

V(A). Planned Program (Summary)

Program # 5

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
501	New and Improved Food Processing Technologies	30%		15%	
711	Ensure Food Products Free of Harmful Chemicals, Including Residues from Agricultural and Other Sources	30%		8%	
712	Protect Food from Contamination by Pathogenic Microorganisms, Parasites, and Naturally Occurring Toxins	30%		77%	
806	Youth Development	10%		0%	
	Total	100%		100%	

V(C). Planned Program (Inputs)

1. Actual amount of FTE/SYs expended this Program

Year: 2013	Extension		Research	
	1862	1890	1862	1890
Plan	27.0	0.0	13.0	0.0
Actual Paid Professional	16.0	0.0	9.0	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
453089	0	310287	0
1862 Matching	1890 Matching	1862 Matching	1890 Matching
321311	0	261151	0
1862 All Other	1890 All Other	1862 All Other	1890 All Other
0	0	0	0

V(D). Planned Program (Activity)

1. Brief description of the Activity

IANR will use a holistic approach in addressing food safety from farm to fork. Research and extension programming will target reducing food borne illnesses. A variety of teaching strategies will be used for program delivery including face-to-face education, distance learning technologies, and eXtension programming.

2. Brief description of the target audience

The target audience for this program includes:

- Producers,
- Food processing and retail establishment owners/workers, and
- Consumers.

3. How was eXtension used?

Food Safety programming continues to benefit from eXtension resources. In addition to serving as a reference for new topics, eXtension content is regularly linked back to our umbrella food website (<http://food.unl.edu>) which houses our food safety resources. UNL Extension faculty are regular contributors to the eXtension site in the food/nutrition and food safety areas.

V(E). Planned Program (Outputs)

1. Standard output measures

2013	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Actual	15000	3600	37000	22000

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

Patent Applications Submitted

Year: 2013

Actual: 3

Patents listed

Probiotic to prevent Candida yeast infection

In-Shell Pasteurization of Eggs

Probiotics and methods of obtaining same

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

2013	Extension	Research	Total
Actual	5	7	12

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

- Number of extension in-depth workshops.

Year	Actual
2013	37

Output #2

Output Measure

- Percentage of Agricultural Research Division HATCH projects in food safety.

Year	Actual
2013	4

Output #3

Output Measure

- Number of scholarly publications and curricula related to food safety.

Year	Actual
2013	10

V(G). State Defined Outcomes

V. State Defined Outcomes Table of Content

O. No.	OUTCOME NAME
1	Increased adoption of pre-harvest methods for beef quality and safety.
2	Increased implementation of safe food handling practices by food service providers and consumers.
3	Nebraska will have access to higher educated workforce trained in the new biology with skills applied to addressing critical science in food safety.

Outcome #1

1. Outcome Measures

Increased adoption of pre-harvest methods for beef quality and safety.

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2013	3620

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Agriculture is the economic driver in Nebraska's economy accounting for \$12 billion annually. Over half, \$7.1 billion, of this revenue comes from the beef industry. Improving the profitability of beef producers contributes to the economic vitality of Nebraska cities and towns. There are 1.71 million beef cows in Nebraska, ranking us fourth nationally. The cow-calf enterprise is a complex production system that integrates human, financial, and natural resources. As world populations continue to grow, the efficient, sustainable conversion of forage and feed resources into high quality protein products will be increasingly important. Nebraska farmers and ranchers are positioned to be leaders in the production of economical, safe, and healthy food.

What has been done

Educational programs for meat and food processing establishments helped implement food safety controls and new technologies to reduce food borne hazards include:

- * Four "Implementing Your Company's HACCP Plan" workshops provided company employees with the tools to implement and manage HACCP in their facilities to meet USDA regulations and reduce the risk of food borne hazards.
- * Assistance to one very small meat processing businesses with establishment of the grant of inspection and approximately 20 very small meat processing businesses with HACCP plans, food safety plans, and responses to regulatory non-compliance.
- * Assembly of photographs and background information for standard operating procedures in veal slaughter targeted at reducing the incidence of STEC (Shiga Toxin E. Coli)
- * Improved understanding of livestock producers and meat processors on quality, consistency, and value of market animals and processed meat products.
- * Demonstrations on three carcass boxed beef cut-outs to show the effect of grade on value.
- * Carcass contests for the Nebraska State Fair and the Ak-Sar-Ben Livestock Expo.
- * Workshop on processed meats for the Nebraska Association of Meat Processors on ingredients

and processing technologies to improve quality and economic sustainability of processed of their meat products.

- * A Cured Meats Contest for the Nebraska Association of Meat Processors.

- * Five Food Processing Center projects for clients introducing a new product or ingredient.

- * Published Powerpoint presentations with instruction for identification of retail meat cuts used in the CDE contest for instructors and conducted the CDE (Career Development Events) and PASE (Premier Animal Science Events) Meat Evaluation contests for youth.

- * Increase the knowledge and awareness on meat science and food safety topics of undergraduate and graduate students.

The 4-H Livestock Quality Assurance (LQA) Online Program teaches youth about the quality of meat and food products that come from livestock. Quality assurance for livestock producers means making a promise to the consumers, or the people who consume the meat, milk and dairy products, and eggs that come from livestock poultry. The promise made is that products from livestock will be the highest possible quality and producers will do everything possible to make these products safe to eat. All Nebraska 4-H youth ages 8-18, who are enrolled in a livestock project (beef, dairy cattle, dairy goat, meat goat, poultry, rabbit, sheep, and swine) are required to complete three modules in the LQA Online Course in order to get certified. Certificates of completion are then turned into their local Extension office in order to receive full credit for completion allowing youth to participate in local, state and regional livestock competitions.

Results

Increased knowledge and awareness of the livestock and meat processing industry for quality, consistency and value differences in market animal carcasses and processed meat products:

- * Beef carcass cutout value and the influence of quality and yield grade were demonstrated to two groups. We provided presentations on beef grading, cuts of beef and beef carcass cutout, ground beef formulation, beef in processed meats, and beef food safety for the programs. Industry representatives and beef producers were provided with an opportunity to increase their knowledge and awareness of factors affecting beef quality, the impact of USDA grades and carcass muscling on carcass value, and food safety.

- * Held carcass contests for the Nebraska State Fair and the Ak-Sar-Ben Livestock Show involving over 450 exhibitors; Meat Evaluation and Identification contests for 4-H PASE and the Nebraska Career Development Events (CDE); workshops including presentations and cutting demonstrations for vocational agriculture instructors (FFA) on new retail cuts and laboratory practicums for the Career Development Events. Exhibitors received carcass information to better understand the carcass quality characteristics and value difference of their show animal. Contest participants are exposed to meat evaluation and food safety to increase their knowledge on these subjects and to help them better understand career opportunities in the meat industry.

- * Helped to improve processed meat quality and profitability of small and very small meat processing business. Evaluated processed meat products for the Nebraska Cured Meats Competition. Evaluations were conducted on over 250 processed meat products. Association members were able to utilize the product ideas and meat processing techniques to improve the variety and quality of products they sell in their business

In 2013, 3,418 youth participated in the 4-H Livestock Quality Assurance (LQA) online course reaching youth in 80% of Nebraska counties, with 7,972 module certificates earned (youth are required to complete at least three for LQA certification each year). Certificates are issued only when a youth has achieved an 80% competency on the module content. Youth have access to the course from a variety of locations (home, extension office, library, etc.) including one youth able to complete LQA requirements on the bus using a smartphone in route to a basketball game. The following statements are preliminary findings from the ongoing research on this course

(n=358):

* 88% of participants understand that as a food producer, they have a responsibility to consumers for quality assurance.

* 83% of participants learned how to care for their animal in a way that preserves carcass quality.

4. Associated Knowledge Areas

KA Code	Knowledge Area
501	New and Improved Food Processing Technologies
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
806	Youth Development

Outcome #2

1. Outcome Measures

Increased implementation of safe food handling practices by food service providers and consumers.

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2013	1200

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

About 48 million people (one in six Americans) get sick, 128,000 are hospitalized, and 3,000 die each year from foodborne diseases, according to recent data from the Centers for Disease Control and Prevention (CDC). The Food Safety Modernization Act (FSMA), signed into law by President Obama on January 4, 2011, when fully implemented will shift the focus of food safety for federal regulators from responding to contamination issues, to preventing them.

What has been done

UNL Extension continues to be the "go to" organization for food safety education for the meat processing industry, food service providers, and consumers. For example, UNL Extension

reached 139 small and very small sized meat processing operations in Nebraska, Kansas, Missouri, and South Dakota with education on Hazard Analysis and Critical Control Point (HACCP) information.

During 2013, our USDA Food Safety for Diverse Families team developed an educational program based on research data collected from focus groups and surveys. The educational program was developed to be culturally sensitive for Native American and Hispanic families with young children. The Conceptual Change Teaching Strategies was used in the development of the educational program which is a participant-centered teaching methodology to increase behavior change. This teaching methodology was used based on the desired learning method of the participants from the focus groups (ie; teaching methodology was matched to learning style of the participant). Four graduate students were trained to deliver the program; six sessions were conducted with Native American audiences (n=40) and four sessions with Hispanic audiences (n=45).

The incidence of chronic and episodic conditions related to improper food handling will decrease which brings to a major food safety focus in 2013, promoting (through social media) food safety materials/messages for the public. There are 3,000+ food-safety related deaths yearly. This Internet-based outreach helps get materials directly into consumer hands and to other multiplier groups "Any Time, Any Place Any Path, Any Pace." Several statistics indicate this by helping provide materials that meet consumer and health professional needs. The most outstanding examples include:

HANDWASHING MATERIALS

Some scientists estimate up to 80% of all infections are transmitted by hands, according to the Centers for Disease Control and Prevention (CDC). CDC considers handwashing the single important thing you can do to help prevent the spread of infection and to stay healthy and well. Handwashing posters developed over seven years ago with our local health department and that continue to be promoted through social media still meet a vital need.

The ServSafe Program delivers consistent food safety training to employees. The program covers: food safety, hygiene, cross-contamination, allergens, time and temperature, cleaning, and sanitation. UNL Extension Educators and specialists work the Nebraska Restaurant Association in providing training. This year ServSafe Starter training was conducted for the National Guard. Usually this training is for those employees or youth working in foodservice in the summer or as a part-time job.

Results

The research components of the new USDA grant, "Food Safety for Diverse Families (Native American and Hispanic) results show a 39.6% (p=0.0001) increase in knowledge was found for the Hispanic participants from the pre-post surveys and a 21% (p=0.037) increase in knowledge for Native American. Since we are working with diverse populations, more work is needed to establish relationships with key people within the cultural populations. In November, a graduate student and specialist went to the University of New Mexico (UNM) to provide training for their team.

As a result of HACCP education HACCP workshop participants indicated that they felt more comfortable in utilizing the HACCP principles in their programs and indicated that they would be using them regularly. The overall comfort levels of the participants for working with HACCP plans increased after completing the course and they indicated they would be more willing to discuss HACCP plans with co-workers.

In 2013, assistance was given to 21 small meat processing businesses for HACCP plan development, reassessment, and implementation of food safety procedures including standard operating procedures for E. coli O157:H7 sampling to small processors. Assistance was also provided to one company with establishing the USDA grant of inspection and for startup advice to two additional companies.

Handwashing statistics for 2013 indicate:

- * A Google search for "free handwashing posters" brings them up first in the world.
- * 53,213 pageviews/33,521 unique views for food.unl.edu webpages offering downloadable handwashing posters.
- * 287,510 downloads of PDF handwashing posters, handouts, etc. have occurred since original placement on the Web. (PDF files aren't counted in Google Analytics statistics and are hand tallied.)

In 2013, UNL Extension trained 797 managers on ServSafe. These managers trained nearly 10,000 front-line staff and 430 ServSafe Starters. From the pre/post evaluation data collected across the state for ServSafe, we have significant increases in knowledge gain in eight of the 10 questions that we ask. For ServSafe Starters, increases in self-reported knowledge indicated:

- * 57% calibrate a thermometer
- * 44% proper cooling methods
- * 35% minimum cooking temperatures

4. Associated Knowledge Areas

KA Code	Knowledge Area
501	New and Improved Food Processing Technologies
711	Ensure Food Products Free of Harmful Chemicals, Including Residues from Agricultural and Other Sources
806	Youth Development

Outcome #3

1. Outcome Measures

Nebraska will have access to higher educated workforce trained in the new biology with skills applied to addressing critical science in food safety.

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2013	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Preparing Nebraska's youth to pursue meaningful career choices, especially in the areas of science and the new biology continues to be a top priority of Nebraska 4-H. The 2012-2017 Nebraska 4-H Strategic Plan sought to teach our youth the value of opportunity and connectivity, and to develop the skills necessary for acting on those opportunities. Through various 4-H programs, projects, and activities, youth were able to discover and pursue their interests as they relate to future career possibilities. In each of these endeavors, a special emphasis was placed on careers related to science. It is anticipated that this focus will help generate a new pool of science-ready students who can take on the challenge of feeding 9 billion people. Food safety plays a critical role in meeting that challenge.

What has been done

As a part of their experience, each Nebraska 4-H participant is challenged to engage in projects that are of interest to them and match their skills. 4-Her's are then empowered to connect the dots between that set of skills and potential careers. The new Career Explorer app released in 2011 has been downloaded 7,627 with total game plays that reached the final page totaling 22,285. Top 10 careers chosen through the Career Explorer app in order were: lawyer, veterinarian, singer, actor, surgeon, pediatrician, animal breeder, architect, teacher and fashion designer.

Results

While not all directly related to food safety, the work of Nebraska 4-H in helping young people be college-ready and prepared to choose careers that would benefit the state are obvious. Over the last five years, the efforts of Nebraska 4-H have been evidenced by the significant increase in percentage of youth respondents who know a college major related to their 4-H program or project. After participating in a 4-H program, 83% said they interacted with someone working in a career area they're interested in; an increase of 55% from before the program; 97% of students agreed that they now understand the value of higher education in their future; 84% agreed that they understand the path to their desired career, an increase of 21% from 2011.

Nebraska 4-H is developing science interests, skills and abilities in the areas of agriculture, energy, environmental stewardship, and food science and technology. When surveyed, 88% of 4-Her's agreed or strongly agreed that they can explain their science-related decisions to others; 89% agreed or strongly agreed that science is important in solving everyday problems and 99% agreed or strongly agreed that good scientists work together to solve problems.

In 2013 the Departments of Food Science and Technology and the Department of Nutrition and Health Sciences conferred 31 graduate degrees on students with expertise in Food Safety.

4. Associated Knowledge Areas

KA Code	Knowledge Area
---------	----------------

501	New and Improved Food Processing Technologies
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
806	Youth Development

V(H). Planned Program (External Factors)

External factors which affected outcomes

- Economy
- Appropriations changes
- Public Policy changes
- Government Regulations
- Competing Public priorities

Brief Explanation

UNL Extension has been able to successfully meet goals as planned in the area of food safety. Research and Extension faculty continue to be watchful for emerging issues and world conditions that could change food systems and the global trust that consumers have of U.S. agriculture. In addition, UNL faculty are at the forefront of basic research in food allergies, food safety through the food chain, and microbiome profiling.

V(I). Planned Program (Evaluation Studies)

Evaluation Results

UNL Extension has developed an impact report for each of its Action Teams. These can be found on our Extension home page at: <http://www.extension.unl.edu/>.

The Nebraska Agricultural Experiment Station measures its success in our ability to provide Extension with cutting edge research results that impact Nebraska. In addition, we have begun to use a commercial product (Academic Analytics) to assess faculty productivity measures. We are still in the process of determining the robustness of this dataset.

Key Items of Evaluation

UNL Extension continues to identify signature outcomes and indicators in each of its programming areas and is collecting statewide data to assess progress made toward achieving those outcomes. In 2012, each Extension Action Team completed an outcome report highlighting their efforts and the impact of those efforts on clientele. These reports have been instrumental in working with stakeholders who in turn used them to advocate on behalf of the Extension program. Additional efforts are underway to enhance the skills of Action Team leaders in order to strengthen selected indicators and evaluation strategies.

Information regarding Academic Analytics can be found at: <http://www.academicanalytics.com/>