

# 2010 University of Nebraska Combined Research and Extension Annual Report of Accomplishments and Results

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## I. Report Overview

### 1. Executive Summary

Since 1988, the Institute of Agriculture and Natural Resources (IANR) of the University of Nebraska-Lincoln has served our state's residents by providing internationally-recognized science and education to assure the state's competitiveness in the global marketplace. IANR has followed a carefully developed and regularly revised strategic plan that is based upon clientele needs and concerns. Listening sessions for stakeholders at listening sessions is an ongoing focus of the IANR to help insure that our strategic plan is on target. The three strategic plan themes that have guided the work of the IANR are:

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

In 2010, these three strategic themes morphed into the five NIFA societal challenge areas. The IANR's efforts in teaching, research, and extension continue to evolve to these five societal theme areas. Also in 2010 listening sessions with clientele hosted by the Vice Chancellor of IANR and the Deans of the three mission areas led to further focus of Nebraska's work. Achievement of a twenty-five percent increase in production of food by our state's agricultural producers by 2025 was accepted as a 'big goal' for which to strive. This incredible goal will engage at least three, if not all, of the five societal goals identified by NIFA. The purpose of this goal is to contribute to feeding the ever increasing number of people of the world.

Through public-private partnerships IANR strives to accomplish the goals of its mission areas. During 2010 the results of relationship building with private partners led to joint efforts with Monsanto, Bayer Foundation, and Time Warner Cable to create new opportunities for research, extension, and teaching mission areas. Additionally gifts of \$50,000,000 from the Daughtery Foundation and \$20,000,000 from the Paul and Virginia Engler Foundation provided resources to address both water and entrepreneurship. All three mission areas will be impacted by these in-kind and financial resources. Public-private partnerships are viable ways for higher education to achieve its goals. These Nebraska partnerships are built on a common passion to accomplish a goal such as create more enthusiasm in youth for science or create opportunities for more young people to assume agricultural careers in our state. Additional relationship building efforts are underway in 2011. With reducing federal, state, and local tax dollar support; such public-private partnerships contribute to the public good. Senior administrators of IANR are leading these partnership building efforts.

IANR's framework for addressing the five societal themes continues to be sharpened using the latest in scientific methodology, research practices, and delivery methods. Nebraska Extension's emphasis on use of technology to deliver interactive learning for clientele is on the increase. Applications for iPads, iPhones, eBooks are among the tools under development to provide for clientele a 'just in time' learning experience.

In response to the Nebraska 2011 plan of work, NIFA personnel asked about the increase in

Research FTE and the reduction in Extension FTE. In the Nebraska system almost one hundred percent of department and research/extension center professors carry a joint appointment shared between Research and Extension. In the past that FTE split was typically 75%Extension - 25% Research. Over time this is shifting to 60% Extension - 40% Research or even a 50/50 split. More faculty are wanting a higher percent research appointment to accommodate their research. When possible this request of newly hired faculty is being accommodated.

Examples of impact in the five societal areas that are evidenced from our current work are:

Global Food Security and Hunger - 86% of livestock producers have made documented changes as a result of UNL Extension educational programs.

Climate Changes - As a result of Extension programs, people accessed drinking water information about 59,000 times for assistance in decision making to ensure safe drinking water at a reasonable cost.

Sustainable Energy - In 2010, over 1,700 producers/consultants (representing 6.6 million acres of cropland) attended an educational program, respondents indicated they saved \$9.80 per acre reduced pumping costs.

Childhood Obesity - 21% of youth participants improved knowledge and behavior related to food preparation, MyPyramid, healthy snacking, and physical activity.

Food Safety - ServSafe™ participants increased their knowledge of safe food handling practices by 40%.

Note: Why we are not supporting fourth outcome in Goal 3:

Based on stakeholder input and the need to more tightly focus our work, UNL Extension is no longer supporting family financial management. Our specialist in that area is retiring and it would be difficult for educators to lead high quality programming in this area without specialist support.

We have refocused our work on the Learning Child. Our goal is to help young children be successful by using a systems approach involving parents, families, caregivers, schools, and the community in child-focused efforts. This work fits well into our newly funded NIFA project working with caregivers of military families and a new Nebraska-based initiative funded by the Suzie Buffet Foundation.

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

Year: 2010	Extension		Research	
	1862	1890	1862	1890
Plan	200.0	0.0	136.0	0.0
Actual	205.0	0.0	139.0	0.0

## II. Merit Review Process

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

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

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

## 2. Brief Explanation

Clientele engagement is greatly valued in Nebraska. Hence, the review processes used in the past remain in place for Nebraska Extension and Research. The following strategies continue to be used:

Extension plan of work teams update their plans annually using stakeholder input. Stakeholders provide face-to-face input as well as through study of all extension action plans displayed on websites for public review.

Research faculty have current approved peer-reviewed projects that define their areas of investigation. The peer review process includes the Unit/Research and Extension Center head, a member of the faculty with relevant expertise, and an Associate Dean of the Agricultural Research Division. Following review and acceptable revision, the project outline is forwarded to USDA-CSREES for inclusion in the CRIS database.

Departments and Research/Extension Centers undergo five year comprehensive reviews to help insure goals remain on target; and that emerging science based issues are reflected in the work of our units. At least one Research and Extension Center, and two or three campus based academic departments undergo a review on an annual basis. Units strive to implement as best possible the recommendations of external review teams. It is the responsibility of the IANR Deans to work with the unit administrators to oversee the goals proposed by the unit, and supported (or modified) by the review team. Recommendations of the unit review are incorporated into the unit's annual goal statement for the five years till the next review.

Commodity check-off boards review more than 100 research and extension proposals on an annual basis. Proposals selected for funding address the significant problems facing the state's producers, and are chosen by the commodity boards, to address high priority items.

Additionally, two organizations organized to advocate for the IANR provide continual feedback. The Agricultural Builders of Nebraska and the Family-Youth-Community Partners meet at least quarterly to discuss the priority needs of constituents.

## 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 groups

- Survey of traditional stakeholder individuals
- Survey of the general public
- Survey specifically with non-traditional groups
- Survey specifically with non-traditional individuals
- Survey of selected individuals from the general public
- Other

**Brief explanation.**

Input from clientele is built into the fabric of the IANR planning process. To the credit of IANR administrators and faculty the goals of Research and Extension remain, for the most part, in alignment with needs of clientele. Programmatic goals generally evolve in our system, and do not change dramatically unless there is a sudden shift in available resources or the state's clientele are faced with a crisis. Our system does pride itself on being nimble to meet needs that quickly emerge. To this end the following strategies are used to garner input of clientele.

The University of Nebraska-Lincoln (UNL) Extension and Agricultural Research Divisions collaborate to plan and develop a timely response to issues identified. Research, teaching, and extension have worked together to develop a unified strategic planning process. This has been an ongoing process for more than 10-12 years. Listening sessions across the state provide significant input. During 2011 strategic listening sessions were led by the new IANR Vice Chancellor, Ronnie Green; and the Deans of Extension and Research in at least five locations in our state.

Extension Plan of Work Teams asked for input from key stakeholders. This input was sought through face-to-face meetings and discussions; and well as survey requests for input. Follow up surveys of those who attended an Extension educational class are requested both from the standpoint of impact the class had on their personal or business operation; and what additional issues should be addressed through education.

Most of the academic departments and Research/Extension Centers have advisory committees that represent stakeholders and meet at least annually. Stakeholder advisory committees are crucial in providing guidance to the issues of units as well as the overall goals of the IANR. Advisory committee members are selected for a multi year term and are representative of the unit's discipline and are selected to be representative of the stakeholders served by the units.

Members of county Extension Boards are also key to the collection of input. They are appointed by the elected governmental structure of their counties (commissioners and supervisors) and provide input to local Extension Educators.

**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 Internal Focus Groups
- Use External Focus Groups
- Open Listening Sessions

- Needs Assessments
- Use Surveys
- Other

**Brief explanation.**

IANR uses several methods to identify individuals and groups to provide input to our research and extension programs.

Extension Plan of Work Teams are responsible for identifying stakeholders familiar with the subject matter and related issues impacting state residents. Stakeholders include commodity groups, state agencies, private entities, school systems, county officials, etc.

Unit advisory group participants are identified by administrators and faculty to represent the stakeholders with an interest in the specific unit's research and extension program. The participants typically represent commodity groups, the green industry, related industrial entities, and advisory groups for IANR such as Ag Builders of Nebraska and Family, Youth & Community Partners.

For IANR listening sessions, Extension Educators housed at geographic site are asked to identify key community stakeholders. In addition, for some sessions general invitations to the public are made to achieve a broader range of input. Some listening sessions target leaders of specific groups to suggest participants. For example, listening sessions in Omaha and Lincoln target individuals who are cognizant of the needs of constituents.

The 4-H program uses a survey sampling technique to include input of specific groups. In addition, 4-H uses youth curriculum committee members to help identify critical curricula topics.

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

**1. Methods for collecting Stakeholder Input**

- Meeting with traditional Stakeholder groups
- Survey of traditional Stakeholder groups
- Meeting with traditional Stakeholder individuals
- Survey of traditional Stakeholder individuals
- Meeting with the general public (open meeting advertised to all)
- Survey of the general public
- Meeting specifically with non-traditional groups
- Survey specifically with non-traditional groups
- Meeting specifically with non-traditional individuals
- Survey specifically with non-traditional individuals
- Meeting with invited selected individuals from the general public
- Survey of selected individuals from the general public
- Other

**Brief explanation.**

The IANR listening sessions are face-to-face meetings with traditional and non-traditional stakeholders. Extension and Research Divisions have representatives in attendance at stakeholder sessions to hear input from clientele. IANR has faculty engage in one-on-one relationships with federal, state and local agencies; commodity organizations, companies, and a variety of non-profit organizations. These relationships lead to partnerships to plan and implement research and educational programs. This engagement provides significant stakeholder feedback. Extension Plan of Work Teams use a variety of methods to obtain input including face-to-face meetings, web-based surveys, and follow-up surveys of program participants. IANR is conscious that Spanish speaking residents is a quickly growing part of Nebraska's population. Extension Educators have developed methodology for input of Latino audiences that have resulted in educational programming within specific communities. An Extension Educator also works intently with the 1994 land grant institutions to help them in issue identification and grant applications. Jeff Hart, Extension Educator, working with the 1994s provides them assistance on an ongoing basis and helps them identify educational needs and locate resources. The Nebraska Rural Poll is sent annually to approximately 7,000 rural Nebraska residents with about a 40% return. The survey asks for input to a variety of issues impacting rural residents.

### **3. A statement of how the input will be 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
- Other

#### **Brief explanation.**

Research and Extension believe that stakeholder input is essential to the development, delivery, and support of our missions. Our state has used stakeholder input to help identify issues critical to our state's agricultural future, guide the hiring of personnel, the redirection of programs, as well as the introduction of new programs. As testimony to this effort, the following have been used:

IANR listening sessions identified priority issues for consideration by Research and Extension. The 'bigger than life' goal of increasing the production of food products in our state by 25% by 2025 was first a kernel of an idea heard at a listening session.

Extension Board members closely aligned with local needs have provided input and helped market educational programs. Extension plan of work teams have utilized what was learned from Extension Board 'conversations' with local clientele to affirm the goals of Extension's educational classes.

The engagement with minority audience stakeholders is used to help plan and deliver programs that promote cross cultural understanding. Teens are taught to be advocates for local communities. State legislators from impoverished and minority communities are requested to participate in the decision making process on programs and research topics.

Through stakeholder involvement, research results are made available to a broader range of

individuals. Tours for decision making stakeholders are held regularly to showcase the research, and its application through Extension educational classes.

Program priorities are a key part of the advertisement and hiring of new faculty. As Extension repositioned its plan of work teams the roles of Extension Educators working within content areas were reassessed. As Research priorities change, so do the hiring of new faculty with targeted expertise.

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

Stakeholders will be advocates for your research, teaching, and extension programs if they believe in the priorities selected for emphasis, if they are involved in the priority setting process, and IF the outcomes/accomplishments of your programs make a difference for the state's residents. This role of advocacy was essential in 2010 (and will be in 2011) as our educational institution faces financial struggles. Advocates have spoken repeatedly on behalf of the impact of research, teaching, and extension.

**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>
4960662	0	3829094	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>	4631861	0	3930338	0
<b>Actual Matching</b>	5102709	0	4131017	0
<b>Actual All Other</b>	0	0	0	0
<b>Total Actual Expended</b>	9734570	0	8061355	0

<b>3. Amount of Above Actual Formula Dollars Expended which comes from Carryover funds from previous</b>				
<b>Carryover</b>	778326	0	925982	0

## V. Planned Program Table of Content

S. No.	PROGRAM NAME
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

**Add previously unplanned program**

**V(A). Planned Program (Summary)****Program # 1****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

<b>KA Code</b>	<b>Knowledge Area</b>	<b>%1862 Extension</b>	<b>%1890 Extension</b>	<b>%1862 Research</b>	<b>%1890 Research</b>
201	Plant Genome, Genetics, and Genetic Mechanisms	4%		9%	
203	Plant Biological Efficiency and Abiotic Stresses Affecting Plants	4%		8%	
205	Plant Management Systems	11%		8%	
206	Basic Plant Biology	6%		8%	
211	Insects, Mites, and Other Arthropods Affecting Plants	3%		10%	
212	Pathogens and Nematodes Affecting Plants	3%		7%	
213	Weeds Affecting Plants	3%		4%	
215	Biological Control of Pests Affecting Plants	2%		2%	
216	Integrated Pest Management Systems	9%		4%	
301	Reproductive Performance of Animals	8%		5%	
302	Nutrient Utilization in Animals	5%		8%	
305	Animal Physiological Processes	2%		4%	
307	Animal Management Systems	8%		4%	
315	Animal Welfare/Well-Being and Protection	7%		2%	
402	Engineering Systems and Equipment	6%		4%	
501	New and Improved Food Processing Technologies	5%		5%	
511	New and Improved Non-Food Products and Processes	3%		5%	
601	Economics of Agricultural Production and Farm Management	8%		2%	
603	Market Economics	2%		1%	
901	Program and Project Design, and Statistics	1%		0%	
	<b>Total</b>	100%		100%	

Add knowledge area

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

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

Year: 2010	Extension		Research	
	1862	1890	1862	1890
Plan	78.0	0.0	86.0	0.0
Actual	66.0	0.0	85.0	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
1807873	0	2760079	0
1862 Matching	1890 Matching	1862 Matching	1890 Matching
2126067	0	2723879	0
1862 All Other	1890 All Other	1862 All Other	1890 All Other
0	0	0	0

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

**1. Brief description of the Activity**

- 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**

2010	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
<b>Plan</b>	37100	300000	750	2000
<b>Actual</b>	93897	354898	88029	117079

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

**Patent Applications Submitted**

Year: 2010  
 Plan: 2  
 Actual: 12

**Patents listed**

IL-1beta-releasing agents as novel adjuvants

Water Stable and Biocompatible Electrospun Protein Fibers

Improved Production and Yield Capacity of Transgenic Plants Expressing a Genetically Engineered Version of the Dicamba Monooxygenase Gene (aka, oxygenaseDIC)

Methods and Device for Non-Destructive Measurement of Relative Water Content in Plants

Development of Crops Tolerant to Treatment with Dicamba

Thermoplastics from distillers dried grains by esterification

Marigold Meal Extracts as a Natural Parasite Control Substance in Poultry

Alkaline active xylanases

New Gene Which Intensifies Purple Plant Color in Pearl Millet (Temporarily designated PP3)

Mask Scentometer

RNA Interference as a tool to control western corn rootworm adults and screening of gene function

Self-powered smart wireless identification sensor system for production agriculture applications

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

**Number of Peer Reviewed Publications**

2010	Extension	Research	Total
<b>Plan</b>	45	175	
<b>Actual</b>	48	206	254

**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.

- Not reporting on this Output for this Annual Report

Year	Target	Actual
2010	220	254

**Output #2**

**Output Measure**

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

- Not reporting on this Output for this Annual Report

Year	Target	Actual
2010	445	693

**Output #3**

**Output Measure**

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

- Not reporting on this Output for this Annual Report

Year	Target	Actual
2010	190	102

**Output #4**

**Output Measure**

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

- Not reporting on this Output for this Annual Report

Year	Target	Actual
2010	35	43

**Output #5**

**Output Measure**

- Number of new or improved plant and animal genetic materials or resources related to economically viable and sustainable food and biomass systems.

- Not reporting on this Output for this Annual Report

Year	Target	Actual
2010	15	6

**Output #6**

**Output Measure**

- Number of new products and decision tools developed and made available to clientele related to economically viable and sustainable food and biomass systems.
- Not reporting on this Output for this Annual Report

<b>Year</b>	<b>Target</b>	<b>Actual</b>
2010	10	8

**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 and ranchers 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 and livestock represented at education programs).

**Add Cross-cutting Outcome/Impact Statement or Unintended or Previously Unknown Outcome Measure**

**Outcome #1**

**1. Outcome Measures**

Not Reporting on this Outcome Measure

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
- Change in Action Outcome Measure
- Change in Condition Outcome Measure

**3b. Quantitative Outcome**

Year	Quantitative Target	Actual
2010	133400000	146690000

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

**Issue (Who cares and Why)**

To remain economically viable and environmentally sustainable 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 2010, IANR program impact reports indicated participation by about 17,000 farmers, agricultural consultants, and other agribusiness professionals who over see directly or indirectly one-third of Nebraska's crop land acres. UNL Extension taught 693 educational workshops, fields, days, professional develop sessions, and web delivered seminars to share new research based information and recommendations. In addition, many additional individuals were contacted through our statewide websites such as Crop Watch (<http://cropwatch.unl.edu>) and water (<http://water.unl.edu>). Shaping the Future of Food was the university display at Husker Harvest days and at other awareness building initiatives.

**Results**

Extension hosted educational workshops and classes to increase profitability. These educational experiences were taught through face to face classes, field day, and through on-line learning. These classes were evaluated for economic and behavioral changes. Examples of the impact of these educational classes is evidenced by the following reports. Fifty-eight soybean growers and agronomic industry representatives significantly increased their knowledge on identification, biology and management of soybean cyst nematodes. Participants estimated the value of information presented was \$20.73/acre. This makes the value of the programs \$2,108,687 on the

101,711 acres reported by participants.

Attendees at the Farmers and Ranchers college showed participants managed nearly 227,000 acres and valued information learned from the programs was \$5.A, with a potential program impact of \$1.1 million.

A UNL Extension led Center Pivot Water Conservation Project survey indicated center pivot irrigators attending project workshops were able to reduce pumping by 360,000 acre inches. This translated into less water used and a savings of \$1.5 million annually.

Two Nebraska No-till conferences, total number of acres of no-till increased by 981,438 acres, saved or made an additional \$14/A or \$13.7 million.

#### **4. Associated Knowledge Areas**

- 201 - Plant Genome, Genetics, and Genetic Mechanisms
- 203 - Plant Biological Efficiency and Abiotic Stresses Affecting Plants
- 205 - Plant Management Systems
- 206 - Basic Plant Biology
- 211 - Insects, Mites, and Other Arthropods Affecting Plants
- 212 - Pathogens and Nematodes Affecting Plants
- 213 - Weeds Affecting Plants
- 215 - Biological Control of Pests Affecting Plants
- 216 - Integrated Pest Management Systems
- 301 - Reproductive Performance of Animals
- 302 - Nutrient Utilization in Animals
- 305 - Animal Physiological Processes
- 307 - Animal Management Systems
- 315 - Animal Welfare/Well-Being and Protection
- 402 - Engineering Systems and Equipment
- 501 - New and Improved Food Processing Technologies
- 511 - New and Improved Non-Food Products and Processes
- 601 - Economics of Agricultural Production and Farm Management
- 603 - Market Economics
- 901 - Program and Project Design, and Statistics

#### **Outcome #2**

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

- Not Reporting on this Outcome Measure

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
- Change in Action Outcome Measure
- Change in Condition Outcome Measure

**3b. Quantitative Outcome**

Year	Quantitative Target	Actual
2010	81262000	53953195

**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. One of UNL Extensions five spires of excellence targets beef cattle systems.

**What has been done**

In 2010, IANR programs impacted over 4000 ranchers, feeders, and related agribusiness professionals, representing about 4.7 million head of cattle. Nebraska Extension hosts the #1 web site on beef from a search engine perspective and also leads the national eXtension beef web initiative. In 2010 Extension education focused on making profitable management decisions.

**Results**

The Beef Ranch Practicum series which is in its eleventh year 'sells out' each year. The small annual enrollment of about 35 allows for individual teaching on an intense basis. The course is taught by a team of animal science research and extension faculty over an eight month period. The management system decision making tools learned influenced decisions on 273,858 acres and 26,430 head of cattle in 2010. The benefit to the ranches for this 'one year of participation' was approximately \$11,168/operation, or about \$390,705.

The beef satellite series was taught to 215 producers at fifteen sites with nearly 50,000 acres of pasture supporting 13,576 beef cattle. The value indicated by producers for their attendance was \$10-\$30/head for a median impact of \$271,000.

Educational programs taught in 2010 included in-depth workshops, on-line classes, multi-state meetings and monthly classes. Evaluation data aggregated from these 100 plus education programs evidences that economic and management changes were made by the class attendees. The changes most reported were reproduction management (46% of the class participants), beef quality improvement (36%), reduced stress at weaning (31%), and improved cattle handling (35%).

**4. Associated Knowledge Areas**

- 201 - Plant Genome, Genetics, and Genetic Mechanisms
- 203 - Plant Biological Efficiency and Abiotic Stresses Affecting Plants
- 205 - Plant Management Systems
- 206 - Basic Plant Biology
- 211 - Insects, Mites, and Other Arthropods Affecting Plants
- 212 - Pathogens and Nematodes Affecting Plants
- 213 - Weeds Affecting Plants
- 215 - Biological Control of Pests Affecting Plants
- 216 - Integrated Pest Management Systems
- 301 - Reproductive Performance of Animals
- 302 - Nutrient Utilization in Animals
- 305 - Animal Physiological Processes
- 307 - Animal Management Systems
- 315 - Animal Welfare/Well-Being and Protection
- 402 - Engineering Systems and Equipment
- 501 - New and Improved Food Processing Technologies
- 511 - New and Improved Non-Food Products and Processes
- 601 - Economics of Agricultural Production and Farm Management
- 603 - Market Economics
- 901 - Program and Project Design, and Statistics

**Outcome #3**

**1. Outcome Measures**

- Not Reporting on this Outcome Measure

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
- Change in Action Outcome Measure
- Change in Condition Outcome Measure

**3b. Quantitative Outcome**

Year	Quantitative Target	Actual
2010	70	61

### 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

Extension hosted a large variety of workshops, field days, tours, clinics, on-farm research and electronically delivered offerings. Many of these events were evaluated by a variety of quantitative economic and behavioral change survey tools. In 2010, field days/workshops targeted economic sustainable practices in farming and ranching including 1) Emerging Ag Technologies reached 1,000 farmers and advisors on mapping, imagery, guidance technologies; 2) Winning the Game was attended by 550 participants on grain marketing strategies; 3) ethanol co-product utilization education was delivered to 5,700 small cattle producers; 4) Solution Days reached 500 participants on crop efficiency topics; 5) soybean management field days reached 434 participants on emerging soybean technologies; and 6) Ranching for Profitability reached 175 ranchers on cow nutrition topics. In addition, web based delivery through CropWatch ([cropwatch.unl.edu](http://cropwatch.unl.edu)) was accessed by 165,000 visitors who viewed more than 472,000 web

#### Results

The surveys indicated that on average 61% of clientele participating in University of Nebraska sponsored workshops, field days, tours and electronically delivered events definitely would or probably would make changes as a result of the new research based information presented. Sample impacts include 1) Winning the Game resulted in changes increased profitability by \$5400 per farm; 2) ethanol co-product utilization education produced likely changes on 55% of participating farms; 3) Solution Days produced an economic return of \$9.16 per acre or \$45 million; 4) soybean management field days participants saved \$4.9 million; and 5) Ranching for Profitability produced management changes that increased profitability on 59% of farms. Statewide aggregation of beef programs for cow/calf producers suggested that 86% of producers made documented changes as a result of UNL Extension programs, feedlot schools improved feeder profitability by \$940,000.

### 4. Associated Knowledge Areas

- 201 - Plant Genome, Genetics, and Genetic Mechanisms
- 203 - Plant Biological Efficiency and Abiotic Stresses Affecting Plants
- 205 - Plant Management Systems
- 206 - Basic Plant Biology
- 211 - Insects, Mites, and Other Arthropods Affecting Plants
- 212 - Pathogens and Nematodes Affecting Plants
- 213 - Weeds Affecting Plants
- 215 - Biological Control of Pests Affecting Plants
- 216 - Integrated Pest Management Systems
- 301 - Reproductive Performance of Animals

- 302 - Nutrient Utilization in Animals
- 305 - Animal Physiological Processes
- 307 - Animal Management Systems
- 315 - Animal Welfare/Well-Being and Protection
- 402 - Engineering Systems and Equipment
- 501 - New and Improved Food Processing Technologies
- 511 - New and Improved Non-Food Products and Processes
- 601 - Economics of Agricultural Production and Farm Management
- 603 - Market Economics
- 901 - Program and Project Design, and Statistics

**Outcome #4**

**1. Outcome Measures**

- Not Reporting on this Outcome Measure

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
- Change in Action Outcome Measure
- Change in Condition Outcome Measure

**3b. Quantitative Outcome**

Year	Quantitative Target	Actual
2010	100	0

**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 2010, there were 620 Baccalaureate and 230 Masters/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; approximately 70% take their first job in Nebraska.

### **4. Associated Knowledge Areas**

- 201 - Plant Genome, Genetics, and Genetic Mechanisms
- 203 - Plant Biological Efficiency and Abiotic Stresses Affecting Plants
- 205 - Plant Management Systems
- 206 - Basic Plant Biology
- 211 - Insects, Mites, and Other Arthropods Affecting Plants
- 212 - Pathogens and Nematodes Affecting Plants
- 213 - Weeds Affecting Plants
- 215 - Biological Control of Pests Affecting Plants
- 216 - Integrated Pest Management Systems
- 301 - Reproductive Performance of Animals
- 302 - Nutrient Utilization in Animals
- 305 - Animal Physiological Processes
- 307 - Animal Management Systems
- 315 - Animal Welfare/Well-Being and Protection
- 402 - Engineering Systems and Equipment
- 501 - New and Improved Food Processing Technologies
- 511 - New and Improved Non-Food Products and Processes
- 601 - Economics of Agricultural Production and Farm Management
- 603 - Market Economics
- 901 - Program and Project Design, and Statistics

### **Outcome #5**

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

- Not Reporting on this Outcome Measure

Nebraska farmers and ranchers 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 and livestock represented at education programs).

#### **2. Associated Institution Types**

- 1862 Extension
- 1862 Research

**3a. Outcome Type:**

- Change in Knowledge Outcome Measure
- Change in Action Outcome Measure
- Change in Condition Outcome Measure

**3b. Quantitative Outcome**

Year	Quantitative Target	Actual
2010	64	82

**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. In 2009, our Extension Action Teams identified our "Signature Outcomes" that will involve a targeted, statewide-delivered, educational programs engaging teams of specialists and educators. The behavioral and conditional outcomes from these programs will address Beef Systems Profitability, Enhancing Beef Cattle Health/Well Being and Economic Risk Management in Cropping Systems for the next several years.

**What has been done**

Participant surveys from workshops, field days, tours, clinics, and electronically delivered offerings included a variety of quantitative economic and behavioral change questions. Approximately 12800 individuals (10,000 cattle producers) participated in beef production programs representing more than 13,000,000 head of cattle (210% of NE cattle inventory). In addition, approximately 15,800 participants (12,600 crop farmers) participated in crop production programs targeting profitability issues. These individuals managed about 17,700,000 acres of cropland (82% of NE crop acres). NE Extension programs attract participant from outside NE and some individuals participate in multiple educational programs in any one year. NE Extension also reaches many advisors to agricultural enterprises. For example our 6 eastern NE Crop Diagnostic Clinics reached 331 participants (primarily crop advisors) which influence conservatively 5.3 million crop acres (20% of all crop acres). Educational programs provided more than 60,000 learner-hours of Extension instruction in 2010.

**Results**

Example impacts of these programs include 1) 2010 Crop Production Clinics which observed that 80% of participants reported that knowledge gained at the clinic would help increase the profitability or success of their operation; they valued this knowledge at \$3.12 per acre; 2) 2010 Crop Management & Diagnostic Clinics valued knowledge gained at \$6.44 per acre with 51% improving their ability to id agronomic crop weeds, 52% intending to make increased use of insect resistant alfalfa varieties, and 43% intending to do better job managing soybean cyst nematode; 3) participants at the 2010 Nebraska No Till Conferences reporting that they added no-till practices to 981,000 acres at a savings of \$14 per acre based in part on past knowledge from

Nebraska No-Till conferences.

#### 4. Associated Knowledge Areas

- 201 - Plant Genome, Genetics, and Genetic Mechanisms
- 203 - Plant Biological Efficiency and Abiotic Stresses Affecting Plants
- 205 - Plant Management Systems
- 206 - Basic Plant Biology
- 211 - Insects, Mites, and Other Arthropods Affecting Plants
- 212 - Pathogens and Nematodes Affecting Plants
- 213 - Weeds Affecting Plants
- 215 - Biological Control of Pests Affecting Plants
- 216 - Integrated Pest Management Systems
- 301 - Reproductive Performance of Animals
- 302 - Nutrient Utilization in Animals
- 305 - Animal Physiological Processes
- 307 - Animal Management Systems
- 315 - Animal Welfare/Well-Being and Protection
- 402 - Engineering Systems and Equipment
- 501 - New and Improved Food Processing Technologies
- 511 - New and Improved Non-Food Products and Processes
- 601 - Economics of Agricultural Production and Farm Management
- 603 - Market Economics
- 901 - Program and Project Design, and Statistics

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

##### External factors which affected outcomes

- Natural Disasters (drought, weather extremes, etc.)
- Economy
- Appropriations changes
- Public Policy changes
- Government Regulations
- Competing Public priorities
- Competing Programmatic Challenges
- Populations changes (immigration, new cultural groupings, etc.)
- Other

##### Brief Explanation

Natural disasters: Drought conditions continue to moderate in 2010. Only parts of

the Panhandle and much of the southern tier of Nebraska counties were listed as abnormally dry during the start of the 2011 growing season. During 2010, 20% to 40% of the state were listed as abnormally dry or moderate drought, significantly less than the first half of the decade.

**Economy:** 2010 was a year of high crop costs and prices for crops and generally positive economic conditions for crop producers. The recession and trade protection policies of key trading partners have moderated and demand for meat products is holding steady or growing within all animal production sectors. Animal industry is enjoying stronger product prices but balancing that against very high feed costs.

The continued strength of the corn-based ethanol industry has brought significant economic development and income potential to many rural areas. There are currently 24 active ethanol production plants in Nebraska, with a combined production capacity of over 2 billion gallons of ethanol each year-and requiring 769 million bushels of grain in the process. These ethanol plants represent more than \$5 billion in capital investment in the state and provide direct employment for some 1,200 Nebraskans.

**Public policy and Government Regulations:** Public pressure by the Human Society of the US is causing significant concerns among all agricultural organizations. Policy implementation in California and other states sponsored by HSUS is seen as promoting economically unsustainable animal agricultural practices in the US by agricultural organizations. HSUS has established an office in Nebraska and is hosting public meetings.

**Appropriation Changes:** Reduced state tax collection and soaring federal deficits has led to static state and federal budget support in 2010 with significant federal reductions possible in 2011. Additional elimination of some research and extension program areas is anticipated.

**Competing public priorities:** A customer base that has little connection and no understanding of modern agricultural production systems and values of the farming community and a desire to use public policy to design agricultural systems is very frustrating to the agricultural community. Some aspects of this public oversight of food production is seen as beneficial such as local foods production and organic systems because of potential for premium prices. However, the lack of acceptance by some groups of many production technologies for reducing inputs ( e.g. genetically modified seeds) or increasing production efficiencies and yields (e.g. use of antibiotics and growth promotants in animal production) comes at the same time that society is asking for greater production to meet a growing food and energy feedstock need. These competing public priorities are leaving farmers frustrated with meddling by their customers and policy makers that the agricultural community believes to be poorly informed.

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

### **(OPTIONAL SECTION)**

#### **1. Evaluation Studies Planned**

- After Only (post program)
- Retrospective (post program)

- Before-After (before and after program)
- During (during program)
- Time series (multiple points before and after program)
- Case Study
- Comparisons between program participants (individuals, group, organizations) and non-participants
- Comparisons between different groups of individuals or program participants experiencing different levels of program intensity.
- Comparison between locales where the program operates and sites without program intervention
- Other

## Evaluation Results

UNL Extension has divided into five spires of excellence with two specifically targeting agriculture and natural resource issues: 1) Beef Systems, 2) Crops of the Future. The Action Team supporting each spire has identified one or more "Signature Outcomes" that first became active at the start of 2010. The "Signature Outcomes" were delivered statewide for the first time in 2010 and establish methodologies for measuring statewide impact allowed capture of a significant part of our 2010 impact (see Making a Difference at <http://extension.unl.edu>). The faculty team supporting each spire is in the process of planning 2011 statewide delivery and evaluation procedures identified in the statewide action plans. These tools have produced our first statewide snapshots of educational program impacts including knowledge gain, intended practice change, and likely conditional changes.

### Key Items of Evaluation

Impact indicators and supporting statewide survey are being completed for one to three Signature Programs (initiated for 2010) associated with each Action Team. The preliminary statewide measures of impact that will be utilized for the next several years are as follows:

#### Beef Systems (Cow-Calf) Profitability:

1. Changes in production practices
2. Changes in business skills
3. Savings per animal

#### Beef Systems (Feedlot) Profitability:

1. Changes in production practices
2. Reduced environmental challenges
3. Savings per animal

#### Enhancing Beef Cattle Health, Quality, and Wholesomeness

1. Reduced cattle disease incidence and improved cattle performance

2. Greater use of health records
3. Increased adoption of pre-harvest methods for beef quality and safety

#### Integrated Pest Management

1. Farmers etc. learn principles of IPM
2. IPM tool and resources are readily available to clientele
3. IPM is implemented
4. Consultants, other Ag Professionals and Ag service providers use science based IPM management recommendations

#### Economic Risk Management

1. Federal, state, and local food policy
2. Land, machinery, other ag assets, and input and production costs
3. Crop insurance products, crop marketing, and exposure to emerging markets
4. Enterprise and whole farm financial analysis
5. Transition planning and employee / business management

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

**Program # 2**

**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**

<b>KA Code</b>	<b>Knowledge Area</b>	<b>%1862 Extension</b>	<b>%1890 Extension</b>	<b>%1862 Research</b>	<b>%1890 Research</b>
101	Appraisal of Soil Resources	2%		5%	
102	Soil, Plant, Water, Nutrient Relationships	17%		16%	
111	Conservation and Efficient Use of Water	17%		25%	
112	Watershed Protection and Management	12%		8%	
121	Management of Range Resources	10%		4%	
122	Management and Control of Forest and Range Fires	1%		0%	
123	Management and Sustainability of Forest Resources	1%		2%	
124	Urban Forestry	1%		0%	
125	Agroforestry	1%		0%	
131	Alternative Uses of Land	1%		1%	
132	Weather and Climate	9%		7%	
133	Pollution Prevention and Mitigation	12%		12%	
135	Aquatic and Terrestrial Wildlife	7%		9%	
141	Air Resource Protection and Management	1%		0%	
403	Waste Disposal, Recycling, and Reuse	3%		2%	
404	Instrumentation and Control Systems	1%		6%	
405	Drainage and Irrigation Systems and Facilities	2%		1%	
605	Natural Resource and Environmental Economics	2%		2%	
	<b>Total</b>	100%		100%	

**Add knowledge area**

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

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

<b>Year: 2010</b>	<b>Extension</b>		<b>Research</b>	
	<b>1862</b>	<b>1890</b>	<b>1862</b>	<b>1890</b>

Plan	44.0	0.0	35.0	0.0
Actual	57.0	0.0	36.0	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
697337	0	748935	0
1862 Matching	1890 Matching	1862 Matching	1890 Matching
820814	0	1055987	0
1862 All Other	1890 All Other	1862 All Other	1890 All Other
0	0	0	0

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

**1. Brief description of the Activity**

IANR will 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**

2010	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
<b>Plan</b>	10000	20000	8000	20000
<b>Actual</b>	82160	310536	61620	81955

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

**Patent Applications Submitted**

Year: 2010  
 Plan: 1  
 Actual: 0

**Patents listed**

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

**Number of Peer Reviewed Publications**

2010	Extension	Research	Total
<b>Plan</b>	15	35	
<b>Actual</b>	21	97	118

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

**Output Target**

**Output #1**

**Output Measure**

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

Not reporting on this Output for this Annual Report

Year	Target	Actual
2010	50	70

**Output #2**

**Output Measure**

- Number of water management and water quality education workshops/presentations, continuing education programs, web-based curricula and field days/tours.
- Not reporting on this Output for this Annual Report

Year	Target	Actual
2010	150	173

**Output #3**

**Output Measure**

- Number of Agricultural Research Division projects that include water management and water quality as a key component.
- Not reporting on this Output for this Annual Report

Year	Target	Actual
2010	50	32

**Output #4**

**Output Measure**

- Number of new extension publications and other education resources developed.
- Not reporting on this Output for this Annual Report

Year	Target	Actual
2010	20	26

**Output #5**

**Output Measure**

- Number of scholarly publications and outputs addressing environmental and natural resources issues other than water management and water quality.
- Not reporting on this Output for this Annual Report

Year	Target	Actual
2010	30	48

**Output #6**

**Output Measure**

- Number of Agricultural Research Division projects that address environment and natural resource issues other than water management and quality.
- Not reporting on this Output for this Annual Report

Year	Target	Actual
2010	30	48

**Output #7**

**Output Measure**

- Number of education workshops/presentations, continuing education programs, web-based curricula and field days/tours that address environment and natural resource issues other than water management and quality.
- Not reporting on this Output for this Annual Report

<b>Year</b>	<b>Target</b>	<b>Actual</b>
2010	40	55

**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.

**Add Cross-cutting Outcome/Impact Statement or Unintended or Previously Unknown Outcome Measure**

**Outcome #1**

**1. Outcome Measures**

Not Reporting on this Outcome Measure

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
- Change in Action Outcome Measure
- Change in Condition Outcome Measure

**3b. Quantitative Outcome**

Year	Quantitative Target	Actual
2010	2000	2400

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

**Issue (Who cares and Why)**

According to the USDA 2007 Farm and Ranch Irrigation Survey, Nebraska irrigates approximately 8.45 million acres with more than 6.70 million acre-feet of water annually. This represents a 11% increase in acres irrigated with 21% less water. This change is likely a result of both difference in rainfall patterns and concerted efforts promoting efficient irrigation water use. In 2004, state policy established a process for defining watersheds as a fully or over-appropriated. Part or all of eleven Natural Resource Districts are currently defined as fully or over-appropriated. Over-appropriated basins are required to reduce water use to 1997 levels. Discussion continues on defining additional areas of Nebraska as over or fully appropriated. State public policy continues to emerge and change annually on a variety of topics related to water use by irrigation.

**What has been done**

UNL Extension has delivered educational programs ranging from one-on-one in-field instruction to two-day long workshops. In 2010, over 1,700 producers/consultants (representing 6.6 million acres of cropland) have attended an educational program and participated in program evaluation. UNL Extension initiatives include educational conferences (e.g. Nebraska/Colorado Limited Irrigation Systems), pivot dealers irrigation workshops co-sponsored with the 4 pivot manufacturers, demonstrations and workshops on subsurface drip irrigation (SDSI) engaging over 3,000 producers since 2004, and on-farm demonstration (e.g. Nebraska Agricultural Water Management Demonstration Network-NAWMDN). NAWMDN continues to grow into a robust on-farm extension initiative demonstrating irrigation water savings through in-field ET and soil moisture monitoring on 400 farms and approximately 400,000 acres.

**Results**

Currently proven technologies and management practices continue to demonstrate the potential to reduce statewide irrigation water pumped by 2 inches (or 460 billion gallons per year) or more and energy use by 42 million gallons of diesel fuel equivalent per year or more. Examples include installation of approximately 60,000 acres of SDI technology since 2004 (Extension providing the only research and education effort in NE). The Republican River Valley water use efficiency tours and demonstrations produced a water savings of about 29,000 acre-feet/year or a savings of \$1.2 million per year. NAWMDM continues to demonstrate an actual water savings of 2.0 acre-inches/acre for a savings of \$2.5 million. Farmer participants in the Pivot dealers workshops estimated their savings at 30,000 acre-feet/acre and \$1.5 million annually.

#### 4. Associated Knowledge Areas

- 101 - Appraisal of Soil Resources
- 102 - Soil, Plant, Water, Nutrient Relationships
- 111 - Conservation and Efficient Use of Water
- 112 - Watershed Protection and Management
- 121 - Management of Range Resources
- 122 - Management and Control of Forest and Range Fires
- 123 - Management and Sustainability of Forest Resources
- 124 - Urban Forestry
- 125 - Agroforestry
- 131 - Alternative Uses of Land
- 132 - Weather and Climate
- 133 - Pollution Prevention and Mitigation
- 135 - Aquatic and Terrestrial Wildlife
- 141 - Air Resource Protection and Management
- 403 - Waste Disposal, Recycling, and Reuse
- 404 - Instrumentation and Control Systems
- 405 - Drainage and Irrigation Systems and Facilities
- 605 - Natural Resource and Environmental Economics

#### **Outcome #2**

##### 1. Outcome Measures

- Not Reporting on this Outcome Measure

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 Knowledge Outcome Measure
- Change in Action Outcome Measure
- Change in Condition Outcome Measure

**3b. Quantitative Outcome**

Year	Quantitative Target	Actual
2010	70	70

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

**Issue (Who cares and Why)**

Agriculture impacts water quality. Atrazine issues are targeted as a critical issue for the Blue River Basin with the potential risk of loss of herbicide registration within parts of this watershed. EPA and industry sponsored monitoring is ongoing with Extension partnering with others on education relative to Atrazine BMPs. A 2009 USGS analysis showed that all of the pesticides assessed (including common corn pesticides such as atrazine, metolachlor, alachlor, cyanazine) on 32 Corn Belt rivers including 3 in Nebraska, were dominated by varying degrees of concentration downtrends. Only one pesticide-simazine, which is used for both agricultural and urban weed control-increased from 1996 to 2006. Nitrate in ground water continues as our primary pollutant of statewide concern. A 2009 Nebraska groundwater quality report from the Department of Environmental Quality suggests a nitrate trend showed increasing slope about 1.25 ppm per decade from 1973 to 1993 while the trend from 1994 to 2008 is flat.

**What has been done**

Extension hosts educational experiences targeting issues related to water quality impairment from nitrogen, erosion, and herbicides and encouraging and best practices for reducing contamination associated with tillage, irrigation, fertilization, chemigation, on-site waste water, and municipal storm water. Examples include (1) Atrazine supplement added to pesticide safety education certification program in southeast NE; (2) Private Well Users educational products on the UNL wide water web site (accessed 59,00 in 2010); (3) workshop series and publications development on bioretention gardens, rain gardens and other green infrastructure topics Phase II Nebraska cities (10,00 to 50,000 people) and (4) and pesticide safety education classes that reach approximately 1/3 of the licensed private pesticide applicators with information on management practices designed to protect human health and water quality.

**Results**

Sample outcomes or impacts include: (1) 98 participants (engineers, landscape architects, public works administrators) in Bioretention gardens and 95 in rain gardens and 79 in other stormwater management green infrastructure demonstrating significant knowledge increase in design principles, soil evaluation, plant selection; (2) 17 extension events on nutrient management (improved nitrogen management reduces ground water nitrates) reached producers and advisors managing 2,750,000 acres reporting a \$6.8 million value.

**4. Associated Knowledge Areas**

- 101 - Appraisal of Soil Resources
- 102 - Soil, Plant, Water, Nutrient Relationships
- 111 - Conservation and Efficient Use of Water
- 112 - Watershed Protection and Management
- 121 - Management of Range Resources
- 122 - Management and Control of Forest and Range Fires
- 123 - Management and Sustainability of Forest Resources
- 124 - Urban Forestry
- 125 - Agroforestry
- 131 - Alternative Uses of Land
- 132 - Weather and Climate
- 133 - Pollution Prevention and Mitigation
- 135 - Aquatic and Terrestrial Wildlife
- 141 - Air Resource Protection and Management
- 403 - Waste Disposal, Recycling, and Reuse
- 404 - Instrumentation and Control Systems
- 405 - Drainage and Irrigation Systems and Facilities
- 605 - Natural Resource and Environmental Economics

**Outcome #3**

**1. Outcome Measures**

- Not Reporting on this Outcome Measure

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
- Change in Action Outcome Measure
- Change in Condition Outcome Measure

**3b. Quantitative Outcome**

Year	Quantitative Target	Actual
2010	500	13000

**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. In 2010, public policy specific to dust and greenhouse gases associated with livestock systems surfaced with new EPA proposed public policy. In addition, regulatory compliance with CAFO policy on nutrient management planning continues to be targeted by regulatory agencies.

### **What has been done**

Key activities in 2009 include: Nebraska faculty (1) led maintenance of the national eXtension web site on animal manure issues resulting in about 250,000 page views and hosted monthly web cast workshops, each of which is attended on average by 1240 participants that influence decisions made by 180,000 producers (new resources and webinars on climate change issues associated with animal agriculture were added in 2010); (2) Vegetative Treatment Systems (VTS) on-farm demonstration project has installed 36 demonstration over the past 10 years. This year the program focus was on regional tours attended by 130 small and medium feedlot or cow-calf livestock producers representing about 53,000 head of cattle.

### **Results**

Key accomplishments reported by the national eXtension web initiative on animal manure issues are summarized for their 5 year project based upon evaluations of impact in 2008, 2009, and 2010. LPELC resources have contributed to 1) improved nutrient management plans: 78% said "Yes" -51% said moderately or significantly; 2) better advice to producers: 94% said "Yes" -69% moderately or significantly; 3) Improved application of emerging technologies: 93% said "Yes" - 65% moderately or significantly. LPELC resources are used to 1) research client's question by 70% of extension agents 76% of NRCS staff; 2) Assist with recommendation benefitting clientele by 58% of consultants; 3) locate information for educational programs by 74% of extension specialists; 4) assist with permit reviews by 42% of regulatory agency staff. 93% of survey respondents found economic value in information obtained from the LPELC. Their average value placed was \$813. If applied to the eXtension web sites monthly newsletter audience only, the estimated monthly value is more than \$1,200,000.

## **4. Associated Knowledge Areas**

- 101 - Appraisal of Soil Resources
- 102 - Soil, Plant, Water, Nutrient Relationships
- 111 - Conservation and Efficient Use of Water
- 112 - Watershed Protection and Management
- 121 - Management of Range Resources
- 122 - Management and Control of Forest and Range Fires
- 123 - Management and Sustainability of Forest Resources
- 124 - Urban Forestry
- 125 - Agroforestry
- 131 - Alternative Uses of Land
- 132 - Weather and Climate
- 133 - Pollution Prevention and Mitigation

- 135 - Aquatic and Terrestrial Wildlife
- 141 - Air Resource Protection and Management
- 403 - Waste Disposal, Recycling, and Reuse
- 404 - Instrumentation and Control Systems
- 405 - Drainage and Irrigation Systems and Facilities
- 605 - Natural Resource and Environmental Economics

**Outcome #4**

**1. Outcome Measures**

- Not Reporting on this Outcome Measure

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 Knowledge Outcome Measure
- Change in Action Outcome Measure
- Change in Condition Outcome Measure

**3b. Quantitative Outcome**

Year	Quantitative Target	Actual
2010	300	114

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

**Issue (Who cares and Why)**

The Animal Manure Management (AMM) team teaches operators and employees of animal feeding operations (AFOs) and concentrated animal feeding operations (CAFOs) about manure management for agronomic efficiency and environmental protection. The AMM team hosts programs on manure nutrient management addressing feeding routines, manure handling techniques, assessing the risks of phosphorus runoff, nutrient management planning tools, and soil management and conservation. The AMM team educates on the value of manure relative to commercial fertilizer.

**What has been done**

In 2010 alone, AMM educational efforts engaged 91 producers who directly manage more than 356,100 head of livestock and 10,000 chickens and 23 advisors' who influence the decisions of 2807 producers. All 600 plus permitted CAFOs in Nebraska have been trained in use of nutrient management principles and tools using extension developed educational materials.

**Results**

60% of CAFO operators re-certifying have adopted BMPs for nutrient management and required record keeping. For example, in 2003 only 7% of operators calibrated their manure spreaders, now 70% indicated they do. 95% are observing setbacks to keep manure away from streams. 90% apply manure based on crop needs.

#### 4. Associated Knowledge Areas

- 101 - Appraisal of Soil Resources
- 102 - Soil, Plant, Water, Nutrient Relationships
- 111 - Conservation and Efficient Use of Water
- 112 - Watershed Protection and Management
- 121 - Management of Range Resources
- 122 - Management and Control of Forest and Range Fires
- 123 - Management and Sustainability of Forest Resources
- 124 - Urban Forestry
- 125 - Agroforestry
- 131 - Alternative Uses of Land
- 132 - Weather and Climate
- 133 - Pollution Prevention and Mitigation
- 135 - Aquatic and Terrestrial Wildlife
- 141 - Air Resource Protection and Management
- 403 - Waste Disposal, Recycling, and Reuse
- 404 - Instrumentation and Control Systems
- 405 - Drainage and Irrigation Systems and Facilities
- 605 - Natural Resource and Environmental Economics

#### Outcome #5

##### 1. Outcome Measures

- Not Reporting on this Outcome Measure

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
- Change in Action Outcome Measure
- Change in Condition Outcome Measure

##### 3b. Quantitative Outcome

Year	Quantitative Target	Actual
2010	2000	30900

### 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. In addition, genetically modified crops have presented new opportunities for reducing pesticide use and created new challenges for minimizing emergence of resistant weeds and insects.

#### What has been done

Sample pest management Extension programs in 2010 include: 1) pesticide safety education (PPE) resulting in licensing of over 6,800 farmers and ranchers as private pesticide applicators in Nebraska, 2) pesticide safety education resulting in licensing of almost 2,400 people as commercial and noncommercial pesticide applicators in Nebraska, 3) 116 urban pest management professionals learned new pest management techniques and gained new knowledge on major pests through the Urban Pest Management conference, 4) release in 2010 of an updated final version of Pest Private Eye and the CASE of IPM in Schools, 2008 Association of Communication Excellence ?Best of the Best? Gold Award, and continued implementation of this tool in schools; and 5) publishing of an annual Guide to Weed Management in Nebraska to provide research-based information on safe and effective application of herbicides and other pesticides; 6) Crop Production Clinics and Crop Management and Diagnostic Clinics attended by 331 participants which address multiple crop issues including IPM reach an audience that manages or influences over 5 million acres of crops.

#### Results

Evaluation of participants in 2010 Crop Production Clinics: 1) 76% reported improved knowledge of practices to minimize environmental contamination from pesticide applications; 2) 80% reported that knowledge gained at the clinic would help increase the profitability or success of their operation; they valued this knowledge at \$3.12 per acre. Evaluation of participants in July 2010 Crop Management & Diagnostic Clinics suggest: 1) knowledge gain is valued at \$6.44 per acre; 2) 51% improved ability to id agronomic crop weeds; 3) 52% intend to make increased use of insect resistant alfalfa varieties; 4) 43% intend to do better job managing soybean cyst nematode. 2010 private PSEP participants reported that they will always or sometimes change their behaviors as follows: 1) 100% will take steps to prevent carrying pesticide residues into the home; 2) 99% will consider economic thresholds when using pesticides; 3) 99% will use drift reduction spray nozzles; 4) 99% will calibrate equipment at least once per year.

### 4. Associated Knowledge Areas

- 101 - Appraisal of Soil Resources
- 102 - Soil, Plant, Water, Nutrient Relationships
- 111 - Conservation and Efficient Use of Water

- 112 - Watershed Protection and Management
- 121 - Management of Range Resources
- 122 - Management and Control of Forest and Range Fires
- 123 - Management and Sustainability of Forest Resources
- 124 - Urban Forestry
- 125 - Agroforestry
- 131 - Alternative Uses of Land
- 132 - Weather and Climate
- 133 - Pollution Prevention and Mitigation
- 135 - Aquatic and Terrestrial Wildlife
- 141 - Air Resource Protection and Management
- 403 - Waste Disposal, Recycling, and Reuse
- 404 - Instrumentation and Control Systems
- 405 - Drainage and Irrigation Systems and Facilities
- 605 - Natural Resource and Environmental Economics

## **Outcome #6**

### **1. Outcome Measures**

- Not Reporting on this Outcome Measure

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
- Change in Action Outcome Measure
- Change in Condition Outcome Measure

### **3b. Quantitative Outcome**

<b>Year</b>	<b>Quantitative Target</b>	<b>Actual</b>
2010	6000	13100

### **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. Energy is also emerging as a critical issue to Nebraska with the developments in biofuels and wind energy.

#### **What has been done**

Extension provides a wide variety of activities in 2010. Examples include: (1) wind energy development and land owner rights workshops (760 participants in 2010) (2) Master Naturalist program (570 people in 2010); 3) 110 onsite wastewater treatment professionals have taken advantage of 6-hour training opportunities addressing onsite wastewater issues; (3) sample range management programs include Nebraska Ranch Practicum which directly or indirectly influenced decisions on 510,000 acres and 41,000 head of cattle and West Central Cattleman's Days and Ranching for Profitability which engaged 250 producers, lenders, and consultants attended these programs, representing over 62,000 head of cattle and over 400,000 acres.

#### **Results**

In 2009, sample outcomes from Extension education include: 1) onsite wastewater treatment participants estimated they worked on 4,678 systems per year and impact treatment of 196 million gallons of wastewater annually and improved their skills by modifying how they conduct soil percolation tests (29% "usually" and "always" response), changing how they design systems (27%), changing how they install systems (23%), and changing how they discussed system management with owners (72%); 2) the Nebraska Ranch Practicum participants reported that this educational experience produced a savings of \$17.28 per head or a total economic impact of \$133,955, improved skills in monitoring vegetation and livestock for 96% of participants, and resulted in management changes on 100% participant ranches; 3) Cattleman's Days and Ranching for Profitability participants indicated that 80% of participants had moderate to significant knowledge gain, 59% of participants will make changes to increase their operations' profitability, and 59% of participants indicated they have made changes to their operations as a result of previous years' attendance at these programs; and 3) Going Green workshop youth participants reported that they learned how their 4-H projects could affect the environment (79%), will make at least one or more 4-H projects that are environmentally friendly (77%), understand how to create an entrepreneurial business that recycles old items into new products (72%), and are more aware of how the products they use effect the environment (92%).

#### **4. Associated Knowledge Areas**

- 101 - Appraisal of Soil Resources
- 102 - Soil, Plant, Water, Nutrient Relationships
- 111 - Conservation and Efficient Use of Water
- 112 - Watershed Protection and Management
- 121 - Management of Range Resources
- 122 - Management and Control of Forest and Range Fires
- 123 - Management and Sustainability of Forest Resources
- 124 - Urban Forestry
- 125 - Agroforestry
- 131 - Alternative Uses of Land
- 132 - Weather and Climate

- 133 - Pollution Prevention and Mitigation
- 135 - Aquatic and Terrestrial Wildlife
- 141 - Air Resource Protection and Management
- 403 - Waste Disposal, Recycling, and Reuse
- 404 - Instrumentation and Control Systems
- 405 - Drainage and Irrigation Systems and Facilities
- 605 - Natural Resource and Environmental Economics

**Outcome #7**

**1. Outcome Measures**

- Not Reporting on this Outcome Measure

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 Knowledge Outcome Measure
- Change in Action Outcome Measure
- Change in Condition Outcome Measure

**3b. Quantitative Outcome**

Year	Quantitative Target	Actual
2010	5	16

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

**Issue (Who cares and Why)**

According to the USDA 2007 Farm and Ranch Irrigation Survey, Nebraska irrigates approximately 8.45 million acres with more than 6.70 million acre-feet of water annually. This represents a 11% increase in acres irrigated with 21% less water. This change is likely a result of both difference in rainfall patterns and concerted efforts promoting efficient irrigation water use. In 2004, state policy established a process for defining watersheds as a fully or over-appropriated. Part or all of eleven Natural Resource Districts are currently defined as fully or over-appropriated. Over-appropriated basins are required to reduce water use to 1997 levels. Discussion continues on defining additional areas of Nebraska as over or fully appropriated. State public policy continues to emerge and change annually on a variety of topics related to water use by irrigation.

**What has been done**

UNL Extension has delivered educational programs ranging from one-on-one in-field instruction to two-day long workshops. In 2010, over 1,700 producers/consultants (representing 6.6 million acres of cropland) have attended an educational program and participated in program evaluation. UNL Extension initiatives include educational conferences (e.g. Nebraska/Colorado Limited Irrigation Systems), pivot dealers irrigation workshops co-sponsored with the 4 pivot manufacturers, demonstrations and workshops on subsurface drip irrigation (SDSI) engaging over 3,000 producers since 2004, and on-farm demonstration (e.g. Nebraska Agricultural Water Management Demonstration Network-NAWMDN). NAWMDN continues to grow into a robust on-farm extension initiative demonstrating irrigation water savings through in-field ET and soil moisture monitoring on 400 farms and approximately 400,000 acres.

### **Results**

Water pumped (consumptive use estimates are not generally available) was 68% of water pumped for irrigation in 2005-2007 based upon information from 5 Natural Resource Districts. Currently proven technologies and management practices continue to demonstrate the potential to reduce statewide irrigation water pumped by 2 inches (or 460 billion gallons per year) or more and energy use by 42 million gallons of diesel fuel equivalent per year or more. Examples include installation of approximately 60,000 acres of SDI technology since 2004 (Extension providing the only research and education effort in NE). The Republican River Valley water use efficiency tours and demonstrations produced a water savings of about 29,000 acre-feet/year or a savings of \$1.2 million per year. NAWMDM continues to demonstrate an actual water savings of 2.0 acre-inches/acre for a savings of \$2.5 million. Farmer participants in the Pivot dealers workshops estimated their savings at 30,000 acre-feet/acre and \$1.5 million annually.

### **4. Associated Knowledge Areas**

- 101 - Appraisal of Soil Resources
- 102 - Soil, Plant, Water, Nutrient Relationships
- 111 - Conservation and Efficient Use of Water
- 112 - Watershed Protection and Management
- 121 - Management of Range Resources
- 122 - Management and Control of Forest and Range Fires
- 123 - Management and Sustainability of Forest Resources
- 124 - Urban Forestry
- 125 - Agroforestry
- 131 - Alternative Uses of Land
- 132 - Weather and Climate
- 133 - Pollution Prevention and Mitigation
- 135 - Aquatic and Terrestrial Wildlife
- 141 - Air Resource Protection and Management
- 403 - Waste Disposal, Recycling, and Reuse
- 404 - Instrumentation and Control Systems
- 405 - Drainage and Irrigation Systems and Facilities
- 605 - Natural Resource and Environmental Economics

**Outcome #8**

**1. Outcome Measures**

Not Reporting on this Outcome Measure

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 Knowledge Outcome Measure
- Change in Action Outcome Measure
- Change in Condition Outcome Measure

**3b. Quantitative Outcome**

Year	Quantitative Target	Actual
2010	49	47

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

**Issue (Who cares and Why)**

The Republican River Compact allocates the water supply of the Republican River, originally set at 11% to CO, 49% to NE and 40% to KS. 2008 consumptive use estimates suggest the Nebraska was under its allocation by 78,000 acre-feet. For the five year running average, it exceeds its allocation by less than 200 acre-feet. Natural Resource Districts have developed plans that are contributing towards achieving the targeted allocation than includes retirement of irrigated acres, improvements in efficiency of irrigation water use, and limitations on irrigation development. These reductions are a result of extension education, public policy pressure, and changes in rainfall patterns.

**What has been done**

Our West Central Research and Extension Center conducts research and field demonstrations that targets agricultural systems relevant to the Republican River Basin. A 2010 Field Days on Improving Crop Water Productivity was held at the newly acquired West Central Water Resources Field Laboratory where farm scale research and demonstrations can be implemented on systems applicable to Western Nebraska. Additional irrigation or water conserving extension program in this region include 1) 2010 Nebraska No-Till Conference held in two locations and attended by 434 participants; 2) Nebraska/Colorado Limited Irrigation Systems; 3) pivot dealers irrigation workshops co-sponsored with the 4 pivot manufacturers, demonstrations and workshops on subsurface drip irrigation (SDSI) engaging over 3,000 producers since 2004, 4) Crop Water Use Efficiency Field Tour Series and Demonstration Project which impacted 180 people through field tours and unknown others through weekly live and archived webinars updating producers on

evapotranspiration and field moisture status for making irrigation decisions.

### Results

47% of Republican River allocation is 2009 value. 2010 will be available about April 15, 2011. The Republican River basin and nearby educational programs produced impacts such as 1) Nebraska No-Till Conference participants reported increased no-till acres by over 981,400 acres (7% of Nebraska corn acres); 2) Center Pivot Water Conservation Project survey indicated center pivot irrigators attending project workshops were able to reduce pumping by 30,000 acre-feet with an associated savings of \$1.5 million annually; 3) Crop Water Use Efficiency Field Tour Series and Demonstration Project survey results of 73 producers (180 in attendance) showed more than \$1.2 million per year savings and a potential water savings of 2.9 acre-inches/acre represents at least a 15-20 percent savings (28,900 acre-feet/year).

### 4. Associated Knowledge Areas

- 101 - Appraisal of Soil Resources
- 102 - Soil, Plant, Water, Nutrient Relationships
- 111 - Conservation and Efficient Use of Water
- 112 - Watershed Protection and Management
- 121 - Management of Range Resources
- 122 - Management and Control of Forest and Range Fires
- 123 - Management and Sustainability of Forest Resources
- 124 - Urban Forestry
- 125 - Agroforestry
- 131 - Alternative Uses of Land
- 132 - Weather and Climate
- 133 - Pollution Prevention and Mitigation
- 135 - Aquatic and Terrestrial Wildlife
- 141 - Air Resource Protection and Management
- 403 - Waste Disposal, Recycling, and Reuse
- 404 - Instrumentation and Control Systems
- 405 - Drainage and Irrigation Systems and Facilities
- 605 - Natural Resource and Environmental Economics

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

### External factors which affected outcomes

- Natural Disasters (drought, weather extremes, etc.)
- Economy
- Appropriations changes
- Public Policy changes
- Government Regulations
- Competing Public priorities
- Competing Programmatic Challenges
- Populations changes (immigration, new cultural groupings, etc.)
- Other

### Brief Explanation

Natural disasters: Drought conditions continue to moderate in 2010. Only parts of the Panhandle and much of the southern tier of Nebraska counties were listed as abnormally dry during the start of the 2011 growing season. During 2010, 20% to 40% of the state were listed as abnormally dry or moderate drought, significantly less than the first half of the decade.

Economy: 2010 was a year of high crop costs and prices for crops and generally positive economic conditions for crop producers. The recession and trade protection policies of key trading partners have moderated and demand for meat products is holding steady or growing within all animal production sectors. Animal industry is enjoying stronger product prices but balancing that against very high feed costs.

The continued strength of the corn-based ethanol industry has brought significant economic development and income potential to many rural areas. There are currently 24 active ethanol production plants in Nebraska, with a combined production capacity of over 2 billion gallons of ethanol each year--and requiring 769 million bushels of grain in the process. These ethanol plants represent more than \$5 billion in capital investment in the state and provide direct employment for some 1,200 Nebraskans.

Public policy and Government Regulations: Public pressure by the Human Society of the US is causing significant concerns among all agricultural organizations. Policy implementation in California and other states sponsored by HSUS is seen as promoting economically unsustainable animal agricultural practices in the US by agricultural organizations. HSUS has established an office in Nebraska and is hosting public meetings.

Appropriation Changes: Reduced state tax collection and soaring federal deficits has led to static state and federal budget support in 2010 with significant federal reductions possible in 2011. Additional elimination of some research and extension program areas is anticipated.

Competing public priorities: A customer base that has little connection and no

understanding of modern agricultural production systems and values of the farming community and a desire to use public policy to design agricultural systems is very frustrating to the agricultural community. Some aspects of this public oversight of food production is seen as beneficial such as local foods production and organic systems because of potential for premium prices. However, the lack of acceptance by some groups of many production technologies for reducing inputs ( e.g. genetically modified seeds) or increasing production efficiencies and yields (e.g. use of antibiotics and growth promotants in animal production) comes at the same time that society is asking for greater production to meet a growing food and energy feedstock need. These competing public priorities are leaving farmers frustrated with meddling by their customers and policy makers that the agricultural community believes to be poorly informed.

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

### **(OPTIONAL SECTION)**

#### **1. Evaluation Studies Planned**

- After Only (post program)
- Retrospective (post program)
- Before-After (before and after program)
- During (during program)
- Time series (multiple points before and after program)
- Case Study
- Comparisons between program participants (individuals, group, organizations) and non-participants
- Comparisons between different groups of individuals or program participants experiencing different levels of program intensity.
- Comparison between locales where the program operates and sites without program intervention
- Other

#### **Evaluation Results**

UNL Extension has divided into five spires of excellence with one specifically targeting agriculture and natural resource issues: 1) Water Climate and the Environment for Agriculture and 2) Water Climate and the Environment for Communities. The Action Team supporting each spire has identified one or more "Signature Outcomes" that first became active at the start of 2010. The "Signature Outcomes" were delivered statewide for the first time in 2010 and establish methodologies for measuring statewide impact allowed capture of a significant part of our 2010 impact (see Making a Difference at <http://extension.unl.edu>). The faculty team supporting each spire is in the process of planning 2011 statewide delivery and evaluation procedures identified in the statewide action plans. These tools have produced our first statewide snapshots of educational program impacts including knowledge gain, intended practice change, and likely conditional changes.

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

Impact indicators and supporting statewide survey are being completed for one to three Signature Programs (initiated for 2010) associated with each Action Team. The preliminary statewide measures of impact that will be utilized for the next several years are as follows:

Agricultural Water Management(Water, Climate, and Environment Action Team)

1. Survey clientele current management practices and dollars saved from new practices adopted
2. NASS agricultural statistics and NRD water use records.

Agricultural Manure Management (Water, Climate, and Environment Action Team)

1. Survey clientele on current management practices and dollars saved from practice changes.
2. Assemble NDEQ records of compliance.

Maintain and Improve Community Water Quality/Quantity (Water, Climate, and Environment Action Team)

1. Practice changes that lead to conservation of water quality and quantity.
2. Financial savings for homeowners, businesses and industry.

Resource Efficient Community Landscapes

1. Practice changes that lead to conservation of water quality and quantity.
2. Financial savings for homeowners, businesses and green industry.

**V(A). Planned Program (Summary)****Program # 3****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

<b>KA Code</b>	<b>Knowledge Area</b>	<b>%1862 Extension</b>	<b>%1890 Extension</b>	<b>%1862 Research</b>	<b>%1890 Research</b>
607	Consumer Economics	1%		1%	
608	Community Resource Planning and Development	5%		0%	
701	Nutrient Composition of Food	12%		7%	
702	Requirements and Function of Nutrients and Other Food Components	12%		20%	
703	Nutrition Education and Behavior	10%		7%	
712	Protect Food from Contamination by Pathogenic Microorganisms, Parasites, and Naturally Occurring Toxins	14%		12%	
721	Insects and Other Pests Affecting Humans	1%		1%	
722	Zoonotic Diseases and Parasites Affecting Humans	1%		0%	
723	Hazards to Human Health and Safety	6%		5%	
724	Healthy Lifestyle	1%		3%	
801	Individual and Family Resource Management	4%		0%	
802	Human Development and Family Well-Being	14%		25%	
803	Sociological and Technological Change Affecting Individuals, Families, and Communities	4%		9%	
804	Human Environmental Issues Concerning Apparel, Textiles, and Residential and Commercial Structures	4%		3%	
805	Community Institutions, Health, and Social Services	1%		3%	
806	Youth Development	10%		4%	
	<b>Total</b>	100%		100%	

Add knowledge area

**V(C). Planned Program (Inputs)****1. Actual amount of professional FTE/SYs expended this Program**

Year: 2010	Extension		Research	
	1862	1890	1862	1890
Plan	75.0	0.0	15.0	0.0
Actual	82.0	0.0	18.0	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
2126651	0	421324	0
1862 Matching	1890 Matching	1862 Matching	1890 Matching
2155828	0	351151	0
1862 All Other	1890 All Other	1862 All Other	1890 All Other
0	0	0	0

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

**1. Brief description of the Activity**

- 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, i.e. entrepreneurship.

- 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**

2010	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
<b>Plan</b>	10000	20000	50000	20000
<b>Actual</b>	15000	20000	50000	20000

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

**Patent Applications Submitted**

Year: 2010  
 Plan: 0  
 Actual: 3

**Patents listed**

Extraction solution for recovery of cow's milk residues from processed food products

Inhibitors of FATP-Mediated Fatty Acid Uptake

Dielectric Heating for Improving Microbiological Safety of Low-Moisture Food

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

**Number of Peer Reviewed Publications**

2010	Extension	Research	Total
<b>Plan</b>	10	10	
<b>Actual</b>	50	10	60

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

**Output Target**

**Output #1**

**Output Measure**

- 1) Number of scholarly publications and outputs related to viable communities and appropriate quality of life for individuals and families projects accepted.
- Not reporting on this Output for this Annual Report

Year	Target	Actual
2010	20	30

**Output #2**

**Output Measure**

- 2) Number of extension in-depth community, family and Individual topic-related educational workshops.
- Not reporting on this Output for this Annual Report

<b>Year</b>	<b>Target</b>	<b>Actual</b>
2010	100	138

**Output #3**

**Output Measure**

- 3) Number of extension community, family and individual program-related curricula, publications and other educational resources developed.
- Not reporting on this Output for this Annual Report

<b>Year</b>	<b>Target</b>	<b>Actual</b>
2010	12	34

**Output #4**

**Output Measure**

- 4) Number of Agricultural Research Division projects that focus on community and appropriate quality of life for individuals and families issues.
- Not reporting on this Output for this Annual Report

<b>Year</b>	<b>Target</b>	<b>Actual</b>
2010	20	34

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

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

O. No.	OUTCOME NAME
1	Nebraska's will gain knowledge to make effective choices about their health, wellness and diet. The long-term goal of reducing obesity and increasing physical activity of children is essential. 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 relationships 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	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. 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 entrepreneurial businesses will have been created, and informational technology will be used to create partnerships between the community's public and private sectors.
3	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.
4	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.
5	Families will contribute to community viability and maintain sustainable lifestyle to provide a safe and secure future for their children. Long-term: Families will increase financial assets by decreasing debts. Intermediate: Individuals and families will (1) establish long-term financial goals to guide decision making, (2) will decrease spending, and (3) will practice saving regularly. Short-term: Individuals and families will (1) evaluate spending patterns, (2) identify income and expenses, (3) make and implement a budget, and (4) develop and implement a savings plan.

**Add Cross-cutting Outcome/Impact Statement or Unintended or Previously Unknown Outcome Measure**

**Outcome #1**

**1. Outcome Measures**

Not Reporting on this Outcome Measure

Nebraska's will gain knowledge to make effective choices about their health, wellness and diet. The long-term goal of reducing obesity and increasing physical activity of children is essential. 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 relationships 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 Knowledge Outcome Measure
- Change in Action Outcome Measure
- Change in Condition Outcome Measure

**3b. Quantitative Outcome**

Year	Quantitative Target	Actual
2010	500	637

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

**Issue (Who cares and Why)**

In Nebraska, over \$454 million dollars are spent annually on medical costs associated with adult obesity—a key risk factor in the development of heart disease, strokes, and diabetes. Thirty-eight percent of Nebraska's adult population is overweight and another 27% are obese. Additionally, 27% of adults in Nebraska report no leisure time physical activities. Sadly, this epidemic also impacts Nebraska's children. One in every three (33%), or approximately 106,000 Nebraska students, is either overweight or obese. By improving nutrition and physical activity outcomes through educational program, UNL Extension can contribute to the state's overall health and decrease medical expenses for families; thus improving the state's overall economy.

**What has been done**

UNL Extension offers a variety of programs targeted toward improving the nutrition and physical outcomes of Nebraska's youth people and adults. Programs available include:  
 \*Small Steps to Health and Wealth: A distance-based program that motivates adults to change their health and personal finance behaviors.  
 \*Nutrition Education Program (NEP): A nutrition education and food budgeting program for limited resource families.  
 \*Control Diabetes for Life: A nutrition education program for diabetic adults.

\*Medicare Education Program: A program that enables Medicare beneficiaries to enroll into a prescription drug plan or switch plans depending on what is most beneficial for them.

### Results

Participant evaluations show that these programs are making a difference. For example:

\*Nearly 100 percent (95%) of Small Steps participants reported eating healthier and over 60% increased their physical activity levels. On average, participants lost 2.8 lbs with a loss of up to 7 pounds over a two month period.

\*Eighty-four percent of NEP adult graduates improved in at least one nutrition practice while 14% of NEP youth participants increase their daily physical activity.

\*Sixty-five percent of Control Diabetes participants reported eating healthier and 61% reported increasing their physical activity levels. Savings in medical care for Control Diabetes program participants could be estimated at \$510,000 annually.

\*Savings for Medicare Education Program participants could equal \$440,000.

\*21% of 4-H participants improved knowledge and behavior related to food preparation, MyPyramid, healthy snacking, and physical activity.

## 4. Associated Knowledge Areas

- 607 - Consumer Economics
- 608 - Community Resource Planning and Development
- 701 - Nutrient Composition of Food
- 702 - Requirements and Function of Nutrients and Other Food Components
- 703 - Nutrition Education and Behavior
- 712 - Protect Food from Contamination by Pathogenic Microorganisms, Parasites, and
- 721 - Insects and Other Pests Affecting Humans
- 722 - Zoonotic Diseases and Parasites Affecting Humans
- 723 - Hazards to Human Health and Safety
- 724 - Healthy Lifestyle
- 801 - Individual and Family Resource Management
- 802 - Human Development and Family Well-Being
- 803 - Sociological and Technological Change Affecting Individuals, Families, and
- 804 - Human Environmental Issues Concerning Apparel, Textiles, and Residential and
- 805 - Community Institutions, Health, and Social Services
- 806 - Youth Development

## Outcome #2

### 1. Outcome Measures

- Not Reporting on this Outcome Measure

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. 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 entrepreneurial 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 Knowledge Outcome Measure
- Change in Action Outcome Measure
- Change in Condition Outcome Measure

**3b. Quantitative Outcome**

Year	Quantitative Target	Actual
2010	15	92

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

**Issue (Who cares and Why)**

Nebraskans are concerned about community vitality and economic growth. Lack of employment, per capita income, diverse populations, and keeping youth in communities are growing issues. While a few communities are growing slowly, many are decreasing in size. Entrepreneurship and innovation can help grow the state's economy during an era of globalization and rapid change.

**What has been done**

UNL Extension offers a variety of programs for youth and adults related to entrepreneurship and business growth. These include:

- \*Red Carpet Service On-line (a unique customer service program)
- \*NxBizSuccess.com (a collaborative website for entrepreneurs)
- \*12E Club Video Speakers Series
- \*Security Squad (focused on protecting businesses from theft)
- \*Entrepreneurship Investigation (a youth focused entrepreneurship curriculum)

**Results**

In a two year period UNL Extension:

- \*Assisted 57 business starts and transitions
- \*Provided 61,399 hours of entrepreneurship-related teaching
- \*Helped over 2,000 Nebraskans with their businesses

In addition, an increasing number of Nebraskans are seeking assistance from Extension in entrepreneurship and business growth. Over the last year, Extension programs experienced:

- \*21.4% increase in training hours by program
- \*24.5% increase in the number of clients assisted

Entrepreneurship Investigation (ESI) continues to be successful at helping youth gain the skills necessary to start their own business. For example, in of Nebraska's most rural communities, the ESI curriculum helped high school students create their own business selling signs and fence gates made with computerized shop equipment. Students applied and worked for the company the developed in positions such as sales and customer service, machine operations, advertising, quality control, and website design. Based on that success, UNL Extension is working with the school to create a feasibility and business plan to build a high tunnel greenhouse, sell the greenhouse produce, all while focusing on a science-based curriculum. The local school superintendent touts the project as helping students be more innovative and realize the opportunities available at the local level.

#### 4. Associated Knowledge Areas

- 607 - Consumer Economics
- 608 - Community Resource Planning and Development
- 701 - Nutrient Composition of Food
- 702 - Requirements and Function of Nutrients and Other Food Components
- 703 - Nutrition Education and Behavior
- 712 - Protect Food from Contamination by Pathogenic Microorganisms, Parasites, and
- 721 - Insects and Other Pests Affecting Humans
- 722 - Zoonotic Diseases and Parasites Affecting Humans
- 723 - Hazards to Human Health and Safety
- 724 - Healthy Lifestyle
- 801 - Individual and Family Resource Management
- 802 - Human Development and Family Well-Being
- 803 - Sociological and Technological Change Affecting Individuals, Families, and
- 804 - Human Environmental Issues Concerning Apparel, Textiles, and Residential and
- 805 - Community Institutions, Health, and Social Services
- 806 - Youth Development

#### Outcome #3

##### 1. Outcome Measures

- Not Reporting on this Outcome Measure

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 Knowledge Outcome Measure
- Change in Action Outcome Measure
- Change in Condition Outcome Measure

**3b. Quantitative Outcome**

Year	Quantitative Target	Actual
2010	100	121

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

**Issue (Who cares and Why)**

Empowering young people to be successful is a high priority of UNL Extension. Ensuring that they have the skills needed to pursue higher education and turn their passion into viable career opportunities is critical to the youth of our state as well as Nebraska's long-term vitality. By engaging young people in community decision making processes early-on, they are more likely to see envision opportunities to remain connected and stay within the state.

**What has been done**

A variety of programs are offered through UNL Extension to help young people take on leadership roles and gain skills in the decision making process. For example, the goal of the Youth and Adults in Action program offered in six different sites statewide is to grow young leaders by involving them as partners in projects targeted at specific community needs. These youth-driven projects have focused on environmental stewardship, health and wellness promotion, and community promotion. Other programs such as Health Rocks involve young people working with adults to teach younger youth strategies for effective decision making around high risk behaviors such as tobacco, alcohol, and other drug use. The Nebraska 4-H program has chosen career development and youth citizenship as two of their statewide priorities. This means that 4-H programming, regardless of content, has a specific focus on career exploration and building skills in youth advocacy.

**Results**

Several of the Youth and Adults in Action teams have successfully competed in Nebraska's Community Improvement Program and been recognized for their efforts in developing young leaders. One youth member stated: "This program has taught me how to look at community issues and address them. I have grown in my presentation and leadership skills and am now more involved in my community."

While the youth advocacy program is still in the developmental stages, results are beginning to emerge. For example, based on the suggestions of young people, a new 4-H Ambassador group is being developed. These Ambassadors will make contacts with local and statewide decision makers and work to expand public/private partnerships by sharing the 4-H story with business and industry representatives.

Nebraska 4-H is also serving as a catalyst in helping youth attend post secondary education. For example, 95% of high school seniors surveyed between 2007-2010 who were enrolled in 4-H are pursuing education after high school, with 80% staying in Nebraska and 24% planning to attend the University of Nebraska-Lincoln. In addition, 62% of seniors discussed post-secondary options with their 4-H leader or 4-H staff and 65% of seniors felt that their 4-H project impacted their college decision.

#### 4. Associated Knowledge Areas

- 607 - Consumer Economics
- 608 - Community Resource Planning and Development
- 701 - Nutrient Composition of Food
- 702 - Requirements and Function of Nutrients and Other Food Components
- 703 - Nutrition Education and Behavior
- 712 - Protect Food from Contamination by Pathogenic Microorganisms, Parasites, and
- 721 - Insects and Other Pests Affecting Humans
- 722 - Zoonotic Diseases and Parasites Affecting Humans
- 723 - Hazards to Human Health and Safety
- 724 - Healthy Lifestyle
- 801 - Individual and Family Resource Management
- 802 - Human Development and Family Well-Being
- 803 - Sociological and Technological Change Affecting Individuals, Families, and
- 804 - Human Environmental Issues Concerning Apparel, Textiles, and Residential and
- 805 - Community Institutions, Health, and Social Services
- 806 - Youth Development

#### Outcome #4

##### 1. Outcome Measures

- Not Reporting on this Outcome Measure

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 Knowledge Outcome Measure
- Change in Action Outcome Measure
- Change in Condition Outcome Measure

**3b. Quantitative Outcome**

Year	Quantitative Target	Actual
2010	2000	8239

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

**Issue (Who cares and Why)**

Because of the strong reliance on an agricultural economy, a safe and secure food supply is vital to Nebraska. Safe food handling results in reduced food borne illness and the associated health care costs.

**What has been done**

UNL Extension offers a variety of programs targeted toward improving safe food handling practices in efforts to reduce food-borne illness. For example, ServSafe targets foodservice workers. Farmers Market Vendor training provides research-based information to vendors reaching both rural urban audiences. HACCP planning and implementation training is offered to small business owners and meat processing plants. In addition, Nebraska is part of a multi-state USDA food safety grant targeting families with young children. This project uses social marketing strategies to raise the awareness of and change behaviors related to the proper storage and disposal of leftovers.

**Results**

Participant evaluations show that these programs are making a difference. For example:  
 \*ServSafe participants increased their knowledge of safe food handling practices by 40%.  
 \*ServSafe Starters' participants increased their knowledge of proper cooling methods by 39% and minimum cooking temperatures by 27%.  
 \*Right Bite When the Temperature is Right participants learned how to calibrate a thermometer and will use it when cooking meat and poultry.  
 \*56% of adult NEP participants improved in at least one food safety practice.  
 \*As a result of attending Farmers' Market Vendor Training, participants reported a 32% gain in their knowledge about Food Safety in the Field. Participants stated that they will use the information in their on-farm operation and at their booth at the Farmers' Market.

**4. Associated Knowledge Areas**

- 607 - Consumer Economics
- 608 - Community Resource Planning and Development
- 701 - Nutrient Composition of Food
- 702 - Requirements and Function of Nutrients and Other Food Components
- 703 - Nutrition Education and Behavior
- 712 - Protect Food from Contamination by Pathogenic Microorganisms, Parasites, and
- 721 - Insects and Other Pests Affecting Humans
- 722 - Zoonotic Diseases and Parasites Affecting Humans
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- 724 - Healthy Lifestyle
- 801 - Individual and Family Resource Management
- 802 - Human Development and Family Well-Being
- 803 - Sociological and Technological Change Affecting Individuals, Families, and
- 804 - Human Environmental Issues Concerning Apparel, Textiles, and Residential and
- 805 - Community Institutions, Health, and Social Services
- 806 - Youth Development

**Outcome #5**

**1. Outcome Measures**

- Not Reporting on this Outcome Measure

Families will contribute to community viability and maintain sustainable lifestyle to provide a safe and secure future for their children. Long-term: Families will increase financial assets by decreasing debts. Intermediate: Individuals and families will (1) establish long-term financial goals to guide decision making, (2) will decrease spending, and (3) will practice saving regularly. Short-term: Individuals and families will (1) evaluate spending patterns, (2) identify income and expenses, (3) make and implement a budget, and (4) develop and implement a savings plan.

**2. Associated Institution Types**

- 1862 Extension
- 1862 Research

**3a. Outcome Type:**

- Change in Knowledge Outcome Measure
- Change in Action Outcome Measure
- Change in Condition Outcome Measure

**3b. Quantitative Outcome**

Year	Quantitative Target	Actual
2010	100	3100

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

**Issue (Who cares and Why)**

**What has been done**

**Results**

**4. Associated Knowledge Areas**

- 607 - Consumer Economics
- 608 - Community Resource Planning and Development
- 701 - Nutrient Composition of Food
- 702 - Requirements and Function of Nutrients and Other Food Components
- 703 - Nutrition Education and Behavior
- 712 - Protect Food from Contamination by Pathogenic Microorganisms, Parasites, and
- 721 - Insects and Other Pests Affecting Humans
- 722 - Zoonotic Diseases and Parasites Affecting Humans
- 723 - Hazards to Human Health and Safety
- 724 - Healthy Lifestyle
- 801 - Individual and Family Resource Management
- 802 - Human Development and Family Well-Being
- 803 - Sociological and Technological Change Affecting Individuals, Families, and
- 804 - Human Environmental Issues Concerning Apparel, Textiles, and Residential and
- 805 - Community Institutions, Health, and Social Services
- 806 - Youth Development

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

**External factors which affected outcomes**

- Natural Disasters (drought, weather extremes, etc.)
- Economy
- Appropriations changes
- Public Policy changes
- Government Regulations
- Competing Public priorities
- Competing Programmatic Challenges
- Populations changes (immigration, new cultural groupings, etc.)
- Other

**Brief Explanation**

Decreasing rural populations and growing urban communities continue to present economic and social challenges for Nebraska. Keeping young people attracted to Nebraska,

especially to small communities is of high importance to the state.

While Nebraska's economy continues to be stronger than many states, the economic downturn has impacted job growth and spending which in turn impacts state budgets. Of special concern is the budget growth after the ending of stimulus monies.

In order to best meet the needs of clientele with available resources, continual stakeholder input is sought as to the most important program needs and most effective delivery methods. For example, programming related to financial security was altered to focus more on managing finance through difficult financial times. The delivery method was changed from in-person programs to on-line and television.

Continual focusing of program outcomes and the identification of signature programs is critical to Extension's role as being a premiere provider of research-based education.

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

### **(OPTIONAL SECTION)**

#### **1. Evaluation Studies Planned**

- After Only (post program)
- Retrospective (post program)
- Before-After (before and after program)
- During (during program)
- Time series (multiple points before and after program)
- Case Study
- Comparisons between program participants (individuals, group, organizations) and non-participants
- Comparisons between different groups of individuals or program participants experiencing different levels of program intensity.
- Comparison between locales where the program operates and sites without program intervention
- Other

#### **Evaluation Results**

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

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

UNL Extension has identified signature outcomes and indicators in each of its programming areas and is collecting statewide data to assess progress made toward achieving those outcomes. In 2010, each Extension Action Team completed an outcome report highlighting their efforts and the impact of those efforts on clientele. These reports have been instrumental in working with stakeholders who in turn used them to advocate on behalf of the Extension program. Additional efforts are underway to enhance the skills of Action Team leaders in order to strengthen selected indicators and evaluation strategies.