome #9

1. Outcome Measures

Development of new knowledge and technologies (Measured by percentage of participants who increase knowledge of management practices under climate variability and change)

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2015	82

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Producers in the Southern Great Plains states face a wide range of climate issues that are constantly in flux. Climate change is projected to increase this variability in the future. This is certainly important to both the beef cattle industry and row crop agriculture in the region.

What has been done
The Great Plains Grazing project coordinated an Enterprise Flexibility video series targeting producer audiences as well as a monthly webinar series that began in August 2015 (5 webinars in 2015).

Results
Eighty-two people participated in at least one of the five webinars with more than 273 Youtube views. The Enterprise Flexibility Video Series resulted in more than 1,170 views.

4. Associated Knowledge Areas

KA Code	Knowledge Area
102	Soil, Plant, Water, Nutrient Relationships
111	Conservation and Efficient Use of Water

Outcome #10

1. Outcome Measures

Improve climate mitigation strategies and their adoption (Measured by number of farms and landowners reducing carbon and energy footprints)

Not Reporting on this Outcome Measure

Outcome #11

1. Outcome Measures

Kansas farmers adopt best management practices that result in increased profitability while protecting the environment (measured by strategies adopted)

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual

2015 1

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Poultry litter imported into Southeast Kansas from Arkansas, Missouri and Oklahoma has the potential to reduce the fertilizer costs of crops and forage.

What has been done
Through K-State Research and Extension research - based educational programs, Southeast Kansas producers are increasingly viewing poultry litter as a favorable soil amendment for supplying phosphorus, potassium, micronutrients and organic matter.

Results
Utilizing poultry litter through research-verified management practices, Kansas farmers can accrue an annual savings of $2 million in farm nutrient input costs. Congruently,Kansas citizens voiced concerns about potential environmental impacts (i.e. odor and water quality) from the utilization of poultry litter. A partnership between Kansas Farm Bureau, Kansas Department of Health and Environment, Kansas Department of Agriculture, Kansas Department of Commerce, USDA Natural Resources Conservation Service and K - State Research and Extension formed to identify best management practices for the storage and utilization of poultry litter to protect the air and water quality of Kansas.
From 2013 - 2015, 10 demonstration - learning sites on improved temporary storage for environmental benefit were developed for farmer education.

4. Associated Knowledge Areas

KA Code	Knowledge Area
111	Conservation and Efficient Use of Water
112	Watershed Protection and Management
141	Air Resource Protection and Management
601	Economics of Agricultural Production and Farm Management

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 (Educational funding)

Brief Explanation

K-State Research and Extension is eliminating Outcomes 5-7 related to bioenergy development as this is no longer a priority program. We no longer have a faculty team engaged in projects relating to those outcomes due to the decline in our faculty numbers and realignment of priorities.

V(I). Planned Program (Evaluation Studies)

Evaluation Results

Short Term (Knowledge)
Target audiences will become aware of both existing and emerging natural resource issues. Participants will gain an understanding of:

- Improved knowledge of environmental concepts and Kansas natural resources
- Increased knowledge and skill development in the area of interpretation and leadership
- Why environmental issues are of interest or concern
- Who/what is impacted by these environmental issues
- Which research-based methods could be employed to address and ultimately resolve the issues

Indicators

- Have you tested your well water to determine it's suitability for intended uses?
- Have you developed a cropping plan in response to limited water supply?
- After participating in this program, I gained increased understanding about _____ .

Medium-Term (Behavior)
Stakeholders and participants will develop long-range strategic plans and implement best management practices as they relate to the sustainable management of grasslands, water, forestry, energy, wildlife, and air. Partnerships will be made among stakeholders to work collaboratively to alleviate and prevent environmental concerns throughout Kansas.

Indicators

- What BMPs, if any, do you plan to make based on what you have learned at this meeting?
- How has your management changed to address water quality and quantity issues?
- What changes, if any, have you implemented to reduce livestock impact on stream water quality?

Long-Term (Change in Condition)

Target audiences will benefit from measurable improvements in existing natural resource concerns and mitigation of emerging threats. Kansas citizenry will be environmentally literate and will make sound decisions regarding natural resources. Participants and their associated interests will become economically viable and environmentally sustainable. KDHE water quality monitoring data will show measurable improvement, similar to what has been shown in Clarks Creek,Grouse-Silver Creek, and the Cheney reservoir. The water footprint for the production of crops and livestock, and the maintenance of home landscapes and gardens has been reduced.

Key Items of Evaluation

V(A). Planned Program (Summary)

Program # 4

1. Name of the Planned Program

Childhood Obesity: Healthy Eating and Physical Activity through the Lifespan

☑ 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
702	Requirements and Function of Nutrients and Other Food Components	5%		35%	
703	Nutrition Education and Behavior	70%		55%	
724	Healthy Lifestyle	20%		0%	
802	Human Development and Family Well-Being	5%		10%	
	Total	100%		100%	

V(C). Planned Program (Inputs)

1. Actual amount of FTE/SYs expended this Program

Year: 2015	Extension		Research	
	1862	1890	1862	1890
Plan	49.0	0.0	5.0	0.0
Actual Paid	42.0	0.0	15.0	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**
52260	0	258075	0
1862 Matching	**1890 Matching**	**1862 Matching**	**1890 Matching**
457480	0	1828380	0
1862 All Other	**1890 All Other**	**1862 All Other**	**1890 All Other**
4006990	0	320925	0

V(D). Planned Program (Activity)

1. Brief description of the Activity

Educational programs about making healthy food choices and increasing physical activity

2. Brief description of the target audience

- Families and individuals of all ages living in Kansas, including populations with limited resources; low literacy skills; varying ethnicities; disabilities, diseases, or impairments; and documented or identifiable health disparities;
- Economic stakeholders, and policy and funding agencies;
- Health care, education, and nutrition professionals; KSRE faculty and staff with responsibilities for food and/or nutrition;
- Consumer groups (i.e., STOP)

3. How was eXtension used?

eXtension was not used in this program

V(E). Planned Program (Outputs)

1. Standard output measures

2015	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Actual	66000	0	23000	3000

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

Patent Applications Submitted

Year:	2015
Actual:	0

Patents listed

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

2015	Extension	Research	Total
Actual	1	5	5

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

- Number of workshop series conducted

Year	Actual
2015	20

V(G). State Defined Outcomes

V. State Defined Outcomes Table of Content

O. No.	OUTCOME NAME
1	Children and youth increase their physical activity and/or reduce sedentary time. (Measured by percentage of number reached)
2	Youths increase fruit and vegetable consumption (Measured by number reporting increase)
3	Adolescents reporting healthier lifestyle habits (e.g., eating meals from a variety of food groups; increased frequency and/or time spent participating in physical activity per day) (Measured by increased percentage of those reached)
4	Children and youth increase consumption of foods as recommended by the U.S. Dietary Guidelines for Americans, such as increasing vegetables, fruits (Measured by percentage of those reached)
5	Families/caregivers adopt healthy eating patterns, such as eating breakfast, eating as a family, healthier snack choices (Measured by percentage of those reached)
6	Children and youth increase consumption of foods as recommended by the U.S. Dietary Guidelines for Americans, such as increasing whole grains (Measured by percentage of those reached)
7	Kansans of all ages engage in increased physical activity.

Outcome #1

1. Outcome Measures

Children and youth increase their physical activity and/or reduce sedentary time. (Measured by percentage of number reached)

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2015	5

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
The prevalence of obesity among children aged 6 to 11 years increased from 6.5% in 1980 to 19.6% in 2008, and the prevalence of obesity among adolescents aged 12 to 19 years increased from 5% to 18.1% during the same period (CDC, 2013). Many factors have been linked to the increase in obesity rates including insufficient amounts of physical activity. In 2009, 55% of Kansas high school students did not participate in at least 60 minutes of physical activity per day.

What has been done
The Douglas County Family and Consumer Sciences Agent was invited to mentor the Healthy Kids 0-18 Work Group in order to assist them in prioritizing their Opportunities for Community Action as part of their county Community Health Plan. As a result, the agent served on a local committee to develop strong wellness policies and practices that can be utilized in the public schools, before and after-school programs, youth organizations and child care homes/centers.

Results
Youth will improve their attitudes about increased physical activity. Staff and volunteers will increase their awareness and knowledge of what constitutes an environment of healthy food choices and physical activity in schools and public venues.

4. Associated Knowledge Areas

KA Code	Knowledge Area
703	Nutrition Education and Behavior
724	Healthy Lifestyle
802	Human Development and Family Well-Being

Outcome #2

1. Outcome Measures

Youths increase fruit and vegetable consumption (Measured by number reporting increase)

Not Reporting on this Outcome Measure

Outcome #3

1. Outcome Measures

Adolescents reporting healthier lifestyle habits (e.g., eating meals from a variety of food groups; increased frequency and/or time spent participating in physical activity per day) (Measured by increased percentage of those reached)

Not Reporting on this Outcome Measure

Outcome #4

1. Outcome Measures

Children and youth increase consumption of foods as recommended by the U.S. Dietary Guidelines for Americans, such as increasing vegetables, fruits (Measured by percentage of those reached)

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2015	5

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
The prevalence of obesity among children aged 6 to 11 years increased from 6.5% in 1980 to 19.6% in 2008, and the prevalence of obesity among adolescents aged 12 to 19 years increased from 5.0% to 18.1% during the same period (Centers for Disease Control and Prevention (CDC), 2013).

Many factors have been linked to the increase in obesity rates. In Kansas in 2013, 40% of high school students reported eating fruits less than once daily, while 36% of high school students in

Kansas reported eating vegetables less than once daily.

What has been done
The 4-H Gardening Program reached more than 200 youth in 3rd/4th grades; students increased their knowledge of growing/harvesting vegetables, reading nutrition labels, understanding the six nutrient categories and basic food safety.

Results
As a result of the 4-H Gardening Program, students planted and harvested lettuce, spinach, radishes and onions. They compared nutrition fact labels to make healthful food choices; made and tasted recipes for healthy snacks; made and tasted a salad from the vegetables they grew and harvested.

4. Associated Knowledge Areas

KA Code	Knowledge Area
703	Nutrition Education and Behavior
724	Healthy Lifestyle

Outcome #5

1. Outcome Measures

Families/caregivers adopt healthy eating patterns, such as eating breakfast, eating as a family, healthier snack choices (Measured by percentage of those reached)

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2015	5

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Effective and positive parental and professional caregiving greatly enhances a child's health throughout life. A caregivers skill level determines whether children in care are safe and have the early learning experiences they need to succeed in school. Yet most child care providers and many parents lack the training and understanding needed to provide quality nurturing environments. Well-prepared parents and trained child care workers are needed statewide.

What has been done

Extension agents provided Kansas Department of Health and Environment approved training to early childhood professionals. Additionally, situations around adverse childhood experiences have resulted in efforts across the state, including a pilot program that uses the Centers for Disease Control and Prevention's Adverse Childhood Experiences survey to inform therapists in a local county health department.

Results
Of those attended training provided by K-State Research and Extension, 94% of participants indicated improved skills in physical, cognitive, social/emotional and communication development of children.

4. Associated Knowledge Areas

KA Code	Knowledge Area
703	Nutrition Education and Behavior
724	Healthy Lifestyle
802	Human Development and Family Well-Being

Outcome #6

1. Outcome Measures

Children and youth increase consumption of foods as recommended by the U.S. Dietary Guidelines for Americans, such as increasing whole grains (Measured by percentage of those reached)

Not Reporting on this Outcome Measure

Outcome #7

1. Outcome Measures

Kansans of all ages engage in increased physical activity.

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2015	16208

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Thirty percent of Kansas adults are obese, and 19% of Kansas children live in poverty. Targeting the diversity of Kansans, our programs address quality of life, healthy development, and health behaviors across life stages for all socioeconomic groups.

What has been done
KSRE Family and Consumer Sciences professionals work to improve the health and vitality of individuals and communities. Along with local partners, extension educators offered programs such as Strong People and Walk Kansas. These programs are evidence-based and reflect current physical activity and healthful eating guidelines to improve the health and fitness of all Kansans.

Results
(Measured by # Walk Kansas participants) In 2015, Walk Kansas reached 16,208 participants. Evaluation surveys revealed the following outcomes as a result of the eight-week program.
91% were more physically active;
85% met activity goals;
85% were confident they would continue the activity
90% adopted more healthful lifestyle habits
85% were more aware of healthy eating recommendations
83% increased fruit and vegetable consumption

4. Associated Knowledge Areas

KA Code	Knowledge Area
703	Nutrition Education and Behavior
724	Healthy Lifestyle
802	Human Development and Family Well-Being

V(H). Planned Program (External Factors)

External factors which affected outcomes
- Economy
- Appropriations changes
- Public Policy changes
- Government Regulations
- Competing Programmatic Challenges

Brief Explanation

Because of the similarity between outcomes, Outcomes 2, 4 and 6 will be combined for future AR/POWs and will be reported under one outcome, "Children and youth increase consumption of foods such as fruits, vegetables and whole grains as recommended by the U.S. Dietary Guidelines for Americans (measured by percentage of those reached."

V(I). Planned Program (Evaluation Studies)

Evaluation Results

Evaluation Questions: Three to six months after a program:

- What changes do participants report regarding more healthful eating, meal planning, food preparation, budgeting for food and physical activity habits?
- What changes do participants report regarding use of food assistance programs, gardening, home food preservation, low cost meal preparation and other strategies that increase their access to high quality, abundant and safe food?
- Do participants who are new mothers report initiating breastfeeding, exclusively breastfeeding for a long time, and still breastfeeding at 6 months?
- What changes have staff and volunteers taken to support healthier food choices and physical activity in schools and public venues?
- What changes have staff and volunteers taken to support increased access to high-quality, abundant and safe food (e.g., promoting private and community gardens, increasing local food production for food insecure persons, donations to food pantries, CSAs, electronic benefit transfer devices at Farmer Markets, SNAP outreach)?

Key Items of Evaluation

V(A). Planned Program (Summary)

Program # 5

1. Name of the Planned Program

Healthy Communities: Youth, Adults and Families

☑ 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
724	Healthy Lifestyle	20%		10%	
801	Individual and Family Resource Management	10%		15%	
802	Human Development and Family Well-Being	15%		20%	
803	Sociological and Technological Change Affecting Individuals, Families, and Communities	15%		15%	
806	Youth Development	40%		10%	
903	Communication, Education, and Information Delivery	0%		30%	
	Total	100%		100%	

V(C). Planned Program (Inputs)

1. Actual amount of FTE/SYs expended this Program

Year: 2015	Extension		Research	
	1862	1890	1862	1890
Plan	160.0	0.0	21.0	0.0
Actual Paid	107.0	0.0	20.0	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**
542371	0	344100	0
1862 Matching	**1890 Matching**	**1862 Matching**	**1890 Matching**
3073148	0	2437840	0
1862 All Other	**1890 All Other**	**1862 All Other**	**1890 All Other**
5448261	0	427900	0

V(D). Planned Program (Activity)

1. Brief description of the Activity

• Develop/identify theory- and evidence-based educational programs to promote healthy communities: youth, adults, and families. • Disseminate, implement, and evaluate effectiveness of programs to promote healthy communities: youth, adults, and families.• Strengthen collaborative capacity within K-State Research and Extension and among communities/ organizations to promote healthy communities: youth, adults, and families. • Provide technical assistance and educational programs to citizens seeking to make their communities healthy and sustainable places for meeting human needs. • Establish links between community development researchers and practitioners for cooperative efforts that result in healthy, sustainable communities. •Provide experiential learning opportunities for children and youth to address key and emerging issues that affect their growth and development. • Deliver and evaluate evidence-based community-development strategies for positive youth development in structured out-of-school settings (e.g., after-school programs, youth-serving organizations, clubs). • Strengthen the support for a volunteer development system through training and education on the experiential learning model, 4-H essential elements, ISOTURE model, age appropriate learning experiences and emerging aspects of youth development. • Provide imaginative, motivational, and experiential learning experiences to help youth build competencies and master life skills.

2. Brief description of the target audience

• Families and individuals of all ages living in Kansas, including populations with limited resources; low literacy skills; varying ethnicities; disabilities, diseases, or impairments; and documented or identifiable health disparities
• Economic stakeholders, and policy and funding agencies
• Health care and education professionals
• K-State Research & Extension faculty and staff with responsibilities for healthy communities: youth, adults, and families

3. How was eXtension used?

eXtension was not used in this program

V(E). Planned Program (Outputs)

1. Standard output measures

2015	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Actual	157000	0	19000	0

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

Patent Applications Submitted

Year:	2015
Actual:	0

Patents listed

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

2015	Extension	Research	Total
Actual	2	0	2

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

- Number of educational programs delivered to increase knowledge of healthy communities: youth, adults, and families

Year	Actual
2015	21000

Output #2

Output Measure

- Number of program participants

Year	Actual
2015	87250

Output #3

Output Measure

- Number of educational programs to increase knowledge of volunteer development, experiential learning, and youth development competencies

Year	Actual
2015	1300

Output #4

Output Measure

- Number of communities that participate in community capacity building trainings and activities led through Extension.

Year	Actual
2015	60

V(G). State Defined Outcomes

V. State Defined Outcomes Table of Content

O. No.	OUTCOME NAME
1	Community projects engage participants in process to address community goals (Measured by number of substantial community projects that reflect shared participation in addressing community goals)
2	Community members are engaged in community improvement programs (measured by number of volunteer hours)
3	Volunteers, faculty, and staff understand and demonstrate effective youth development principles in service to youth (e.g., 5 Cs of positive youth outcomes, essential elements to positive learning environments)(Measured by number demonstrating competency)
4	Youths improve competence, confidence, connection, and character and caring (measured by number of youths who improve: (a) Competence - believe they are capable and successful; that they have mastery. (b) Confidence - know they influence the world around them (i.e., people and events); that they have independence. (c) Connection - know they are cared about; that they belong. (d) Character and Caring - Youths practice helping others; they are generous.)

Outcome #1

1. Outcome Measures

Community projects engage participants in process to address community goals (Measured by number of substantial community projects that reflect shared participation in addressing community goals)

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2015	400

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Kansas PRIDE (not an acronym) supports community development efforts by providing a structure to mobilize local organizations and governments as they address quality of life issues. Communities are encouraged to assess their needs, set goals, implement plans, evaluate the impact and celebrate.

What has been done
The PRIDE program adopted the community capitals model as a framework for the current program. This framework reveals the interactions between different parts of a community.

Results
In 2015, 60 PRIDE communities were involved in 400 projects at the local level. PRIDE communities reported that 300 of these projects engaged youth.

4. Associated Knowledge Areas

KA Code	Knowledge Area
803	Sociological and Technological Change Affecting Individuals, Families, and Communities

Outcome #2

1. Outcome Measures

Community members are engaged in community improvement programs (measured by number of volunteer hours)

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2015	49248

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
The philosophy of community development that Kansas PRIDE encourages is based on the fundamental valuing of volunteer hours.

What has been done
In 2015, PRIDE communities were involved in 400 projects at the local level. PRIDE communities reported that 300 of these projects engaged youth.

Results
In 2015, 60 Kansas PRIDE communities reported 49,248 hours of volunteerism. This conservatively calculates to a dollar value of more than $1,065,700. Kansas PRIDE communities reported raising $400,000 for re-investments in their communities during 2015.

4. Associated Knowledge Areas

KA Code	Knowledge Area
802	Human Development and Family Well-Being
803	Sociological and Technological Change Affecting Individuals, Families, and Communities
806	Youth Development

Outcome #3

1. Outcome Measures

Volunteers, faculty, and staff understand and demonstrate effective youth development principles in service to youth (e.g., 5 Cs of positive youth outcomes, essential elements to positive learning environments)(Measured by number demonstrating competency)

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2015	5392

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Current demographics of Kansas show that in some counties the minority is now the majority. Families face economic challenges, plus great strains on their time. New trends in volunteerism show that people demand shorter time commitments and very specific responsibilities. With this in mind, Kansas 4-H created a new opportunity to develop tomorrow's leaders.

What has been done
With the goal of reaching new audiences, engaging more volunteers in 4-H and marshaling the resources needed to significantly grow the 4-H program, the Kansas 4-H Foundation, the Department of 4-H Youth Development and K-State Research and Extension partnered to create the Growing Kansas Leaders: 4-H Program Expansion grant. Fourteen local extension units are involved with the grant. The Kansas 4-H Foundation provided funding for a leadership meeting, volunteer background checks and materials and supplies for piloting 4-H SPIN clubs and professional development funds.

Results
Seventy-five percent of the units have seen an increase in the number of volunteers. In order to reach new audiences, the 4-H SPecial INterest (SPIN) club concept was developed. The 4-H SPIN club model allows youth, not typically part of 4-H, to learn about a subject of interest to them, have positive interactions with their peers and caring adults, and develop life skills in a short term experience. Sixty-four new 4-H SPIN clubs started with approximately 913 4-H club members. Seventy-five percent of the 14 extension units have seen an increase in the number of 4-H members to include both community and SPIN club members. Ford County chartered a new bilingual and/or bicultural community club, Dodge City Cuauhtli's with 21 members. To watch a video featuring a SPIN club, visit the K-State Research and Extension YouTube page (https://www.youtube.com/watch?v=amgREDjDjc4).

4. Associated Knowledge Areas

KA Code	Knowledge Area
806	Youth Development

Outcome #4

1. Outcome Measures

Youths improve competence, confidence, connection, and character and caring (measured by number of youths who improve: (a) Competence - believe they are capable and successful; that they have mastery. (b) Confidence - know they influence the world around them (i.e., people and events); that they have independence. (c) Connection - know they are cared about; that they belong. (d) Character and Caring - Youths practice helping others; they are generous.)

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2015	1845

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Youth Development research indicates that youth involved in 4-H Youth development experiences are more 2.5 more likely to be involved in their communities. The ethic of community involvement help youth to feel they are capable and successful, helps youth build mastery and teamwork, demonstrates in a visible way how they are able to participate in the world around them and connect with others, and learn and practice a sense of generosity. Involvement in a local community service day is a way to engage youth, adults and the community at large in projects that improve the health and vitality of communities.

What has been done
For the second year, the Kansas 4-H Youth Leadership Council executive officers have provided leadership for a a two-day service event that involves local 4-H groups, alumni and friends across the state to participate in 48 Hours of 4-H. As a finale for National 4-H Week, the statewide community service project required careful planning by youth and adults working together and coordinated communication plans. This 48-hour service project was a collaborative effort among the Kansas 4-H Youth Leadership Council, Kansas 4-H Foundation, 4-H Youth Development and the local Extension units and 4-H youth and volunteers across the state.

Results

The 48 Hours of 4-H project took place October 10-11, 2015 and was promoted as a weekend of service - a lifetime of impact. The project resulted in 94 community service projects in 55 local Extension units across Kansas. The type of projects primarily included collections and donations; benefits; educational events; clean up and beautification projects. There were a total of 3,336 participants of which 689 were 4-H alumni. Results: 1144 hours of planning and completing projects; $15,080 raised for charities; 9,368 items collected (primarily nonperishable food); 84 new youth joined 4-H; and a value of $24,756 in volunteer time.

4. Associated Knowledge Areas

KA Code	Knowledge Area
806	Youth Development

V(H). Planned Program (External Factors)

External factors which affected outcomes

- Appropriations changes
- Public Policy changes
- Competing Public priorities
- Competing Programmatic Challenges

Brief Explanation

V(I). Planned Program (Evaluation Studies)

Evaluation Results

Short-Term:

- Increase knowledge and tools for positive conflict resolution.
- Learn the importance of, parts of, and process for strategic planning.
- Understand generational differences and how they might affect the dynamics of a board or group.
- Understand how the dynamics of a group can impact how it functions.
- Learn to use proper parliamentary procedure, build an agenda and plan in order to conducting effective meetings.
- Understand the legal aspects of boardsmanship
- Learn the importance of teamwork and techniques for being an effective team member.
- Have an increased awareness of community needs and how to go about planning to address them together.

Evaluation Questions:

- What knowledge and skills did participants gain about conflict resolution, generational differences, team work, and other aspects of working as a community group?
- What knowledge and skills did participants gain about strategic planning?
- What knowledge and skills related to parliamentary procedure, building an agenda and the importance of planning prior to a meeting did participants gain?

- What knowledge and skills of the legal aspects of being a board member and your fiscal responsibility did participants gain?

Medium-Term:

- Demonstrate conflict resolution skills.
- Develop or revise a strategic plans.
- Seek out and have representation from a variety of age groups, and have respect for diverse voices.
- Act in a respectful manner towards other members of the group.
- Understand and use parliamentary procedure, set and use an agenda and conduct more effective meetings.
- Practice ethical and legal behaviors.
- Practice good communication (talking and listening) skills.
- Practice skills to identify community needs.
- Seek out opportunities for leadership.

Evaluation Questions:

- Do groups report less conflict at meetings, diverse membership, and more effective, results-oriented meetings?
- Do groups report creating or revising strategic plans?
- Do groups report less legal and ethical issues?
- Do groups report that members practice improved communication skills?
- Do groups report improved ability to identify community needs?
- Do group members report that they seek out additional leadership roles within the community?

Long-Term:

- Increased diversity among volunteer base.
- Community improvements that represent the needs of current and future residents.
- Community vitality that attracts young people and families to the community.
- Sustainable community improvement process.

Evaluation Questions:

- How many community groups have been sustained?
- How many groups are involved in participatory community planning?
- How many boards or committees have partnered with others?
- How many participants in leadership development programs report broader community involvement?

Key Items of Evaluation

VI. National Outcomes and Indicators

1. NIFA Selected Outcomes and Indicators

Childhood Obesity (Outcome 1, Indicator 1.c)	
0	Number of children and youth who reported eating more of healthy foods.
Climate Change (Outcome 1, Indicator 4)	
0	Number of new crop varieties, animal breeds, and genotypes whit climate adaptive traits.
Global Food Security and Hunger (Outcome 1, Indicator 4.a)	
0	Number of participants adopting best practices and technologies resulting in increased yield, reduced inputs, increased efficiency, increased economic return, and/or conservation of resources.
Global Food Security and Hunger (Outcome 2, Indicator 1)	
0	Number of new or improved innovations developed for food enterprises.
Food Safety (Outcome 1, Indicator 1)	
0	Number of viable technologies developed or modified for the detection and
Sustainable Energy (Outcome 3, Indicator 2)	
0	Number of farmers who adopted a dedicated bioenergy crop
Sustainable Energy (Outcome 3, Indicator 4)	
0	Tons of feedstocks delivered.