

# 2007 University of Nebraska Combined Research and Extension Annual Report

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## I. Report Overview

### 1. Executive Summary

Since 1988, the University of Nebraska--Lincoln Institute of Agriculture and Natural Resources (IANR) has followed a carefully developed and regularly revised strategic plan that set the institute's direction based upon clientele needs. The 2000-2008 Strategic Plan reflected the changes in Nebraska's agriculture, agribusiness, natural resources and human resources occurring across the state. As needs changed, IANR reassessed and updated the strategic plan's priorities to meet those needs. Not only have the issues diversified but also the delivery tools used to distribute educational programs. Use of the internet and the demand for 24/7 access to education have changed how the faculty of the IANR deliver educational programs.

Throughout the years of this strategic plan, IANR solicited input at listening sessions held at statewide sites. These listening sessions held in metropolitan and non metropolitan areas, with persons of varied occupations and ages, provided rich input as to the issues impacting the lives of Nebraska's residents.

IANR maintains three high-priority, overarching strategic objectives: student programs, extended education and program balance. With these objectives at its core, the strategic plan's program themes are:

- A quality environment and effective natural resource management
- Sustainable and economically viable food and biomass systems
- Viable communities and appropriate quality of life for individuals and families

During 2007, Battelle Technology Partnership Practice of Columbus, Ohio, was commissioned to complete an independent assessment of the impact of the work of IANR and its divisions (College of Agricultural Sciences and Natural Resources, Agricultural Research Division, University of Nebraska-Lincoln Extension) to assess the impact of the three programmatic themes listed above. The consulting firm determined that the impact of IANR's educational programs and expenditures represented a leverage of state funding that exceeds fifteen to one.

The conclusion of the "Battelle" report, IANR Positive Economic Impacts for Nebraska, reported the following:

1. IANR is an innovation engine for the state.
2. IANR is a pragmatic disseminator of the latest in research and technologies to enhance productivity and expand the economic base of Nebraska.
3. IANR has a track record in applying technology and enhancing productivity
4. IANR is focused on education, seeking to significantly enhance human capital
5. IANR provides a state wide network
6. IANR tackles complex problems in scientific, economic and social areas
7. IANR works to enhance and sustain the environment and quality of place in Nebraska
8. IANR emphasizes youth development and leadership

More evidence of the impact of the work of IANR can be found at : <http://atworkfornebraska.unl.edu>.

#### Total Actual Amount of professional FTEs/SYs for this State

Year:2007	Extension		Research	
	1862	1890	1862	1890
<b>Plan</b>	212.0	0.0	131.0	0.0
<b>Actual</b>	212.0	0.0	136.0	0.0

## II. Merit Review Process

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

- Internal University Panel
- External Non-University Panel
- Combined External and Internal University Panel
- Combined External and Internal University External Non-University Panel

### 2. Brief Explanation

The program descriptions included in this annual report reflect major focus areas identified in the IANR Strategic Plan. These focus areas reflect our citizens' review of critical issues as shown by input of stakeholders, faculty and administrators.

The faculty teams within each of the five Extension action plans (which contribute to the outcomes of the IANR Strategic Plan) annually update their plans using stakeholder input and evaluation results from delivered educational programs. Also, every faculty member with a research appointment in the Agricultural Research Division (ARD) must have a current approved peer-reviewed project that defines his or her area of research investigation. The peer review process is consistent with the Hatch Act requirements as amended for agricultural experiment station projects and is required for all projects, whether classified as Hatch, State, or Multi-state. After internal departmental review, a peer review panel meets with the principal investigators (PIs), unit administrators, and ARD representative. Following review and acceptable revision, if necessary, the project outline is forwarded to USDA-CSREES for inclusion in the CRIS database.

Another review process, used within IANR combines merit and peer review, and is the annual review by state commodity check-off boards of more than 100 research and extension funding proposals submitted by Extension and ARD faculty. Proposals selected for funding address the most significant problems currently facing the producer members of these boards and clearly communicate the research's relevance to user needs. This review process provides additional valuable input to the extension and ARD planning efforts.

Department and Research/Extension Center comprehensive six-year reviews provide another information source to ensure program quality and relevance. Teams comprised of three to six external panel members and approximately two internal panel members from other departments conduct these reviews, which ensure that the programs provided focus on Nebraskans' most pressing needs.

### III. Stakeholder Input

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

- Use of media to announce public meetings and listening sessions
- Targeted invitation to traditional stakeholder groups
- Targeted invitation to non-traditional stakeholder groups
- Targeted invitation to traditional stakeholder individuals
- Targeted invitation to non-traditional stakeholder individuals
- Targeted invitation to selected individuals from general public
- Survey of traditional stakeholder individuals
- Survey of the general public

#### Brief Explanation

The University of Nebraska–Lincoln Extension and Agricultural Research Division have collaborated to deliver programs for over 10 years. Stakeholder input processes conducted by UNL Extension impact ARD planning and vice versa.

Hundreds of individuals are involved annually in the identification of program issues pertinent to the delivery of education through Nebraska's land grant university. Following are examples of the multitude of ways that input were sought this year from Nebraska residents, both metropolitan and non metropolitan .

Stakeholder listening session feedback is shared with the Extension action plan teams. The five UNL Extension action plan teams also received program input from their key clientele annually. (Each stakeholder represented a significant population, organization or was a key political leader.) Teams obtained stakeholder input in a variety of ways including face-to-face meetings and telephone or written surveys. In addition, a number of advisory committees associated with University of Nebraska academic departments and research and extension centers provided excellent input to both our extension programming and the Agricultural Research Division's research projects.

Throughout the process of garnering stakeholder input, special efforts were made to include non-traditional groups and individuals into the discussions. For example targeted invitations were made to representatives from under-represented populations. Traditional individual stakeholders are asked to bring non-traditional stakeholders to listening sessions. They are also asked to help identify non-traditional stakeholder groups that can be invited to participate. Separate listening sessions were held with under -represented populations.

In 2007, Extension boards statewide were involved in a series of Appreciative Inquiry efforts. Members of over 60 of the Extension Boards, sought out neighbors, colleagues, and even strangers to ask questions about the value of Extension initiatives and describe future program needs. It was found that the issues identified by clientele to Extension board members (split about 50/50 between those who used and did not use Extension programs) were consistent with those identified over time by key stakeholders.

#### 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 External Focus Groups
- Open Listening Sessions

#### **Brief Explanation**

Several methods were used to identify individuals and groups to provide programming process input. Because they have the closest association with their subject area, extension action teams were responsible for identifying stakeholders familiar with their area of programming and related issues impacting state residents. These action teams also kept abreast of Nebraska's changing demographic trends and included those audiences who might be underserved through our traditional programming.

Most IANR departments, research and extension centers, interdisciplinary centers and programs have external advisory groups representing stakeholders and users. These groups meet at least annually and provide input on current and future programs. Members of these groups are consistently asked to gain additional local input from individuals and groups in their communities. Special efforts were made to ensure that input from non-users and under-represented populations are included in the discussions.

### **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
- Meeting with traditional Stakeholder individuals
- Survey of traditional Stakeholder individuals
- Meeting specifically with non-traditional individuals
- Survey specifically with non-traditional individuals
- Meeting with invited selected individuals from the general public

#### **Brief Explanation**

Collecting accurate stakeholder input which reflects the needs of the state is an important part of University of Nebraska–Lincoln Extension and Agricultural Research Division programming. Hence, a variety of methods for data collection are used.

Action teams hold meetings with stakeholders to gain their input. Researchers meet with constituents and experts from other agencies to assess current needs. Representatives from commodity groups, the green industry and related industrial entities participate in the IANR department advisory committees. These advisory groups provide departmental and extension/research programmatic goal input. For each IANR listening session, the host extension educators were asked to invited key community stakeholders. In addition, many of the listening sessions issued a general invitation to the public.

Additional stakeholder input is sought from targeted audiences. For example the 4-H Youth Development team surveyed non-English speaking and high-risk youth in inner-city Omaha to determine what kinds of educational programs related to career development would best fit their needs. The Building Strong Families team worked with families who had been ordered by the courts to attend parenting classes to gain input as to the future direction of their work.

While stakeholder input from clients is vital to program and research success, on-going communication among experts is also critical. UNL Extension and academic departments compare action plans to insure congruence. This happens through group discussions between departmental and extension/research administrators and departmental administrative attendance as a part of the extension action plan team meetings. Action team planning included research/extension faculty and department heads. In addition, on-going dialogue among action team members and departmental faculty create unified programming efforts that meet needs identified by stakeholders.

In addition to the above methods, several action plan teams held regular meetings through telephone or face-to-face meetings. Latino and Native American audiences helped plan and deliver programs to promote cross cultural understanding and involvement of teens in local decision making and career planning.

In 2007, members of 60 Extension Boards in Nebraska conducted an Appreciative Inquiry process to determine what programs, and what resources of UNL Extension were being utilized. Over 2500 hundred contacts were made by Extension Board members.

### **3. A statement of how the input was considered**

- In the Budget Process
- To Identify Emerging Issues
- Redirect Extension Programs
- Redirect Research Programs
- In the Staff Hiring Process
- In the Action Plans
- To Set Priorities

**Brief Explanation**

UNL Extension and Agricultural Research Division concur that in addition to collecting stakeholder input, it must also be used to develop on-target education and research programs. Hence, this input was used for: the on-going visioning of action teams, making decisions as to budget allocations and hiring of new staff, re-directing and creating new programming, and setting priorities for the system.

For example, because of stakeholder input related to the need to do better marketing, UNL Extension is working with an outside marketing firm to develop tools and messages that will be delivered statewide. Because of stakeholder input, an Extension Educator was hired to work with energy, including bio-fuels and energy management. Water continues to be a top priority for Extension and research based on on-going conversations with stakeholder groups and individuals, hence a targeted water programming web site is being developed.

Through stakeholder involvement: UNL Extension programs are better marketed across the state. Program co-sponsorships become more likely as others learn about programs. Collaborating entities become program participants. Collaborating entities become sources of matching funds to deliver educational programs.

**Brief Explanation of what you learned from your Stakeholders**

Meetings and reports submitted by the extension action plan teams and research advisory committees indicate that while stakeholders generally see their goals as in alignment with Nebraskans' needs, modifications need to be ongoing to insure that the plan of work goals are positioned to have extension/research partner with other educational entities. The general tone of stakeholder reviewers is that the action plan teams' educational goals focus on high priority issues. Encouragement from stakeholders to not duplicate, but partner with other educational entities, remains a key item, as does the need to market and promote educational efforts undertaken. Additional themes that remain consistent are: UNL Extension needs to be able to respond more rapidly. Bring other partners to the table for planning and implementation. Become better acquainted with other entities delivering education in various program areas. Continue to use technology for program delivery. Throughout the 2007 listening sessions, the issues of highest priority for educational programming were economic development, community vitality and water quality and quantity.

**IV. Expenditure Summary**

<b>1. Total Actual Formula dollars Allocated (prepopulated from C-REEMS)</b>			
<b>Extension</b>		<b>Research</b>	
<b>Smith-Lever 3b &amp; 3c</b>	<b>1890 Extension</b>	<b>Hatch</b>	<b>Evans-Allen</b>
4641014	0	5889842	0

<b>2. Totaled Actual dollars from Planned Programs Inputs</b>				
	<b>Extension</b>		<b>Research</b>	
	<b>Smith-Lever 3b &amp; 3c</b>	<b>1890 Extension</b>	<b>Hatch</b>	<b>Evans-Allen</b>
<b>Actual Formula</b>	4394844	0	3373455	0
<b>Actual Matching</b>	4641014	0	5965663	0
<b>Actual All Other</b>	42158700	0	67211962	0
<b>Total Actual Expended</b>	51194558	0	76551080	0

<b>3. Amount of Above Actual Formula Dollars Expended which comes from Carryover funds from previous years</b>				
<b>Carryover</b>	360566	0	135701	0

**V. Planned Program Table of Content**

<b>S. NO.</b>	<b>PROGRAM NAME</b>
1	Sustainable and Economically Viable Food and Biomass Systems
2	A quality Environment and Effective Natural Resource Management
3	Viable Communities and Appropriate Quality of Life for Individuals and Families

**Program #1**

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

**1. Name of the Planned Program**

Sustainable and Economically Viable Food and Biomass Systems

**V(B). Program Knowledge Area(s)**

**1. Program Knowledge Areas and Percentage**

KA Code	Knowledge Area	%1862 Extension	%1890 Extension	%1862 Research	%1890 Research
205	Plant Management Systems	25%		25%	
216	Integrated Pest Management Systems	21%		21%	
307	Animal Management Systems	18%		18%	
315	Animal Welfare/Well-Being and Protection	11%		11%	
402	Engineering Systems and Equipment	6%		6%	
501	New and Improved Food Processing Technologies	5%		5%	
511	New and Improved Non-Food Products and Processes	3%		3%	
601	Economics of Agricultural Production and Farm Management	8%		8%	
606	International Trade and Development	2%		2%	
901	Program and Project Design, and Statistics	1%		1%	
<b>Total</b>		<b>100%</b>		<b>100%</b>	

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

**1. Actual amount of professional FTE/SYs expended this Program**

Year: 2007	Extension		Research	
	1862	1890	1862	1890
<b>Plan</b>	116.0	0.0	83.0	0.0
<b>Actual</b>	78.0	0.0	86.0	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
1616971	0	2133214	0
1862 Matching	1890 Matching	1862 Matching	1890 Matching
1707543	0	3772404	0
1862 All Other	1890 All Other	1862 All Other	1890 All Other
15511220	0	42501682	0

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

**1. Brief description of the Activity**

- Conduct research and extension programs to develop/deliver new and improved crop and livestock integrated management programs.
- Conduct research and extension programs to develop/deliver new and improved information to help producers create sustainable crop and livestock production programs.
- Conduct research and extension programs to develop/deliver new and improved information to identify new and emerging markets and marketing strategies for agricultural products and agribusiness.
- Conduct research and extension programs to develop/deliver information on new or improved food products and technologies and emerging efficiencies of production to Nebraska’s ag-based industries.

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

Targeted audiences will include a broad range of small and large agricultural producers and processors. Nebraska-based processors, especially start-up companies, will receive high priority. Specific groups that will use the research and education programs include:

- Crop and livestock producers
- State agribusiness
- Food processing facilities
- Natural Resource Districts
- Research and extension specialists
- Extension educators
- Commodity groups
- Nebraska independent crop consultants
- Seed fertilizer and pesticide suppliers
- Commercial pesticide applicators
- Certified crop advisors
- Neighboring state institutions
- Scientists and engineers developing new knowledge

**V(E). Planned Program (Outputs)**

**1. Standard output measures**

**Target for the number of persons (contacts) reached through direct and indirect contact methods**

	<b>Direct Contacts Adults</b>	<b>Indirect Contacts Adults</b>	<b>Direct Contacts Youth</b>	<b>Indirect Contacts Youth</b>
<b>Year</b>	<b>Target</b>	<b>Target</b>	<b>Target</b>	<b>Target</b>
<b>Plan</b>	37100	300000	750	2000
2007	68090	550000	2529	7000

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

**Patent Applications Submitted**

<b>Year</b>	<b>Target</b>
<b>Plan:</b>	2
2007 :	2

**Patents listed**

- 1) U.S. 60/803,684:ZHO-0601
- 2) U.S. 7,102,059

**3. Publications (Standard General Output Measure)**

**Number of Peer Reviewed Publications**

	<b>Extension</b>	<b>Research</b>	<b>Total</b>
<b>Plan</b>			
2007	56	499	0

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

**Output Target**

**Output #1**

**Output Measure**

- Number of scholarly publications and outputs related to economically viable and sustainable food and biomass systems.

<b>Year</b>	<b>Target</b>	<b>Actual</b>
2007	220	499

**Output #2**

**Output Measure**

- Number of workshops, continuing education programs, web-based curricula and field days/tours related to economically viable

<b>Year</b>	<b>Target</b>	<b>Actual</b>
2007	445	383

**Output #3**

**Output Measure**

- Number of Agricultural Research Division projects related to economically viable and sustainable food and biomass systems.

<b>Year</b>	<b>Target</b>	<b>Actual</b>
2007	190	200

**Output #4**

**Output Measure**

- Number of new extension publications and other education resources related to economically viable and sustainable food and

<b>Year</b>	<b>Target</b>	<b>Actual</b>
2007	35	56

**Output #5**

**Output Measure**

- Number of new or improved plant and animal genetic materials or resources related to economically viable and sustainable for

<b>Year</b>	<b>Target</b>	<b>Actual</b>
2007	25	29

**Output #6**

**Output Measure**

- Number of new products and decision tools developed and made available to clientele related to economically viable and susta

<b>Year</b>	<b>Target</b>	<b>Actual</b>
2007	10	15

**V(G). State Defined Outcomes****V. State Defined Outcomes Table of Content**

O No.	Outcome Name
1	Nebraska farmers will increase profitability through adoption of research and extension information provided by IANR programs (measured by value placed on the information by clientele).
2	Nebraska ranchers and feeders will increase profitability through adoption of research and extension information provided by IANR programs (measured by value placed on the information by clientele).
3	Nebraska farmers and ranchers will have sustainable food and biomass systems through adoption of best management practices (measured by percent of clientele adopting best management practices).
4	Nebraska will have access to a highly trained and educated workforce for economically viable and sustainable food and biomass systems (indirectly measured by number of undergraduate and graduate students receiving degrees).
5	Nebraska farmers will rely on IANR research and extension programs to assure an economically viable and sustainable food and biomass system (measured by percent of state acreage represented at education programs).

**Outcome #1****1. Outcome Measures**

Nebraska farmers will increase profitability through adoption of research and extension information provided by IANR programs (measured by value placed on the information by clientele).

**2. Associated Institution Types**

- 1862 Extension
- 1862 Research

**3a. Outcome Type:**

Change in Knowledge Outcome Measure

**3b. Quantitative Outcome**

Year	Quantitative Target	Actual
2007	133400000	140000000

**3c. Qualitative Outcome or Impact Statement****Issue (Who cares and Why)**

To remain economically viable and environmentally compatible in a rapidly changing world, Nebraska farmers and related agribusiness representatives must obtain and incorporate new research based knowledge as quickly as possible in order to gain efficiencies, be better stewards of our natural resources, and take advantage of new opportunities.

**What has been done**

In 2007, IANR program impact reports indicated over 14,500 farmers, agricultural-consultants, and other agri-business professionals, representing over 16.5 million acres of field crops in the state (primarily corn, soybeans, wheat, and sorghum), attended 231 workshops, field days, tours, etc. to gain new research based information to be more profitable and develop more sustainable farms and agricultural related businesses.

**Results**

Clientele attending IANR sponsored events assessed the value of the information in potential increased profits at \$14.05/acre, averaged across all field crop related programs. The accumulative value to the state in 2007 was estimated to be over \$140 million. Selected impacts include: Water optimizer demonstration project showed a water miser strategy used 31% less water, reduced corn yields only 3%, and pumping cost savings usually offset yield loss. Market Journal, an educational television and Web program, reaches an estimated 12,000 Nebraska households weekly with an estimated annual value to agriculture of \$26 million; Crop Management and Diagnostic Clinics drew nearly 500 participants that influence or manage nearly 6.5 million acres. Participants valued the knowledge gained at an average of \$6.67 per acre, or a total of nearly \$42.3 million; IANR-developed wheat varieties are worth roughly \$30 to \$35 million annually to Nebraska producers, based on increased yield alone.

**4. Associated Knowledge Areas**

KA Code	Knowledge Area
216	Integrated Pest Management Systems
402	Engineering Systems and Equipment
901	Program and Project Design, and Statistics
205	Plant Management Systems
601	Economics of Agricultural Production and Farm Management

**Outcome #2****1. Outcome Measures**

Nebraska ranchers and feeders will increase profitability through adoption of research and extension information provided by IANR programs (measured by value placed on the information by clientele).

**2. Associated Institution Types**

- 1862 Extension
- 1862 Research

**3a. Outcome Type:**

Change in Knowledge Outcome Measure

**3b. Quantitative Outcome**

Year	Quantitative Target	Actual
2007	81262000	58000000

**3c. Qualitative Outcome or Impact Statement****Issue (Who cares and Why)**

To remain economically viable and environmentally compatible in a rapidly changing world, Nebraska ranchers and feeders and related agribusiness representatives must obtain and incorporate new research based knowledge as quickly as possible in order to gain efficiencies, be better stewards of our natural resources, and take advantage of new opportunities.

**What has been done**

In 2007, IANR program impact reports indicated over 4,500 (plus 50,000 online) ranchers, feeders, and related agri-business professionals, representing over 4.1 million acres of range, hay, and crop land, and over 3.5 million head of cattle participated in 152 workshops, field days, tours, etc. to gain new research based information to be more profitable and develop more sustainable ranch, feeding, and related agricultural business operations.

**Results**

Clientele surveys valued the information provided at \$14.33/head, averaged across all livestock related impact reports. Total value was over \$58 million. Selected impacts include: Ranch Practicum influenced decisions of 1,160 attendees representing 603,000 acres of range, hay, and crops, and 42,200 head of cattle; Feeding Wet Byproducts of the ethanol industry had an estimated benefit to Nebraska of almost \$500 million over the past 15 years. IANR research determined the feasibility, benefits and economic advantages of feeding byproducts wet; E. coli O 157:H7 control in cattle before slaughter is a critical step in reducing outbreaks of this food borne pathogen. IANR research demonstrated the effectiveness of a new vaccine and a bacterial feed additive to reduce E. coli in the manure of feedlot cattle. Beef Feedlot Roundtable participants indicated they gained value worth \$5.05/head, with a total value to the state of over \$15 million. Attendees represented 3 million head of cattle.

**4. Associated Knowledge Areas**

KA Code	Knowledge Area
606	International Trade and Development
901	Program and Project Design, and Statistics
402	Engineering Systems and Equipment
601	Economics of Agricultural Production and Farm Management
307	Animal Management Systems
216	Integrated Pest Management Systems
315	Animal Welfare/Well-Being and Protection

**Outcome #3****1. Outcome Measures**

Nebraska farmers and ranchers will have sustainable food and biomass systems through adoption of best management practices (measured by percent of clientele adopting best management practices).

**2. Associated Institution Types**

- 1862 Extension
- 1862 Research

**3a. Outcome Type:**

Change in Knowledge Outcome Measure

**3b. Quantitative Outcome**

Year	Quantitative Target	Actual
2007	70	77

**3c. Qualitative Outcome or Impact Statement****Issue (Who cares and Why)**

To remain economically viable and environmentally compatible in a rapidly changing world, Nebraska farmers, ranchers, and related agribusiness representatives must obtain and incorporate new research based knowledge as quickly as possible. Clientele expressed intent to implement changes based on the new information presented at UNL sponsored events is a strong indication that the information presented was timely and of value to the agricultural industry.

**What has been done**

Participant surveys from 132 of the 383 workshops, field days, tours, clinics, and e-delivered offerings included a variety of quantitative economic and behavioral change questions. Over 17,400 farmers, ranchers, feedlot, and related agribusiness professionals participated in the 132 educational offerings and they represented over 16 million acres of Nebraska crops and 3.5 million head of cattle.

**Results**

The surveys indicated that over 80% of clientele participating in University of Nebraska sponsored workshops, field days, tours and e-delivered events definitely would or probably would make changes as a result of the new research based information presented. The participants attending the events represented over 87.6% of the crop acres and 66.7% of the cattle in the state. These results indicate the information provides economic value to the producers in the state, with over 80% using the information to make or consider changes in their operations. The information influences decision on 60-85% of agricultural production in the state.

**4. Associated Knowledge Areas**

KA Code	Knowledge Area
315	Animal Welfare/Well-Being and Protection
606	International Trade and Development
307	Animal Management Systems
601	Economics of Agricultural Production and Farm Management
901	Program and Project Design, and Statistics
205	Plant Management Systems
216	Integrated Pest Management Systems
402	Engineering Systems and Equipment
501	New and Improved Food Processing Technologies
511	New and Improved Non-Food Products and Processes

**Outcome #4****1. Outcome Measures**

Nebraska will have access to a highly trained and educated workforce for economically viable and sustainable food and biomass systems (indirectly measured by number of undergraduate and graduate students receiving degrees).

**2. Associated Institution Types**

- 1862 Extension
- 1862 Research

**3a. Outcome Type:**

Change in Knowledge Outcome Measure

**3b. Quantitative Outcome**

Year	Quantitative Target	Actual
2007	100	370

**3c. Qualitative Outcome or Impact Statement****Issue (Who cares and Why)**

To remain economically viable and environmentally compatible in a rapidly changing world, Nebraska farmers and related agribusiness representatives must have access to a highly educated and trained work force in order to take advantage of new information, incorporate new technologies, and adjust to changing economic, social, and environmental conditions.

**What has been done**

The University of Nebraska offers 27 undergraduate programs of study and two pre-professional programs in agriculture and natural resources, and 15 Master of Science and 12 Ph.D. programs. Our programs include agribusiness, animal science, agronomy, biochemistry, biological systems engineering, fisheries and wildlife, food science and technology, pre-veterinary medicine, professional golf management, etc.

**Results**

In 2007, there were 231 Baccalaureate, 105 Masters, and 34 Doctoral degrees conferred at the University of Nebraska in agricultural and natural resources related areas. Over 85% of our Baccalaureate degree students find jobs in their fields or continue with their professional education, and approximately 70% take their first job in Nebraska.

**4. Associated Knowledge Areas**

KA Code	Knowledge Area
216	Integrated Pest Management Systems
601	Economics of Agricultural Production and Farm Management
315	Animal Welfare/Well-Being and Protection
511	New and Improved Non-Food Products and Processes
402	Engineering Systems and Equipment
307	Animal Management Systems
901	Program and Project Design, and Statistics
606	International Trade and Development
501	New and Improved Food Processing Technologies
205	Plant Management Systems

**Outcome #5****1. Outcome Measures**

Nebraska farmers will rely on IANR research and extension programs to assure an economically viable and sustainable food and biomass system (measured by percent of state acreage represented at education programs).

**2. Associated Institution Types**

- 1862 Extension
- 1862 Research

**3a. Outcome Type:**

Change in Knowledge Outcome Measure

**3b. Quantitative Outcome**

Year	Quantitative Target	Actual
2007	64	80

**3c. Qualitative Outcome or Impact Statement****Issue (Who cares and Why)**

To remain economically viable and environmentally compatible in a rapidly changing world, Nebraska farmers, ranchers, and related agribusiness representatives must obtain and incorporate new research based knowledge as quickly as possible. For the University of Nebraska to effectively serve the needs of our clientele, our education efforts must reach a significant portion of the farming, ranching, and related agribusiness industry in the state.

**What has been done**

Participant surveys from 132 of the 383 workshops, field days, tours, clinics, and e-delivered offerings included a variety of quantitative economic and behavioral change questions. Over 17,400 farmers, ranchers, feedlot, and related agribusiness professionals participated in the 132 educational offerings and they represented over 16 million acres of Nebraska crops and 3.5 million head of cattle.

**Results**

The surveys indicated that over 80% of clientele participating in University of Nebraska sponsored workshops, field days, tours and e-delivered events definitely would or probably would make changes as a result of the new research based information presented. The participants attending the events represented over 87.6% of the crop acres and 66.7% of the cattle in the state. These results indicate the information provides economic value to the producers in the state, with over 80% using the information to make or consider changes in their operations. The information influences decision on 60-85% of agricultural production in the state.

**4. Associated Knowledge Areas**

KA Code	Knowledge Area
307	Animal Management Systems
601	Economics of Agricultural Production and Farm Management
205	Plant Management Systems
216	Integrated Pest Management Systems

**V(H). Planned Program (External Factors)****External factors which affected outcomes**

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

**Brief Explanation**

We met or exceeded all of our 2007 output/outcome targets except number of educational offerings (383, target was 445) and total value of livestock related information (\$58 million, target was \$81 million). We established our 2007 target numbers based on 2005 and 2006 results and some of the reduction in these two areas may reflect year to year variation.

However, major increases in the cost of livestock feed and fuel may have contributed to the slightly lower value estimates for the livestock information.

**V(I). Planned Program (Evaluation Studies and Data Collection)****1. Evaluation Studies Planned**

- After Only (post program)
- Before-After (before and after program)
- During (during program)

### **Evaluation Results**

### **Key Items of Evaluation**

**Program #2**

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

**1. Name of the Planned Program**

A quality Environment and Effective Natural Resource Management

**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	25%		25%	
111	Conservation and Efficient Use of Water	11%		11%	
112	Watershed Protection and Management	15%		15%	
121	Management of Range Resources	11%		11%	
123	Management and Sustainability of Forest Resources	1%		1%	
132	Weather and Climate	9%		9%	
135	Aquatic and Terrestrial Wildlife	8%		8%	
403	Waste Disposal, Recycling, and Reuse	17%		17%	
405	Drainage and Irrigation Systems and Facilities	1%		1%	
605	Natural Resource and Environmental Economics	2%		2%	
<b>Total</b>		<b>100%</b>		<b>100%</b>	

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

**1. Actual amount of professional FTE/SYs expended this Program**

Year: 2007	Extension		Research	
	1862	1890	1862	1890
<b>Plan</b>	47.0	0.0	34.0	0.0
<b>Actual</b>	44.0	0.0	35.0	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
912138	0	868169	0
1862 Matching	1890 Matching	1862 Matching	1890 Matching
963229	0	1535281	0
1862 All Other	1890 All Other	1862 All Other	1890 All Other
8749919	0	17297196	0

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

**1. Brief description of the Activity**

IANR will conduct research and deliver extension education programs that will enable Nebraska agricultural water users to use water in ways that maximize efficiency and profitability, protect water quality and meet regulatory requirements. Key elements of this effort include:

- Development of an improved understanding of basic plant, water, soil and climate relationships.
- Evaluation of alternative water delivery systems including sprinkler irrigation technologies and sub-surface drip irrigation systems.
- Evaluation of alternative irrigation water management strategies for all irrigation system types and particularly for situations where deficit irrigation is necessary.
- Development of adapted crop varieties, using either conventional breeding programs or genetic modification, that are more drought tolerant, perform well in deficit irrigation situations or require less evapotranspiration for profitable production.
- Evaluate alternative crops that require less applied irrigation water or are adapted to non-irrigated production, that will fit into Nebraska cropping systems and for which a market exists.
- Evaluate opportunities for shifting from irrigated to non-irrigated production or other enterprises that will maintain producer and community economic viability and sustainability.
- Develop decision-making support systems that enable producers, policy makers, financial institutions and others to make critical decisions regarding crop production and water resources use.
- Enhance research and extension education programs that will increase the scientific knowledge base and public understanding of the occurrence, movement and quality of ground water; factors that impact the quantity and quality of surface water; the interrelationships between ground water and surface water; and the ecology of Nebraska's ground water and surface water systems.
- Develop research and extension education programs that analyze the water resource and economic impacts of existing or proposed public policies.
- Enhance research and extension education programs that enable Nebraskans to protect ground water and surface water quality and respond to regulatory requirements.
- Enhance research and extension education programs that will enable communities and individuals to better understand and use appropriate technologies to protect the quality of drinking water supplies and to remove contaminants when drinking water standards are exceeded.
- Research-based information will be provided for individuals, groups and decision makers that will enable informed decisions relative to use of limited water supplies and protection of water quality.

## 2. Brief description of the target audience

Nebraska farmers and ranchers, along with landowners, are the primary target audience for this work. In addition, target audiences will include land managers, bankers, agricultural consultants and agribusiness professionals who provide products and services to farmers and ranchers. The program's research and education efforts will provide valuable information for state and local policy makers (especially Natural Resource District Boards of Directors) as their make decisions regarding natural resources issues. The program will provide agency staff with the knowledge they need to carry out the agency responsibilities and mandates.

## V(E). Planned Program (Outputs)

### 1. Standard output measures

#### Target for the number of persons (contacts) reached through direct and indirect contact methods

	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Year	Target	Target	Target	Target
Plan	10000	20000	8000	20000
2007	20900	41800	2400	6000

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

#### Patent Applications Submitted

Year	Target
Plan:	1
2007 :	0

#### Patents listed

**3. Publications (Standard General Output Measure)**

**Number of Peer Reviewed Publications**

	<b>Extension</b>	<b>Research</b>	<b>Total</b>
<b>Plan</b>			
2007	19	205	224

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

**Output Target**

**Output #1**

**Output Measure**

- Scholarly publications and outputs related to water management and water quality.

<b>Year</b>	<b>Target</b>	<b>Actual</b>
2007	50	131

**Output #2**

**Output Measure**

- Number of water management and water quality education workshops/presentations, continuing education programs, web-based

<b>Year</b>	<b>Target</b>	<b>Actual</b>
2007	150	264

**Output #3**

**Output Measure**

- Number of Agricultural Research Division projects that include water management and water quality as a key component.

<b>Year</b>	<b>Target</b>	<b>Actual</b>
2007	50	44

**Output #4**

**Output Measure**

- Number of new extension publications and other education resources developed.

<b>Year</b>	<b>Target</b>	<b>Actual</b>
2007	20	19

**Output #5**

**Output Measure**

- Number of scholarly publications and outputs addressing environmental and natural resources issues other than water manag

<b>Year</b>	<b>Target</b>	<b>Actual</b>
2007	30	74

**Output #6**

**Output Measure**

- Number of Agricultural Research Division projects that address environment and natural resource issues other than water mar

<b>Year</b>	<b>Target</b>	<b>Actual</b>
2007	30	36

**Output #7**

**Output Measure**

- Number of education workshops/presentations, continuing education programs, web-based curricula and field days/tours that

<b>Year</b>	<b>Target</b>	<b>Actual</b>
2007	40	74

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

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

O No.	Outcome Name
1	Irrigators will gain new knowledge and awareness of water conservation practices, crop water use rates, limited irrigation, irrigation scheduling and new irrigation technologies.
2	Nebraska farmers, ranchers, businesses and home owners will adopt new practices that will improve water management and protect water quality. This will be measured as the percentage of education program participants who indicate that they have adopted or plan to adopt new practices.
3	Livestock producers will continue to gain knowledge and awareness of appropriate practices to manage livestock manure.
4	Livestock producers will develop comprehensive nutrient management plans (CNMPs) and use best management practices for livestock manure handling and storage.
5	Nebraska farmers will increase their knowledge and awareness of how integrated pest management and pesticide best management practices can help protect water quality.
6	Nebraskans will gain increased awareness and knowledge of natural resources including wildlife, forest resources and rangeland and the relationship between natural resources stewardship, sustainability, economic viability and the environment.
7	Consumptive water use by irrigated crops will be reduced. The outcome measure will be the percent reduction of estimated consumptive water use when the current year is compared to the estimated consumptive water use in calendar year 2006. The consumptive water use will be estimated using the irrigation water pumped in Natural Resources Districts that require the use of water measurement devices.
8	Nebraska will not exceed its allocation of water in the Republican River as allowed by the interstate compact with Kansas and Colorado. Nebraska's allocation is 49% of the average annual water supply. The output measure will be the percent of the Republican River average annual water supply used by Nebraska.

**Outcome #1****1. Outcome Measures**

Irrigators will gain new knowledge and awareness of water conservation practices, crop water use rates, limited irrigation, irrigation scheduling and new irrigation technologies.

**2. Associated Institution Types**

- 1862 Extension
- 1862 Research

**3a. Outcome Type:**

Change in Knowledge Outcome Measure

**3b. Quantitative Outcome**

Year	Quantitative Target	Actual
2007	750	3940

**3c. Qualitative Outcome or Impact Statement****Issue (Who cares and Why)**

Vast quantities of water are used for irrigation in Nebraska (8,790 million gallons per day in 2000), representing almost 93% of all water use. The sustainability of irrigation is being questioned. In 2004, state policy established a process for defining watersheds as a fully or over-appropriated. Part or all of eleven Natural Resource Districts (out of a total of 23) are currently defined as fully or over-appropriated. Over-appropriated basins are required to reduce water use to 1997 levels.

**What has been done**

Extension sponsored 57 workshops/tours. Programs addressed: lowering energy costs, maintaining pumping plant performance, soil moisture/ET gauges for scheduling irrigation, managing limited irrigation, reducing pumping costs, sprinkler package selection, increasing fertilizer use efficiency, timing of irrigation application, skip row planting, Water Optimizer software application. Tours included visits to on-farm demonstration of soil moisture monitoring and ET gauges for scheduling irrigation.

**Results**

The 27 evaluated programs impacted 898 crop producers (57 programs reached 3,940 producers) which represented 1,560,000 acres of irrigated crops. Those attended programs for which evaluations were available represent approximately 20% of Nebraska's irrigated acres. Additional participants included crop consultants, Natural Resource District and USDA agency staff, and extension educators that influence management of additional acres. Post meeting evaluations completed by producers indicated that changes resulting from these workshops would result in a potential saving of approximately 1.7 inches of water per acre per year or 211,470 acre feet of water or about 69 billion gallons of water. Producers also indicated a potential savings of \$17,000,000. The quantitative outcome of 2.2% is a reduction in irrigation water pumped in Nebraska, not consumptive use (water loss during irrigation from evaporation).

**4. Associated Knowledge Areas**

KA Code	Knowledge Area
111	Conservation and Efficient Use of Water
405	Drainage and Irrigation Systems and Facilities
605	Natural Resource and Environmental Economics

**Outcome #2****1. Outcome Measures**

Nebraska farmers, ranchers, businesses and home owners will adopt new practices that will improve water management and protect water quality. This will be measured as the percentage of education program participants who indicate that they have adopted or plan to adopt new practices.

**2. Associated Institution Types**

- 1862 Extension
- 1862 Research

**3a. Outcome Type:**

Change in Action Outcome Measure

**3b. Quantitative Outcome**

Year	Quantitative Target	Actual
2007	65	74

**3c. Qualitative Outcome or Impact Statement****Issue (Who cares and Why)**

Agriculture impacts water quality. A 2006 Surface Water Quality Report suggests that dissolved oxygen, atrazine, and ammonia are increasing at 4 sites, decreasing at 12 sites and stable at 64 sites. The 2006 Nebraska Ground Water Quality Report suggests a slow upward trend in median nitrate levels (from 3 ppm in 1974 to 5 ppm in 2005) with a possible decline since 2001 and a decline in mean atrazine levels since the mid-1990's. Emerging pollutants of concern include EDCs and antibiotics.

**What has been done**

UNL Extension hosts range of educational experiences targeting issues related to water quality impairment from nitrogen, erosion, and herbicides. Programs target environmental design/best management practices for reducing contamination associated with tillage, irrigation, fertilization, chemigation, on-site waste water, and construction sites. In 2007, 140 workshops delivering 330 hours of instruction targeting improved water quality attended by 10,300 farmers/consultants and other professions.

**Results**

Agricultural programs impacted about 10,000,000 acres of cropland. On-site wastewater programs certified 733 professionals, and construction site sediment control programs were attended by 300 public and private sector individuals involved in construction. Sample impacts include:

- 1) creation of a professional on-site waste water association that lobbied for and received required state certification of on-site installers, pumpers, and inspectors;
- 2) 91% of construction industry professionals indicating adoption of new practices for reducing construction site erosion;
- 3) Increase in no-till planted crop acres by 12% between 2004 and 2006 based upon a survey of 40 counties;
- 4) Reduction in erosion of 35,000 tons per year in a TMDL listed Shell Creek watershed;
- 5) Producer adoption rate of no-till increasing from 17% in 1996 to 75% in 2006 and adoption or post-apply herbicides increasing from 57% to 80% over same time period (suggesting reduced atrazine use) in Blue River basin.

**4. Associated Knowledge Areas**

KA Code	Knowledge Area
102	Soil, Plant, Water, Nutrient Relationships
112	Watershed Protection and Management
605	Natural Resource and Environmental Economics

**Outcome #3****1. Outcome Measures**

Livestock producers will continue to gain knowledge and awareness of appropriate practices to manage livestock manure.

**2. Associated Institution Types**

- 1862 Extension
- 1862 Research

**3a. Outcome Type:**

Change in Knowledge Outcome Measure

**3b. Quantitative Outcome**

Year	Quantitative Target	Actual
2007	400	5350

**3c. Qualitative Outcome or Impact Statement****Issue (Who cares and Why)**

Individuals involved in public policy issues, animal production, and delivery of technical services for confined animal systems need on-demand access to the nation's best science-based resources. This information is critical to preparing and implementing good public policy and to advising animal producers on nutrient and manure management decisions. Access to such information is generally limited through traditional continuing education opportunities and published resources.

**What has been done**

The Livestock Environmental Learning Center is a national project involving individuals from 20+ land grant universities, USEPA, USDA, and USGS. This team, co-lead by UNL faculty, published a monthly newsletter, hosted 10 web cast workshops, and published the eXtension web site for animal manure issues (<http://www.extension.org/animal+manure+management>).

Extension staff has installed 31 on-farm demonstrations of appropriate technologies for small livestock farms and hosted 7 workshops in 2007.

**Results**

As of February 2008, the Learning Center has hosted 17 web cast seminars on animal manure management issues for a national audience. The comments received in the post-web cast evaluations are overwhelmingly positive. Thirty-four national experts from 14 universities, US EPA, USDA (ARS, CSREES, and NRCS), and USGS have contributed to the web casts. Approximately 1700 individuals have viewed the live webcasts. Archived webcast were viewed approximately 1100 times. The average individual viewing a live webcast reports that they interact with 139 producers during a calendar year. 80% of participants use the workshop for continuing education, 60% for public policy development or implementation. 50% for producer recommendations, and 40% in nutrient planning. Participants are primary from regulatory agencies, extension, USDA, private sector consultants, or agricultural or environmental agencies and represent all parts of the US and Canada.

**4. Associated Knowledge Areas**

KA Code	Knowledge Area
102	Soil, Plant, Water, Nutrient Relationships
605	Natural Resource and Environmental Economics
403	Waste Disposal, Recycling, and Reuse

**Outcome #4****1. Outcome Measures**

Livestock producers will develop comprehensive nutrient management plans (CNMPs) and use best management practices for livestock manure handling and storage.

**2. Associated Institution Types**

- 1862 Extension
- 1862 Research

**3a. Outcome Type:**

Change in Action Outcome Measure

**3b. Quantitative Outcome**

Year	Quantitative Target	Actual
2007	300	662

**3c. Qualitative Outcome or Impact Statement****Issue (Who cares and Why)**

Nutrient management plans (NMPs) are the foundation for environmental stewardship in livestock operations. NMPs are an essential expectation for cost share assistance through NRCS and required for USEPA and state of Nebraska permitting programs.

**What has been done**

Extension specialists and educators conducted 21 training events enabling 660 AFO operators to better understand concepts underlying manure use planning and to enhance their skill in developing and implementing the plans. The skills taught include using the P-index, understanding relevant regulations, calibrating equipment and testing manure, identifying location of setbacks, calculating nutrients available, calculating nutrients needed, preparing an annual plan, and identifying records needed.

**Results**

Twenty-one training events were attended by 660 AFO operators. This included 169 participants in the CNMP program which represented an average one-time livestock capacity of 753,529 cattle, 280,529 swine and nursery pigs, 5 million poultry, and nearly 1200 acres/farm of cropland. The additional 491 participants attended workshops targeting the value of manure and implementation of the Phosphorus Index.

Most producers (97 %) expect the CNMP program will improve their compliance with environmental regulations and reduce fertilizer expenses (90 %). Nearly half will increase the land used for manure application (reduce application rate). When asked about skills taught in class, 97% felt they could identify issues or situations where manure application regulations applied to their farm, 96% could calculate nitrogen and phosphorus credit from manure, 97% could calculate the nutrients needed by a crop, and 94% could identify records needed for maintaining a permit.

**4. Associated Knowledge Areas**

KA Code	Knowledge Area
605	Natural Resource and Environmental Economics
102	Soil, Plant, Water, Nutrient Relationships
403	Waste Disposal, Recycling, and Reuse

**Outcome #5****1. Outcome Measures**

Nebraska farmers will increase their knowledge and awareness of how integrated pest management and pesticide best management practices can help protect water quality.

**2. Associated Institution Types**

- 1862 Extension
- 1862 Research

**3a. Outcome Type:**

Change in Knowledge Outcome Measure

**3b. Quantitative Outcome**

Year	Quantitative Target	Actual
2007	5000	1870

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

**Issue (Who cares and Why)**

A variety of pest problems occur in Nebraska, including insects, weeds and plant diseases. Economically important pest species may vary by location within state and by year. Users of IPM need skills to identify and assess pest problems, and make intelligent management decisions, taking into account relevant economic, environmental, and health issues. The diversity of cropping systems and environments across Nebraska challenges faculty to identify site-specific IPM systems for adoption.

**What has been done**

IPM program addresses Crop IPM, Urban IPM, and Vertebrate IPM/Wildlife Damage. Crop IPM targets IPM approaches to weed, disease and insect problems through extension workshops and field training clinics. The Urban IPM team hosts an annual Urban Pest Management Conference, and a School IPM pilot program in cooperation with districts in eastern Nebraska. The Wildlife team addresses in-state wildlife IPM and management issues as well as co-leads an eXtension CoP in Wildlife Damage Management.

**Results**

The Integrated Crop Management Program impacted 1.1 million acres of row crop production in Nebraska and participants indicated that the knowledge gained or changes to be made would have an estimated value of \$9,250,000. Responses from Crop Protection Clinic participants indicated that 29% would change their management practices based on what they learned. Since the Northeast Nebraska IPM Newsletter was started in 1983, a total of approximately \$3,505,600 in specific reported benefits has been documented. Seventy-eight pest management companies participated in the Nebraska Urban Pest Management Conference and 42% of the participants responding to an evaluation indicated that the conference had increased their revenue. Surveys of the IPM in Schools Program showed that 67% of the participants would decrease their use of pesticides and none would increase their use of pesticides. In December 2006, the Wildlife Damage group, one of the pioneering CoPs, launched their eXtension web site.

**4. Associated Knowledge Areas**

KA Code	Knowledge Area
135	Aquatic and Terrestrial Wildlife
605	Natural Resource and Environmental Economics
102	Soil, Plant, Water, Nutrient Relationships

**Outcome #6**

**1. Outcome Measures**

Nebraskans will gain increased awareness and knowledge of natural resources including wildlife, forest resources and rangeland and the relationship between natural resources stewardship, sustainability, economic viability and the environment.

**2. Associated Institution Types**

- 1862 Extension
- 1862 Research

**3a. Outcome Type:**

Change in Knowledge Outcome Measure

**3b. Quantitative Outcome**

Year	Quantitative Target	Actual
2007	5000	5138

**3c. Qualitative Outcome or Impact Statement****Issue (Who cares and Why)**

Nebraska natural resources are critical to sustaining the state's population and economy. Approximately 50% of the state's land is pasture or rangeland and nearly 40% is crop land which is the foundation for a \$12 billion agricultural economy (2006) and a rapidly expanding ethanol industry. The water resources sustain production on 50% of the cropland resources. The land and water resources also support a myriad of biological resources critical to outdoor recreation.

**What has been done**

Extension sponsors a range of educational opportunities. Agriculture targeted programs include topics such as carbon sequestration, organic agricultural systems, invasive species control, participation in the Conservation Security Program, and range fire recovery. Youth/Teacher targeted programs include festivals/field days addressing water, environment, range, and other issues. General public programs address sustainable agriculture for acreages, wetlands, and green energy and conservation.

**Results**

In 2007, 69 programs provided 5139 learners with 13,500 learner-hours of education. Outcomes include expanded student appreciation and awareness of career opportunities in environmental and agricultural fields, expanded hands-on opportunities for teacher application in science classes, expanded knowledge of CSP cost-share opportunities to reduce water use in the Republican River basin, and 733 certified professions for on-site wastewater system installation and maintenance.

**4. Associated Knowledge Areas**

KA Code	Knowledge Area
135	Aquatic and Terrestrial Wildlife
121	Management of Range Resources
123	Management and Sustainability of Forest Resources
605	Natural Resource and Environmental Economics
132	Weather and Climate
112	Watershed Protection and Management

**Outcome #7****1. Outcome Measures**

Consumptive water use by irrigated crops will be reduced. The outcome measure will be the percent reduction of estimated consumptive water use when the current year is compared to the estimated consumptive water use in calendar year 2006. The consumptive water use will be estimated using the irrigation water pumped in Natural Resources Districts that require the use of water measurement devices.

**2. Associated Institution Types**

- 1862 Extension
- 1862 Research

**3a. Outcome Type:**

Change in Action Outcome Measure

**3b. Quantitative Outcome**

Year	Quantitative Target	Actual
2007	0	2

**3c. Qualitative Outcome or Impact Statement****Issue (Who cares and Why)**

Vast quantities of water are used for irrigation in Nebraska (8,790 million gallons per day in 2000), representing almost 93% of all water use. The sustainability of irrigation is being questioned. In 2004, state policy established a process for defining watersheds as a fully or over-appropriated. Part or all of eleven Natural Resource Districts (out of a total of 23) are currently defined as fully or over-appropriated. Over-appropriated basins are required to reduce water use to 1997 levels.

**What has been done**

Extension sponsored 57 workshops/tours. Programs addressed: lowering energy costs, maintaining pumping plant performance, soil moisture/ET gauges for scheduling irrigation, managing limited irrigation, reducing pumping costs, sprinkler package selection, increasing fertilizer use efficiency, timing of irrigation application, skip row planting, Water Optimizer software application. Tours included visits to on-farm demonstration of soil moisture monitoring and ET gauges for scheduling irrigation.

**Results**

The 27 evaluated programs impacted 898 crop producers (57 programs reached 3,940 producers) which represented 1,560,000 acres of irrigated crops. Those attended programs for which evaluations were available represent approximately 20% of Nebraska's irrigated acres. Additional participants included crop consultants, Natural Resource District and USDA agency staff, and extension educators that influence management of additional acres. Post meeting evaluations completed by producers indicated that changes resulting from these workshops would result in a potential saving of approximately 1.7 inches of water per acre per year or 211,470 acre feet of water or about 69 billion gallons of water. Producers also indicated a potential savings of \$17,000,000. The quantitative outcome of 2.2% is a reduction in irrigation water pumped in Nebraska, not consumptive use (water loss during irrigation from evaporation).

**4. Associated Knowledge Areas**

KA Code	Knowledge Area
111	Conservation and Efficient Use of Water
605	Natural Resource and Environmental Economics
405	Drainage and Irrigation Systems and Facilities
112	Watershed Protection and Management

**Outcome #8****1. Outcome Measures**

Nebraska will not exceed its allocation of water in the Republican River as allowed by the interstate compact with Kansas and Colorado. Nebraska's allocation is 49% of the average annual water supply. The output measure will be the percent of the Republican River average annual water supply used by Nebraska.

**2. Associated Institution Types**

- 1862 Extension
- 1862 Research

**3a. Outcome Type:**

Change in Condition Outcome Measure

**3b. Quantitative Outcome**

Year	Quantitative Target	Actual
2007	49	57

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

**Issue (Who cares and Why)**

The Republican River Compact allocates the water supply of the Republican River, 11% to CO, 49% to NE and 40% to KS. 2006 consumptive use estimates suggest the Nebraska exceeded its allocation by 31,500 acre-feet. Projections suggest that a 20% reduction in irrigation water pumping is necessary for compliance. Natural Resource Districts have developed plans intended to achieve this target that will retire irrigated acres, improve efficiency of irrigation water use, and limit irrigation.

**What has been done**

Eighteen of the 27 extension sponsored workshop with evaluation data discussed in the previous outcome occurred within the Republican River watershed and several additional programs were within driving distance of the watershed. Based upon producer evaluations of the programs, 67% of the Results described in the previous Outcome are a result of changes made by producers in the Republican River watershed.

**Results**

The programs impacted 600 crop producers who represented 1,050,000 acres of irrigated crops. This represents approximately 14% of Nebraska's irrigated acres. Additional participants included crop consultants, Natural Resource District and USDA agency staff, and extension educators that influence management of additional acres. Post meeting evaluations completed by producers indicated that changes resulting from these workshops would result in a potential saving of approximately 1.7 inches of water per acre per year or 142,000 acre feet of water or about 46 billion gallons of water. Producers also indicated a potential savings of \$11,000,000. The quantitative outcome of 1.5% is a reduction in irrigation water pumped in Nebraska, not consumptive use (water loss during irrigation from evaporation).

**4. Associated Knowledge Areas**

KA Code	Knowledge Area
605	Natural Resource and Environmental Economics
111	Conservation and Efficient Use of Water
112	Watershed Protection and Management
405	Drainage and Irrigation Systems and Facilities

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

**External factors which affected outcomes**

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

**Brief Explanation**

**Natural disasters:** Drought conditions have persisted in western half of Nebraska in 2007. Drought conditions influencing significant areas of Nebraska since 2001 have dramatically reduced surface water flows resulting in less surface water available for irrigation, smaller allocations of water for Nebraska in the Republican River basins, and declining ground water levels in significant areas of Nebraska.

**Economy:** Rapidly increasing land value, energy prices, and fertilizer prices have rapidly increased cost of production for corn, soybeans, and other crop commodities. Rapidly increasing prices for wheat, corn, soybeans, and hay crops have added to the potential income of crop producers, caused the increase in land values and rental costs, and substantially reduce the profits (or expanded the losses) from animal production. These trends are increasing the pressure on removal of land from conservation reserve programs, increased the acreage in corn production, and squeezed the profitability of the infant biodiesel industry and the rapidly growing ethanol industry. On a positive note, high fertilizer prices is encouraging much more efficient use of manure nutrients from livestock operations which will help in the implementation of environmental policy targeting the animal industry.

**Public policy and Government Regulations:** Uncertainty in federal policy for Concentrated Animal Feeding Operations (CAFOs) and tighter state regulations of CAFOs have encouraged animal producers to obtain environmental permits and implement animal housing runoff controls and nutrient management plans.

Changing state policy relative to irrigation water use is preventing expansion of irrigation in many regions of Nebraska, encouraging more efficient irrigation practices, and removing some land from irrigation (primarily in Republican River basin).

**Competing Public Priorities:** National policy encouraging greater ethanol production from corn has rapidly ramped up ethanol production and corn acreage in 2007. Such changes are in competition with efforts to conserve water use for irrigation of corn and reduce nitrate and pesticide contamination of surface and ground water. Growth of the ethanol industry is also resulting in greater phosphorus accumulation on livestock operations which is competing CAFO policy designed to reduce phosphorus accumulation.

## V(I). Planned Program (Evaluation Studies and Data Collection)

### 1. Evaluation Studies Planned

- During (during program)

### Evaluation Results

The Food Production and Natural Resources program is developing statewide evaluation tools for estimating statewide program impacts. The Livestock sub-group will begin implementing a tool on July 1, 2008 and the Cropping Systems and Natural Resources groups intend to follow suit by start of 2009. Currently, program impacts are defined for individual events or initiatives. One example is the Crop Management Diagnostic Clinics hosted at the UNL Agricultural Research and Development Center addressing both program goals of “a quality environment and effective natural resources management” and “sustainable and economically viable food and biomass systems”. A team of extension faculty host in-field training events targeting crop consultants. In 2007, 807 participants, who manage or influence management of 7,180,000 acres, attended a one-day clinic. 86% of participants will definitely or probably make changes in their recommendations or management based upon the clinic with an estimated value of \$8.64 per acre (more than \$65,000,000 value to crop producers). As a result of attending the clinics, producers and agribusiness professionals gained:

- Knowledge of the science of biotechnology and germplasm related to yield, reduced chemical use and specialty grains.
- Knowledge of precision agricultural technologies to manage variable rate application and improve accuracy of application.
- Skills to diagnose weed and insect problems in corn, alfalfa and soybeans.
- Skills to implement nutrient management practices to correct nutrient deficiencies and protect water quality.
- Ways to use transgenic crops to control insects.
- Techniques to improve no till and conservation tillage practices.

### Key Items of Evaluation

The Crop Management Diagnostic Clinics evaluated participants changes in knowledge and behavior relative to the following:

1. Knowledge gained relative to :
  - Knowledge of the science of biotechnology and germplasm related to yield, reduced chemical use and specialty grains.
  - Knowledge of precision agricultural technologies to manage variable rate application and improve accuracy of application.
  - Skills to diagnose weed and insect problems in corn, alfalfa and soybeans.
  - Skills to implement nutrient management practices to correct nutrient deficiencies and protect water quality.
  - Ways to use transgenic crops to control insects.
  - Techniques to improve no till and conservation tillage practices.
2. Economic value of anticipated changes in management practices or recommendations.
3. Number of acres directly management or influenced through recommendations in a one year period.

**Program #3**

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

**1. Name of the Planned Program**

Viable Communities and Appropriate Quality of Life for Individuals and Families

**V(B). Program Knowledge Area(s)**

**1. Program Knowledge Areas and Percentage**

KA Code	Knowledge Area	%1862 Extension	%1890 Extension	%1862 Research	%1890 Research
608	Community Resource Planning and Development	10%		10%	
703	Nutrition Education and Behavior	25%		25%	
711	Ensure Food Products Free of Harmful Chemicals, Including	5%		5%	
712	Protect Food from Contamination by Pathogenic Microorgani	10%		10%	
724	Healthy Lifestyle	10%		10%	
801	Individual and Family Resource Management	5%		5%	
802	Human Development and Family Well-Being	5%		5%	
803	Sociological and Technological Change Affecting Individuals,	5%		5%	
806	Youth Development	25%		25%	
<b>Total</b>		100%		100%	

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

**1. Actual amount of professional FTE/SYs expended this Program**

Year: 2007	Extension		Research	
	1862	1890	1862	1890
<b>Plan</b>	49.0	0.0	14.0	0.0
<b>Actual</b>	90.0	0.0	15.0	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
1865735	0	372072	0
1862 Matching	1890 Matching	1862 Matching	1890 Matching
1970242	0	657978	0
1862 All Other	1890 All Other	1862 All Other	1890 All Other
17897561	0	7413084	0

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

**1. Brief description of the Activity**

•The institute will conduct research and deliver extension education programs that will enable Nebraskans to strengthen their families and communities. Output efforts will help reduce food-borne illness, increase healthy eating and active behaviors, increase number of self-confident community leaders and increase the number of communities with access to tools to aid economic development.

•Increasingly, learners lead time-pressed lives and want to access educational information at their convenience. While face-to-face teaching remains an ongoing focus of our efforts, many learners may choose to access educational information online through Internet sites, module learning and ask-an-expert. Therefore, we will employ a blend of teaching strategies to accomplish our educational goals and research of reaching individuals who want just-in-time research-based information and in depth behavior changing educational experiences.

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

Our targeted audiences include: 1. Food processing and retail establishment owners and staff 2. Children, youth and families 3. Youth and adults in community leadership roles 4. Entrepreneurs 5. Local and state decision makers

**V(E). Planned Program (Outputs)**

**1. Standard output measures**

**Target for the number of persons (contacts) reached through direct and indirect contact methods**

	<b>Direct Contacts Adults</b>	<b>Indirect Contacts Adults</b>	<b>Direct Contacts Youth</b>	<b>Indirect Contacts Youth</b>
<b>Year</b>	<b>Target</b>	<b>Target</b>	<b>Target</b>	<b>Target</b>
<b>Plan</b>	10000	20000	50000	20000
2007	12000	1000000	50126	20000

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

**Patent Applications Submitted**

<b>Year</b>	<b>Target</b>
<b>Plan:</b>	0
2007 :	0

**Patents listed**

**3. Publications (Standard General Output Measure)**

**Number of Peer Reviewed Publications**

	<b>Extension</b>	<b>Research</b>	<b>Total</b>
<b>Plan</b>			
2007	21	35	0

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

**Output Target**

**Output #1**

**Output Measure**

- 1) Extension and research refereed journal articles on viable communities and appropriate quality of life for individuals and families

<b>Year</b>	<b>Target</b>	<b>Actual</b>
2007	5	35

**Output #2**

**Output Measure**

- 2) Number of extension in-depth community, family and Individual topic-related educational workshops.

<b>Year</b>	<b>Target</b>	<b>Actual</b>
2007	30	150

**Output #3**

**Output Measure**

- 3) Number of extension community, family and individual program-related curricula, publications and other educational resources

<b>Year</b>	<b>Target</b>	<b>Actual</b>
2007	10	10

**Output #4**

**Output Measure**

- 4) Number of Agricultural Research Division projects that focus on community and appropriate quality of life for individuals and families

<b>Year</b>	<b>Target</b>	<b>Actual</b>
2007	3	24

V(G). State Defined Outcomes

V. State Defined Outcomes Table of Content

O No.	Outcome Name
1	<p>2) Nebraskans will gain knowledge to make effective choices about their health, wellness and diet to reduce their health care costs. This will be measured by comparing annual statistics from Nebraska Health and Human Services (NHHS) for Nebraskans having a decreased prevalence of obesity, heart disease and osteoporosis and reduced dependence on medical care for diet-related diseases.</p> <p>Individuals will increase knowledge of food selection and preparation with reduced fat and/or calories, USDA serving sizes and importance of adequate time spent in physical activity each day and increased understanding of the relationship between diet and physical activity to improve personal health.</p> <p>Individuals will select, prepare and eat recommended amount of fruits, vegetables, low-fat proteins and dairy and whole grains. In addition, individuals will better balance their intake of calories with their energy expenditures.</p>
2	<p>3) Nebraska's communities will have access to the tools they need to retain current residents and businesses and create opportunities for new residents and businesses. This will be measured by comparing annual statistics from the Nebraska Department of Economic Development (NDED) and surveys/case studies.</p> <p>Community leaders and business owners will understand the importance of strategic planning, support business development techniques and information technology to support community's development.</p> <p>Businesses within communities will work to be more profitable, entrepreneurs will be supported by the communities and informational technology will be used effectively to support community growth.</p> <p>Communities will have planned for the future, new businesses will have been created, and informational technology will be used to create partnerships between the community's public and private sectors.</p>
3	<p>4) Nebraska's youth will be informed decision makers and remain active members of their communities as they reach adulthood. This will be measured by surveys, interviews and case studies to document evidence of the benefits (impact) to a community for involving youth in the decision making process. Nebraska will have evidence of the roles and responsibilities that youth are assuming at the community level such as being included on community agendas, leading community decisions and helping establish community policies.</p> <p>Community members will have an increased understanding of how youth can engage with adults in a community decision making process to solve problems impacting their communities.</p> <p>Youth and adults will report improved decision making and problem solving skills. The number of youth engaged as partners in community civic activities will increase.</p>
4	<p>1) Food handlers will practice safe food handling procedures to reduce food-borne illness outbreaks. This will be measured by comparing annual Nebraska statistics from Nebraska Health and Human Services (NHHS) for reduced incidents of food-borne illness because of safe food handling, decreased medical costs due to food-borne illness outbreaks and decreased days lost from work.</p> <p>Food handlers (food service workers, food processors and livestock producers) will increase their knowledge of safe food handling practices measured by increased knowledge about adequate food handling and preparation and animal management practices.</p> <p>Food handlers will implement safe food handling practices for the reduction of food borne illnesses because of strategies learned through ServSafe, HAACP and Quality Assurance.</p>

**Outcome #1****1. Outcome Measures**

2) Nebraskans will gain knowledge to make effective choices about their health, wellness and diet to reduce their health care costs. This will be measured by comparing annual statistics from Nebraska Health and Human Services (NHHS) for Nebraskans having a decreased prevalence of obesity, heart disease and osteoporosis and reduced dependence on medical care for diet-related diseases.

Individuals will increase knowledge of food selection and preparation with reduced fat and/or calories, USDA serving sizes and importance of adequate time spent in physical activity each day and increased understanding of the relationship between diet and physical activity to improve personal health.

Individuals will select, prepare and eat recommended amount of fruits, vegetables, low-fat proteins and dairy and whole grains. In addition, individuals will better balance their intake of calories with their energy expenditures.

**2. Associated Institution Types**

- 1862 Extension
- 1862 Research

**3a. Outcome Type:**

Change in Condition Outcome Measure

**3b. Quantitative Outcome**

Year	Quantitative Target	Actual
2007	500	1000

**3c. Qualitative Outcome or Impact Statement****Issue (Who cares and Why)**

Health care costs are escalating. These increases impact the buying power of individuals, families, government and businesses. Net buying power is reduced when health care costs increase. Other necessities are eliminated. In the long term, preventive health care is one viable method to reduce or stabilize the cost of health care. The effort to teach Nebraskans to improve dietary practices and increase physical activity is essential.

**What has been done**

Preventive practices have been taught to multiple audiences by Extension. Trainer the trainer modules have disbursed education at multiple sites such as schools, health organizations, and to clients of state agencies. Educational programming for youth involved in after school programs, those attending 4-H camps and other activities have been especially valuable. Learning through technology, i.e., web programming, downlink satellite telecasts and 24/7 web access ([lancaster.unl.edu/food](http://lancaster.unl.edu/food)) are effective.

**Results**

Approximately 3,500 learner hours were provided in nutrition related education. ABCs for Good Health targeted low to moderate income women ages 40-64 who are uninsured or under-insured. Evaluations indicate that 74% reached their goals all or most of the time.

Over eighty-six percent of the 5,800 EFNEP and FSNEP families made a positive change in consumption of at least one food group, 76% made a change in one or more nutritional practices and ninety-four percent of youth (2,058) improved in eating a variety of foods.

A distance education program, Control Diabetes for Life, has been a joint effort between Extension and health care professionals. Results for this targeted audience (148) found that statistically significant behavior changes were made in 17 of 18 traits tested, such as incorporating more diabetes appropriate foods in into their diets. For the 437 who participated in Diabetes education since 2005-06 this calculated savings in future medical costs is over \$337,000.

**4. Associated Knowledge Areas**

KA Code	Knowledge Area
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806	Youth Development
703	Nutrition Education and Behavior
724	Healthy Lifestyle
801	Individual and Family Resource Management
802	Human Development and Family Well-Being

**Outcome #2**

**1. Outcome Measures**

3) Nebraska's communities will have access to the tools they need to retain current residents and businesses and create opportunities for new residents and businesses. This will be measured by comparing annual statistics from the Nebraska Department of Economic Development (NDED) and surveys/case studies.

Community leaders and business owners will understand the importance of strategic planning, support business development techniques and information technology to support community's development.

Businesses within communities will work to be more profitable, entrepreneurs will be supported by the communities and informational technology will be used effectively to support community growth.

Communities will have planned for the future, new businesses will have been created, and informational technology will be used to create partnerships between the community's public and private sectors.

**2. Associated Institution Types**

- 1862 Extension
- 1862 Research

**3a. Outcome Type:**

Change in Condition Outcome Measure

**3b. Quantitative Outcome**

Year	Quantitative Target	Actual
2007	15	15

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

**Issue (Who cares and Why)**

Nebraska ranks 15th in size among the 50 states and 38th in population (1.7 million people); hence, capitalizing on community resources is critical. Nebraskans are concerned about economic growth. Rural Nebraskans have a special interest in expanding the community vitality and attracting new residents. Decision makers are concerned about creating new businesses, capitalizing on innovation, developing skills of community leaders, and developing opportunities for youth to stay in the state.

**What has been done**

Extension is working statewide to develop human capacity and contribute to communities' economic, social, and cultural capital. Example programs include: helping rural communities capture tourism dollars, helping retailers capitalize on technology to expand their businesses, developing entrepreneurial skills among business owners, teaching farmers technology to better manage their operation, helping decision makers develop their leadership skills, and facilitating strategic planning processes.

**Results**

Examples of program results:

95% of farmers taking part in specialized computer classes increased their knowledge and ways to utilize computer technology in their agricultural operations.

54% of the 289 people taking part in classes designed to increase the economy of tourism became aware of community attractions and can share that information with visitors.

Residents in 20% of Nebraska counties participating in leadership programs increased their community involvement through activities including: becoming government leaders, developing web-based portals for marketing their community, and conducting community strategic plans.

6% of participants in e-commerce workshops have a working website for their business. An additional 18% are taking steps to develop an e-commerce site.

42 businesses in the EDGE program (designed to help emerging and small businesses) reported \$24.1 million in sales during 2006-2007. In addition, 280 full-time equivalent jobs were retained or newly created.

**4. Associated Knowledge Areas**

KA Code	Knowledge Area
608	Community Resource Planning and Development
803	Sociological and Technological Change Affecting Individuals, Fam

**Outcome #3**

**1. Outcome Measures**

4) Nebraska's youth will be informed decision makers and remain active members of their communities as they reach adulthood. This will be measured by surveys, interviews and case studies to document evidence of the benefits (impact) to a community for involving youth in the decision making process. Nebraska will have evidence of the roles and responsibilities that youth are assuming at the community level such as being included on community agendas, leading community decisions and helping establish community policies.

Community members will have an increased understanding of how youth can engage with adults in a community decision making process to solve problems impacting their communities.

Youth and adults will report improved decision making and problem solving skills. The number of youth engaged as partners in community civic activities will increase.

**2. Associated Institution Types**

- 1862 Extension
- 1862 Research

**3a. Outcome Type:**

Change in Condition Outcome Measure

**3b. Quantitative Outcome**

Year	Quantitative Target	Actual
2007	100	225

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

**Issue (Who cares and Why)**

Retention of its young people is critical to Nebraska's economy. Keeping youth involved in decision making processes creates a vested interest in the state and is critical to long-term growth. Communities are concerned about having trained leaders to take on decision making roles. Parents are concerned about ensuring that their children have leadership skills and are prepared to be capable adults. Changing demographics indicate that these concerns are especially important.

**What has been done**

One way to retain youth is by empowering them to have an active role in community decision making. Extension identified eight rural, majority Hispanic and Native American communities for on-going training and mentoring. Communities have been trained on youth/adult partnerships, the political process, and youth leadership. Each of these communities have youth/adult teams responsible for identifying local issues, planning programs to address those issues, and implementing those plans.

**Results**

As a result of the youth/adult partnership project funded by the National 4-H Council:  
 Each of the eight communities have youth/adult partnership teams that are carrying out local-level programs.  
 Three Nebraska youth were a part of the Helping America's Youth Conference.  
 Forty-five young people serve on local decision making boards.  
 200 Hispanics registered to vote through special programs offered by the Lexington youth/adult team. Candidate forums were sponsored by the team.  
 900 local residents attended the Hispanic Heritage Festival planned and implemented by the Lexington youth/adult team. This is twice the number who normally attend.  
 In addition, Nebraska 4-H continues to emphasize youth in decision making roles. Results of a statewide survey of over 500 4-H members show:  
 9 out of 10 agree that they are able to make a difference through service to their communities.  
 83% report the opportunity serve in a leadership role through 4-H.

**4. Associated Knowledge Areas**

<b>KA Code</b>	<b>Knowledge Area</b>
806	Youth Development
608	Community Resource Planning and Development
803	Sociological and Technological Change Affecting Individuals, Fam

**Outcome #4****1. Outcome Measures**

1) Food handlers will practice safe food handling procedures to reduce food-borne illness outbreaks. This will be measured by comparing annual Nebraska statistics from Nebraska Health and Human Services (NHHS) for reduced incidents of food-borne illness because of safe food handling, decreased medical costs due to food-borne illness outbreaks and decreased days lost from work.

Food handlers (food service workers, food processors and livestock producers) will increase their knowledge of safe food handling practices measured by increased knowledge about adequate food handling and preparation and animal management practices.

Food handlers will implement safe food handling practices for the reduction of food borne illnesses because of strategies learned through ServSafe, HACCP and Quality Assurance.

**2. Associated Institution Types**

- 1862 Extension
- 1862 Research

**3a. Outcome Type:**

Change in Condition Outcome Measure

**3b. Quantitative Outcome**

<b>Year</b>	<b>Quantitative Target</b>	<b>Actual</b>
2007	2000	1550

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

**Issue (Who cares and Why)**

Agriculture and food processing are Nebraska's main industry. Nebraska leads the nation in commercial livestock slaughter; hence, meat safety is an economic and public health issue for citizens, producers, and industry. There is a continual alert for food safety issues that will impact revenue generation. Because the food service/hospitality industry is the third largest industry in the state, educational programs targeting food managers is crucial.

**What has been done**

Since 2000, Extension has helped over 1,100 processors adopted Hazard Analysis and Critical Control Points (HACCP). Extension is a prominent provider of ServSafe, with more than 700 food service employees participating in 2006. Over 1,000 school-age youth were taught proper hand washing. Meals on Wheels recipients were taught refrigerator temperatures. On-going programming related to food safety is conducted for occasional quantity cooks, school cooks, and daycare providers.

**Results**

The following are examples of program results:

The incidence of E. coli bacteria found in Nebraska ground beef samples declined from 59 positive tests in 2001 to 20 positive tests in 2007.

School Food Service providers reported a 90% increase in Standard Operating Procedures, an 84% increase in knowledge about the process approach to HACCP, and a 40% increase in knowledge about categorizing recipes/menu items into one of the three HACCP processes as a result of their training.

Participants in ServSafe programs increased their knowledge of safe food handling practices (25%) use of thermometers (20%), and sanitation (23%).

As a result of the Food Safety Task Force Conference for Food Service Professionals, 91 program participants gained knowledge about the food safety of ethnic foods (65% increase), safety of produce (38% increase), custom-exempt meat processing (45% increase) and the food code (46% increase).

Approximately 500 4-H youth successfully completed Quality Assurance programs before showing meat animals at state and regional shows.

**4. Associated Knowledge Areas**

KA Code	Knowledge Area
703	Nutrition Education and Behavior
724	Healthy Lifestyle
712	Protect Food from Contamination by Pathogenic Microorganisms, Pa
711	Ensure Food Products Free of Harmful Chemicals, Including Residu

**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

**Brief Explanation**

As a rural state, Nebraska is highly dependent upon the weather. Drought continues in Western Nebraska.

Growth in ethanol plants, increased price of corn, increased price of land rental.

Re-focusing of positions to meet high priority needs that mean some traditional or outdated programs may not be available.

New guidelines passed by Congress requiring public schools to implement new food safety guidelines by July, 2006 increased the need for education for school cooks.

**V(I). Planned Program (Evaluation Studies and Data Collection)**

**1. Evaluation Studies Planned**

- Retrospective (post program)
- Before-After (before and after program)
- Case Study
- Comparisons between different groups of individuals or program participants experiencing different levels of program intensity.

#### **Evaluation Results**

UNL Extension is continuing to explore methods of statewide program evaluation that can effectively assess outcomes. Nebraska 4-H implemented a statewide evaluation system of address short and intermediate outcomes identified in the 4-H strategic plan. This involves an on-line process whereby county staff identify the indicators toward which they are teaching. A "survey builder" creates a standard survey based on these outcomes. This instrument is given to program participants, data is analyzed and results compiled. In 2007, over 500 youth participated in the survey. Plans are to continue to expand its use and replicate the process in other program areas. For example, indicators are currently being developed for programs related to health, nutrition, and family programs.

UNL Extension believes that applied research can not only help evaluate program effectiveness, but also help to ensure that current and planned programming is relevant for target audiences. For example, UNL Extension conducted a study of Meals on Wheels (MOW) participants to determine their delivered meal practices, refrigerator food practices and to monitor their refrigerator temperature for one week with a Temperature Data Tracker.

#### **Key Items of Evaluation**

UNL Extension will continue to implement statewide evaluation systems for the five UNL Extension action plans. The Healthy Families and Communities action plan is in the process of developing this statewide data collection system. The 4-H Youth Development action plan will continue to increase youth numbers recruited for their survey. More information on 4-H Youth Development survey system seen in the above section.