

2011 University of Nebraska Combined Research and Extension Plan of Work

Status: Accepted

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I. Plan Overview

1. Brief Summary about Plan Of Work

The Institute of Agriculture and Natural Resources (IANR) is part of the University of Nebraska-Lincoln land grant university. Strategic planning has long been a part of the process used by research, extension, and teaching to determine the program priorities to be addressed. In 2008 those strategic priorities were:

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

With the introduction of the NIFA societal challenge areas in federal fiscal year 2010, the decision was made to translate the three broad strategic themes of IANR to the five societal challenges for our 2011 federal plan of work. Discussions among IANR administration, stakeholders, and faculty determined that it was a strategic move. IANR will continue to focus research and extension on critical issues important to Nebraska. It is believed that our critical issues will integrate within the five societal challenges. The following plan of work is written with the five societal challenge areas as a guide:

Global Food Security and Hunger
Climate Change
Sustainable Energy
Childhood Obesity
Food Safety

Two critical subject areas of IANR programs, youth development and entrepreneurship, will be threaded throughout the five challenge areas. It is possible that youth education (formal, informal) will be a significant portion of most, if not all, five challenge areas. Entrepreneurship, a quickly growing area of Nebraska IANR programming, will also be woven through research, extension, and teaching. A \$20,000,000 gift for entrepreneurship education will support IANR's efforts to increase the number of individuals studying entrepreneurship, and then developing companies that will provide economic return to Nebraska communities.

The mission of the Institute of Agriculture and Natural Resources is to meet the needs of its Nebraska citizens and provide internationally-recognized science and education. This mission is met by: advancing knowledge along a continuum from fundamental research to application; delivering education that addresses the current and emerging needs of the state; and by teaching tomorrow's professionals. The on-going cultivation of public-private partnerships helps make this mission achievable.

IANR works as an integrated teaching, research, and extension system. This integration of work is evident in the grant funds received, the rigor of educational programs delivered in both formal and non formal settings, and in the placement of graduates in 21st century careers.

Estimated Number of Professional FTEs/SYs total in the State.

Year	Extension		Research	
	1862	1890	1862	1890
2011	186.0	0.0	183.0	0.0
2012	186.0	0.0	183.0	0.0
2013	186.0	0.0	183.0	0.0

Estimated Number of Professional FTEs/SYs total in the State.

Year	Extension		Research	
	1862	1890	1862	1890
2014	186.0	0.0	183.0	0.0
2015	186.0	0.0	183.0	0.0

II. Merit Review Process**1. The Merit Review Process that will be Employed during the 5-Year POW Cycle**

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

2. Brief Explanation

The extension teams and work groups within each action plan updates their plans annually using stakeholder input and evaluation results from delivered programs. Also, every faculty member with a research appointment in the Nebraska Agricultural Experiment Station / Agricultural Research Division (ARD) has a current approved peer-reviewed project that defines his or her area of research investigation. The peer review process for research projects includes the Unit and (if applicable) Research and Extension Center head, at least two faculty members with relevant expertise, and an Associate Dean of ARD. Following review and acceptable revision, if necessary, the project outline is forwarded to USDA-NIFA for inclusion in the CRIS database.

Another review process, which combines merit and peer review, is the annual review by state commodity check-off boards of more than 100 research and extension proposals. Proposals selected for funding address the most significant problems facing the producer members of these boards and clearly communicate the research's relevance to user needs.

Academic units (subject matter departments and Research & Center Centers) complete a comprehensive five-year review to ensure program quality and relevance. Teams comprised of three to six external panel members, and two or three faculty panel members from other academic units, conduct these reviews. The review team assesses the work of the academic unit to ensure that the programmatic efforts/research focuses on Nebraska's most critical needs. The review team completes its assessment by the development of a report that helps the academic unit focus its work for the next five years. It is the responsibility of the IANR Deans to assist the academic unit's administrator and faculty to accomplish the goals identified by the unit, as a follow up to the review process.

Stakeholder input is important to IANR. Last year over 1700 individuals gave input to the identification of program priorities. Extension Board members made individual contacts to ask questions about priority issues. Extension Board members interacted with individuals familiar with the mission of IANR, and those not familiar with this university entity.

III. Evaluation of Multis & Joint Activities**1. How will the planned programs address the critical issues of strategic importance, including those identified by the stakeholders?**

Ongoing input from stakeholder groups, ie. advocacy, advisory, and commodity groups keeps Extension action team

plans current. Ongoing relationships with stakeholder groups such as the Agricultural Builders of Nebraska, Family, Youth and Community Partners, listening sessions led by IANR personnel and Extension Board 'one-on-one conversations' confirm that critical needs are addressed. Continuous listening processes ensures that the plan of work is reviewed and updated regularly. The accuracy of the action plans is verified using the following methods:

Extension teams meet face to face at least twice annually. Teams include both faculty of academic departments who understand long-term trends and faculty located in Extension offices who see on a daily basis the needs of Nebraska residents. Many of these faculty members of academic departments have joint research and extension appointments and can represent fundamental as well as applied research and extension education plans.

Many action teams use monthly phone conference calls to stay on track.

Action team leaders talk with subject-matter department administrators annually to ensure that the action team's goals are congruent with university department research and extension goals.

Action teams meet with their stakeholders.

Action teams refine programs to be delivered to ensure that content goals support needs identified by stakeholders and demographic trends.

ARD faculty currently participating in multi-state projects receive research funding through the multi-state research component of the federal formula funds. These projects are selected and approved by regional director associations because they are high priority needs identified for multi-state activity.

2. How will the planned programs address the needs of under-served and under-represented populations of the

Below are examples of how research and extension address the needs of under-served and under-represented populations.

ARD research programs related to human nutrition and healthy lifestyles were highlighted under the federal goals and key themes. The research results feed science-based information directly into UNL Extension programs that target under-served and under-represented populations.

University of Nebraska-Lincoln Extension has built a strong partnership with Little Priest Tribal College and Nebraska Indian Community College. Through this partnership, Native American teens have become more involved in outside activities and interact with other youth and adults outside their schools. Program leaders say teens are more motivated and more interested in learning about activities. The Expanded Food and Nutrition Program and the Food Stamp Nutrition Education Program annually teach over 5,800 families and 15,000 youth from low resource (many are from the under represented populations) individuals and families how to make nutritionally sound food choices, use their food dollars wisely, and cook meals for their families that adhere to food safety principles.

The College of Education and Human Science, Extension and the Nebraska Department of Education have undertaken a programmatic effort with targeted school districts to address needs of first generation families.

An Educator addresses the needs of Hispanic and Native American youth in Scotts Bluff County. This program engages middle and high school youth in after-school and community based programs. Coalitions of Hispanic and Native American individuals contribute to the success of this youth program.

3. How will the planned programs describe the expected outcomes and impacts?

Goals and anticipated outcomes focus Extension educational programs. Plan of work goals identified include output and outcome indicators as well as proposed impacts that will be used as planning tools (see <http://www.extension.unl.edu/web/Extension/progfocus> for work completed in 2009 to help faculty/staff align outcomes/indicators.) Action teams refine evaluation indicators and survey questions so that data collected by action teams represents statewide program impact. Teams are collecting their data through their web sites.

The basic and applied sciences that drive ARD research programs are closely aligned with Extension outcomes and impacts. Knowledge creation and future workforce education (of graduate students), another essential outcome and impact associated with research, is measured in journal article research, improved technologies, improved germplasm, and numbers of graduating agricultural and life-science scientists. Much of the newly developed knowledge, in both the short- and long-term, helps inform our Extension programming.

4. How will the planned programs result in improved program effectiveness and/or efficiency?

Documentation of program impacts reinforce UNL Extension and Agricultural Research program effectiveness. The increasing number of multi-action team, multi-department and multi-state educational programs

in multiple sites using multiple media reflect increased efficiencies in use of content development. The aggressive efforts of faculty to use electronic media to deliver educational programs helps achieve this efficiency but, more important, allows program clientele to participate in programming on their own time and at their own location. An output of the newly focused education concept is in the increase in relationships with departments and colleges external to traditional extension partners; e.g., College of Architecture, College of Fine and Performing Arts, Admissions, Journalism and Computer Science, Peter Kewitt Center for Computer Science, College of Education and Human Sciences, and College of Engineering.

IV. Stakeholder Input

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

- Other (Development of public value statements for use by stakeholders to promote IANR programs)

Brief explanation.

The University of Nebraska-Lincoln (UNL) Extension and Agricultural Research Division collaborate to plan and develop programs. These divisions of the Institute of Agriculture and Natural Resources (IANR) have worked together to develop an IANR integrated strategic plan for more than 10 years. Listening sessions across the state provide significant input to the strategic planning process. Some of the listening sessions target specific (traditional and non-traditional stakeholder) groups while others are open to general stakeholder input. The listening sessions are always conducted in a way to foster input from all participants.

Extension action teams are asked to seek program input from a minimum of five key stakeholders annually (determined to represent a significant population or organization or to be a key leader). This input has been invited by some teams in a formal manner with invitations to specific individuals while other teams use surveys of program stakeholders. In each case the participants are encouraged to provide input for program planning and evaluation.

Most of the UNL academic departments and research and extension centers have advisory committees that represent stakeholder groups. These advisory groups are encouraged to provide input to both extension and research programs. The committees are selected to be representative of the stakeholders served by the unit.

County Extension Board members completed over 1,700 one-on-one conversations to ask how well are we as a university entity doing to achieve our outcomes. Since these are one-on-one conversations it is easy for participants to respond.

The public can easily give input by sending an e-mail to: <http://www.extension.unl.edu>, <http://ard.unl.edu> or any of the related departments or programs. All have feedback options.

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

1. Method to identify individuals and groups

- Use Advisory Committees
- Use External Focus Groups

Brief explanation.

Several methods are used to identify individuals and groups to provide input to research and extension programs.

Extension action teams are responsible for identifying stakeholders familiar with the subject matter and related issues impacting state residents.

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 Community, Youth & Family Partners.

For IANR listening sessions host extension educators 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.

The 4-H program uses a stratified group process technique to target specific groups for input. In addition, 4-H uses youth curriculum committee members to help identify critical curricula topics.

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

1. Methods for collecting Stakeholder Input

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

Brief explanation.

The IANR listening sessions are face-to-face meetings with traditional and non-traditional stakeholder individuals. Extension and the Agricultural Research Division representatives listen for input from the stakeholders. Our institution considers itself fortunate that faculty (specialists, educators and researchers) engage in one-on-one relationships with many of the federal, state and local agencies in the state, commodity organizations, related industries, educational organizations, and a variety of non-profit organizations. This engagement provides significant stakeholder feedback. Extension action teams use a variety of methods to obtain input including face-to-face meetings, telephone surveys, asking for review of action plans with a written survey response, and surveys of program participants during specific program activities. The action teams seek to answer the following questions: Are the action plan's educational goals the highest priorities? Does the action plan represent work that is complementary, but does not duplicate, work of other organizations? Are there potential collaborators for these action plans? Are you, as a stakeholder, aware of potential grant/contract funding sources? Are there educational goals of the action plan that should be eliminated or handed off to other entities? Meetings with leaders within minority population audiences are held to help identify needs and programs to serve audiences such as Latino and Native American populations. The Extension Board Conversations are one-on-one interviews. Questions asked by Extension Board members are: When you think about UNL Extension what are some of the things you value most? When you think of the benefits that UNL Extension brings to the community what comes to mind? What are key programs that we deliver better than anyone else? What are current and/or emerging needs that UNL Extension can address? What new audiences should we be considering? The Nebraska Rural Poll is sent to approximately 7,000 rural Nebraska residents with between 2,500 and 3,000 responses each year over the last 12 years. The poll asks for responses to a variety of rural issues. UNL requires that each administrative unit conduct a program review every five years. In most cases the units conduct some type of stakeholder input process such as surveys, one-on-one interviews, and focus group sessions to gather input for planning future research and education programs. Input from stakeholders for development of the 4-H strategic plan is obtained annually via an interactive web site.

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

Brief explanation.

UNL Extension and Agricultural Research Division believe that stakeholder input is essential to developing and delivering on target research and educational programs.

The IANR listening sessions continue to help identify priority issues for consideration as we consider research and education programs. The listening session engagement provides access to information about trends and issues that impact Nebraskans. The listening session feedback is provided to departments and extension actions teams.

The County Conversation summaries have been shared with all extension faculty and academic department administrators. Extension action teams use this information as they develop program plans.

The engagement with minority audience stakeholders is used to help plan and deliver programs that promotes cross cultural understanding and used to involve teens in local decision making and career planning.

Input from the Nebraska 4-H information gathering process is continually used to refine a Nebraska 4-H strategic plan. Stakeholders identified four target areas for youth development which were used as the basis for the plan. The strategic plan focus is now Science, Engineering and Technology; Citizenship; Healthy Lifestyles; and Career Education.

Through stakeholder involvement, research and education programs target the highest priority needs. Research results are made available to a broader range of stakeholders. Extension education programs are better marketed across the state. Program co-sponsorships become more likely as others learn about programs. Collaborating entities become program participants. Collaborating entities become sources of matching funding for research and education programs.

In 2010, UNL Extension will add a new position to seek out urban companies and organizations to identify opportunities to jointly partner with programs of specific interest to urban residents.

V. Planned Program Table of Content

S. No.	PROGRAM NAME
1	Global Food Security and Hunger
2	Climate Change
3	Sustainable Energy
4	Childhood Obesity
5	Food Safety

V(A). Planned Program (Summary)

Program # 1

1. Name of the Planned Program

Global Food Security and Hunger

2. Brief summary about Planned Program

Our **Global Food Security and Hunger** program is focused on using basic and applied research in the life/agricultural sciences to generate knowledge critical to maximizing productivity in animal and plant agriculture. Extension programs will continue to transfer new knowledge to producers that helps optimize productivity while ensuring financial and environmental sustainability of Nebraska's farms and ranches. Undergraduate and graduate education programs will support research and extension efforts, and ensure a highly educated workforce essential to modern agriculture.

3. Program existence : Mature (More then five years)

4. Program duration : Long-Term (More than five years)

5. Expending formula funds or state-matching funds : Yes

6. Expending other than formula funds or state-matching funds : Yes

V(B). Program Knowledge Area(s)

1. Program Knowledge Areas and Percentage

KA Code	Knowledge Area	%1862 Extension	%1890 Extension	%1862 Research	%1890 Research
121	Management of Range Resources	10%		4%	
201	Plant Genome, Genetics, and Genetic Mechanisms	0%		5%	
203	Plant Biological Efficiency and Abiotic Stresses Affecting Plants	2%		3%	
205	Plant Management Systems	28%		6%	
206	Basic Plant Biology	0%		11%	
211	Insects, Mites, and Other Arthropods Affecting Plants	4%		14%	
212	Pathogens and Nematodes Affecting Plants	4%		11%	
213	Weeds Affecting Plants	4%		6%	
215	Biological Control of Pests Affecting Plants	0%		3%	
216	Integrated Pest Management Systems	4%		5%	
301	Reproductive Performance of Animals	1%		8%	
302	Nutrient Utilization in Animals	4%		6%	
303	Genetic Improvement of Animals	1%		2%	
305	Animal Physiological Processes	1%		3%	
307	Animal Management Systems	20%		5%	
402	Engineering Systems and Equipment	1%		5%	
601	Economics of Agricultural Production and Farm Management	6%		2%	
806	Youth Development	10%		1%	
	Total	100%		100%	

V(C). Planned Program (Situation and Scope)**1. Situation and priorities**

Population experts anticipate the addition of another 3 billion people to the planet's population by the mid-21st century. In addition, growing wealth in China and other parts of Asia is expected to increase demand for higher protein animal products. These conditions may produce a doubling in demand for crop production in the next four decades at a time when agricultural land is not expected to increase.

Significant increases in crop yields and input efficiency will be needed to respond to societal demands. Application of existing technologies to the world's food production regions that have not yet had access to these technologies will be critical. In addition, improvement in genetic and biological technologies that increase yield potential for crops grown in the world's advanced agriculturally intensive production regions (such as Nebraska) is also essential.

Our research and extension programs will focus on economically increasing productivity, while improving environmental stewardship and natural resource (esp. water) protection. Many of the same scientific approaches, technology applications, and educational efforts that address climate variability (see our Climate Change program) will be essential to ensure Global

Food Security. As such, our basic scientists will explore both inherent mechanisms to maximize animal and plant yield potential, but also stress protection mechanisms in both animal and plant systems using a variety of genetic and physiological tools. Extension programs will focus on agricultural systems that maximize yield, profitability and and appropriate risk management in an environment where economics must be adjusted to consider sustainability of water resources as well as other inputs, environmental protection, and climate change.

2. Scope of the Program

- Integrated Research and Extension
- Multistate Integrated Research and Extension

V(D). Planned Program (Assumptions and Goals)

1. Assumptions made for the Program

We will ensure alignment between research and extension efforts throughout this program of work.

We will retain current faculty positions, although the focus of some will change.

We see the continued major role of agriculture in the state.

We will have financial support from state, university and federal programs that support base programs -- although base funding levels will likely decrease.

We will be increasingly dependent on grants to support education, research and extension efforts.

2. Ultimate goal(s) of this Program

To increase the productivity and profitability of Nebraska's agricultural enterprises in order to sustainably meet world food demands.

V(E). Planned Program (Inputs)

1. Estimated Number of professional FTE/SYs to be budgeted for this Program

Year	Extension		Research	
	1862	1890	1862	1890
2011	65.0	0.0	73.0	0.0
2012	65.0	0.0	73.0	0.0
2013	65.0	0.0	73.0	0.0
2014	65.0	0.0	73.0	0.0
2015	65.0	0.0	73.0	0.0

V(F). Planned Program (Activity)

1. Activity for the Program

Conduct foundational research in the basic sciences that underpin and will support future productivity and sustainability advances in agriculture.

Conduct research and extension programs to develop/deliver new and improved crop and livestock integrated management programs that increase the potential for improved agricultural productivity.

Conduct research and extension programs to develop/deliver new and improved information to help producers create sustainable crop and livestock production programs.

2. Type(s) of methods to be used to reach direct and indirect contacts

Extension

Direct Methods	Indirect Methods
<ul style="list-style-type: none"> • Education Class • Workshop • One-on-One Intervention • Demonstrations 	<ul style="list-style-type: none"> • Newsletters • TV Media Programs • Web sites

3. Description of targeted 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 and climate issues. The program will provide agency staff with the knowledge they need to carry out the agency responsibilities and mandates.

V(G). Planned Program (Outputs)

1. Standard output measures

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

	Direct Contact Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Year	Target	Target	Target	Target
2011	25000	300000	25000	2000
2012	25000	300000	25000	2000
2013	25000	300000	25000	2000
2014	25000	300000	25000	2000
2015	25000	300000	25000	2000

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

2011:2 2012:2 2013:2 2014:2 2015:2

3. Expected Peer Review Publications

Year	Research Target	Extension Target	Total
2011	300	25	325
2012	300	25	325
2013	300	25	325
2014	300	25	325

Year	Research Target	Extension Target	Total
2015	300	25	325

V(H). State Defined Outputs

1. Output Target

- Number of Agricultural Research Division HATCH projects in global food security and hunger.

2011:70 2012:70 2013:70 2014:70 2015:70

- Number of workshops, continuing education programs, web-based curricula and field days/tours related to global food security and hunger.

2011:200 2012:200 2013:200 2014:200 2015:200

- Number of new extension publications and other education resources related to global food security and hunger.

2011:30 2012:30 2013:30 2014:30 2015:20

- Number of new products and decision tools developed and made available to clientele related to global food security and hunger.

2011:5 2012:5 2013:5 2014:5 2015:5

V(I). State Defined Outcome

O. No.	Outcome Name
1	Nebraska farmers and ranchers will increase productivity and profitability through adoption of research and extension information provided by IANR programs (measured by value placed on the information by clientele)
2	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).
3	Nebraska farmers and ranchers will increase their knowledge and awareness of how integrated pest management and pesticide best management practices can help protect water quality and human health while providing acceptable crop pest protection (measured by the number of farmers and commercial applicators certified in pesticide safety).
4	Nebraska will have access to higher educated workforce trained in the new biology with skills applied to addressing critical science in global food security and hunger.

Outcome # 1**1. Outcome Target**

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

2. Outcome Type : Change in Condition Outcome Measure

2011:133400000 **2012:**133400000 **2013:**100000000 **2014:**100000000 **2015:**100000000

3. Associated Knowledge Area(s)

- 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
- 402 - Engineering Systems and Equipment
- 601 - Economics of Agricultural Production and Farm Management
- 806 - Youth Development

4. Associated Institute Type(s)

- 1862 Extension
- 1862 Research

Outcome # 2**1. Outcome Target**

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. Outcome Type : Change in Action Outcome Measure

2011:70 **2012:**70 **2013:**70 **2014:**70 **2015:**70

3. Associated Knowledge Area(s)

- 121 - Management of Range Resources
- 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
- 402 - Engineering Systems and Equipment
- 601 - Economics of Agricultural Production and Farm Management
- 806 - Youth Development

4. Associated Institute Type(s)

- 1862 Extension
- 1862 Research

Outcome # 3

1. Outcome Target

Nebraska farmers and ranchers will increase their knowledge and awareness of how integrated pest management and pesticide best management practices can help protect water quality and human health while providing acceptable crop pest protection (measured by the number of farmers and commercial applicators certified in pesticide safety).

2. Outcome Type : Change in Knowledge Outcome Measure

2011:2000	2012:2000	2013:2000	2014:2000	2015:2000
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3. Associated Knowledge Area(s)

- 121 - Management of Range Resources
- 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
- 806 - Youth Development

4. Associated Institute Type(s)

- 1862 Extension
- 1862 Research

Outcome # 4

1. Outcome Target

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

2. Outcome Type : Change in Knowledge Outcome Measure

2011:50

2012:50

2013:50

2014:50

2015:50

3. Associated Knowledge Area(s)

- 121 - Management of Range Resources
- 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
- 303 - Genetic Improvement of Animals
- 305 - Animal Physiological Processes
- 307 - Animal Management Systems
- 402 - Engineering Systems and Equipment
- 601 - Economics of Agricultural Production and Farm Management
- 806 - Youth Development

4. Associated Institute Type(s)

- 1862 Extension
- 1862 Research

V(J). Planned Program (External Factors)

1. External Factors which may affect Outcomes

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

Description

Downturn in the state economy could impact outcomes.

Natural, disease or human-driven catastrophes would impact outcomes.

Complete refocus of University of Nebraska program priorities would affect outcomes.

V(K). Planned Program (Evaluation Studies and Data Collection)

1. Evaluation Studies Planned

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

Description

We will conduct evaluations through the life of this program of work through multiple listening sessions each year; through the formal and informal evaluations completed in conjunction with workshops, field days, continuing education workshops and peer reviews of planned research and extension programs; and from external peer panels during six-year reviews of unit and issue-based reviews of teaching, research and extension programs.

2. Data Collection Methods

- Sampling
- On-Site
- Structured
- Observation
- Journals

Description

Post meeting surveys of knowledge gain and intended behavior change.
Follow-up surveys of actual behavior change and estimated conditional changes of targeted educational efforts.

V(A). Planned Program (Summary)

Program # 2

1. Name of the Planned Program

Climate Change

2. Brief summary about Planned Program

According to the National Agricultural Biotechnology Council, in its NABC Report 21 titled *Adapting Agriculture to Climate Change*, US agriculture accounts for approximately 6-8% of radiative forcing green house gas emissions, and that the emissions in the United States are mainly in the form of methane and nitrous oxide. According to their report, agricultural sources such as animal husbandry, manure management and agricultural soils account for about 51% of these global emissions. As the number 2 (in the US) state in total cattle, and number 2 in total cattle on feed, and number 1 in irrigated crop acres, Nebraska agriculture must continue to explore management practices that have the potential to mitigate production of greenhouse gasses. In addition, as a major crop producers (#5 for all crops in the US) and a grassland state, Nebraska has the potential to capture carbon from the environment and reduce the impact of human activity on climate change.

Our **Climate Change** program is focused on using basic and applied research in the life/agricultural sciences coupled with Engineering, Natural Resources and Climate Monitoring/modeling expertise to generate knowledge critical to maintaining sustainability of animal and plant agriculture when faced with short- and long-term environmental stress. Extension programs will continue to transfer new knowledge to producers that helps optimize productivity while ensuring financial and environmental sustainability of Nebraska's farms and ranches. In Nebraska, adaptation of agricultural systems to climate changes will be a primary focus. Specific agricultural systems vulnerable to climate change include range based beef systems, irrigated agriculture, and open lot beef production systems. Emphasis will be placed on the efficient use of water resources, planning and managing range resources based upon anticipated climate, and managing of beef finishers to reduce cold and heat stress. Undergraduate and graduate education programs will support research and extension efforts, and ensure a highly educated workforce essential to modern agriculture and sustainable use of ecosystem services.

3. Program existence : Mature (More than five years)

4. Program duration : Long-Term (More than five years)

5. Expending formula funds or state-matching funds : Yes

6. Expending other than formula funds or state-matching funds : Yes

V(B). Program Knowledge Area(s)

1. Program Knowledge Areas and Percentage

KA Code	Knowledge Area	%1862 Extension	%1890 Extension	%1862 Research	%1890 Research
102	Soil, Plant, Water, Nutrient Relationships	29%		18%	
111	Conservation and Efficient Use of Water	14%		26%	
132	Weather and Climate	4%		7%	
133	Pollution Prevention and Mitigation	7%		12%	
135	Aquatic and Terrestrial Wildlife	7%		9%	
141	Air Resource Protection and Management	4%		0%	
201	Plant Genome, Genetics, and Genetic Mechanisms	0%		4%	
203	Plant Biological Efficiency and Abiotic Stresses Affecting Plants	7%		4%	
302	Nutrient Utilization in Animals	0%		6%	
303	Genetic Improvement of Animals	0%		2%	
305	Animal Physiological Processes	0%		2%	
307	Animal Management Systems	0%		1%	
315	Animal Welfare/Well-Being and Protection	0%		3%	
403	Waste Disposal, Recycling, and Reuse	4%		2%	
405	Drainage and Irrigation Systems and Facilities	14%		1%	
605	Natural Resource and Environmental Economics	10%		3%	
	Total	100%		100%	

V(C). Planned Program (Situation and Scope)**1. Situation and priorities**

Several Nebraska agricultural systems are likely to experience significant stress due to changes in climate and/or be forced to alter production practices to help mitigate negative environmental impacts. Some of those systems and their likely issues include:

- Irrigated agriculture. Ground water levels and surface water flows are already experiencing significant swings due to variability of climate (extreme drought and wet periods) making investments in irrigated agriculture increasingly risky. Significant investments will need to be made in developing new water conserving practices and applying existing best practices.

- Cropping systems. Dryland agriculture is facing increasing increasing stress from drought and all cropping systems are experiencing changing pest concerns due in part to climatic changes. Drought and pesticide tolerant seed technologies and related practices will be critical to management of these stressors.

- Range Systems. The large area of range based agriculture in the Sandhills region of Nebraska was a desert only several thousand years ago. Small changes in climate could create a return of these conditions to a very productive agricultural system. Planning strategies for stocking density based upon climatic predictions and management of range during drought conditions will be essential to the sustainability of this rich region.

- Confined beef systems. Open lot beef production systems used for the vast majority red meat production in the US is especially vulnerable to heat and cold stress. Engineering, animal selection, and other solutions will need to be considered to maintain red meat production in the region. In addition, Nebraska must continue to explore management practices that have

the potential to adapt to and mitigate production of greenhouse gasses.

In addition to employing climate change adaptation strategies to our agricultural systems, Nebraska's extensive grassland, rangeland, and traditional cropping systems have the potential to reduce the impact of human activity on climate change. Our expertise in water management, agricultural-land carbon sequestration, climate monitoring and climate modeling will be disseminated world-wide. To help protect our agricultural productivity in the face of climate variability, our basic scientists will explore stress protection mechanisms in both animal and plant systems using a variety of genetic and physiological tools.

2. Scope of the Program

- Integrated Research and Extension
- Multistate Integrated Research and Extension

V(D). Planned Program (Assumptions and Goals)

1. Assumptions made for the Program

We will ensure alignment between research and extension efforts throughout this program of work.

We will retain current faculty positions, although the focus of some will change.

We see the continued major role of agriculture in the state.

We will have financial support from state, university and federal programs that support base programs -- although base funding levels will likely decrease.

We will be increasingly dependent on grants to support education, research and extension efforts.

Environmental stewardship and adaptation to climate variability will be essential for the long-term sustainability of Nebraska's agricultural enterprise.

2. Ultimate goal(s) of this Program

Increase the productivity of Nebraska's plant and animal agricultural sectors, provide technologies that allow adaptation to climate variability, and improve Nebraska's environmental stewardship.

V(E). Planned Program (Inputs)

1. Estimated Number of professional FTE/SYs to be budgeted for this Program

Year	Extension		Research	
	1862	1890	1862	1890
2011	37.0	0.0	68.0	0.0
2012	37.0	0.0	68.0	0.0
2013	37.0	0.0	68.0	0.0
2014	37.0	0.0	68.0	0.0
2015	37.0	0.0	68.0	0.0

V(F). Planned Program (Activity)

1. Activity for the Program

Conduct foundational research in the basic sciences that underpin and will support future productivity and sustainability advances in agriculture.

Collect, disseminate, and model climate change data essential for understanding the impact of climate on natural resource and agricultural systems.

Conduct research and extension programs to develop/deliver new and improved crop and livestock integrated management programs that increase the potential for improved agricultural productivity in the face of environmental

stress/climate variability.

Conduct research and extension programs to develop/deliver new and improved information to help producers create sustainable crop and livestock production programs with improved environmental impacts.

2. Type(s) of methods to be used to reach direct and indirect contacts

Extension

Direct Methods	Indirect Methods
<ul style="list-style-type: none"> • Education Class • Workshop • One-on-One Intervention • Demonstrations 	<ul style="list-style-type: none"> • Newsletters • TV Media Programs • Web sites

3. Description of targeted 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 and climate issues. The program will provide agency staff with the knowledge they need to carry out the agency responsibilities and mandates.

V(G). Planned Program (Outputs)

1. Standard output measures

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

	Direct Contact Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Year	Target	Target	Target	Target
2011	2000	10000	10000	20000
2012	2000	10000	10000	20000
2013	2000	10000	10000	20000
2014	2000	10000	10000	20000
2015	5000	10000	10000	20000

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

2011:1 2012:1 2013:1 2014:1 2015:1

3. Expected Peer Review Publications

Year	Research Target	Extension Target	Total
2011	110	10	120
2012	110	10	120
2013	110	10	120

Year	Research Target	Extension Target	Total
2014	110	10	120
2015	110	10	120

V(H). State Defined Outputs

1. Output Target

- Number of Agricultural Research Division HATCH projects in climate change.

2011:65 2012:65 2013:65 2014:65 2015:65

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

2011:25 2012:25 2013:25 2014:25 2015:25

- Number of new extension publications and other education resources related to climate change.

2011:10 2012:10 2013:10 2014:10 2015:10

- Number of new products and decision tools developed and made available to clientele related to climate change.

2011:2 2012:2 2013:2 2014:2 2015:2

V(I). State Defined Outcome

O. No.	Outcome Name
1	Nebraska ranchers will increase sustainability of range resources through adoption of research and extension information provided by IANR programs (measured by value placed on the information by clientele).
2	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 Resource Districts that require the use of water measurement devices.
3	Nebraska will not exceed its allocation of water in the Republican River as allowed by the interstate compact with Kansas and Colorado. Nebraskan'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.
4	Nebraska will have access to higher educated workforce trained in the new biology with skills applied to addressing critical science in climate change.

Outcome # 1**1. Outcome Target**

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

2. Outcome Type : Change in Condition Outcome Measure

2011:30000000 2012:30000000 2013:30000000 2014:30000000 2015:30000000

3. Associated Knowledge Area(s)

- 111 - Conservation and Efficient Use of Water
- 132 - Weather and Climate
- 141 - Air Resource Protection and Management
- 302 - Nutrient Utilization in Animals
- 305 - Animal Physiological Processes
- 307 - Animal Management Systems
- 315 - Animal Welfare/Well-Being and Protection
- 605 - Natural Resource and Environmental Economics

4. Associated Institute Type(s)

- 1862 Extension
- 1862 Research

Outcome # 2**1. Outcome Target**

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 Resource Districts that require the use of water measurement devices.

2. Outcome Type : Change in Condition Outcome Measure

2011:10 2012:12 2013:14 2014:16 2015:18

3. Associated Knowledge Area(s)

- 102 - Soil, Plant, Water, Nutrient Relationships
- 111 - Conservation and Efficient Use of Water
- 132 - Weather and Climate
- 405 - Drainage and Irrigation Systems and Facilities
- 605 - Natural Resource and Environmental Economics

4. Associated Institute Type(s)

- 1862 Extension
- 1862 Research

Outcome # 3**1. Outcome Target**

Nebraska will not exceed its allocation of water in the Republican River as allowed by the interstate compact with Kansas and Colorado. Nebraskan'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. Outcome Type : Change in Condition Outcome Measure

2011:49	2012:49	2013:49	2014:49	2015:49
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3. Associated Knowledge Area(s)

- 102 - Soil, Plant, Water, Nutrient Relationships
- 111 - Conservation and Efficient Use of Water
- 132 - Weather and Climate
- 405 - Drainage and Irrigation Systems and Facilities
- 605 - Natural Resource and Environmental Economics

4. Associated Institute Type(s)

- 1862 Extension
- 1862 Research

Outcome # 4**1. Outcome Target**

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

2. Outcome Type : Change in Knowledge Outcome Measure

2011:10	2012:10	2013:10	2014:10	2015:10
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3. Associated Knowledge Area(s)

- 102 - Soil, Plant, Water, Nutrient Relationships
- 111 - Conservation and Efficient Use of Water
- 132 - Weather and Climate
- 133 - Pollution Prevention and Mitigation
- 135 - Aquatic and Terrestrial Wildlife
- 141 - Air Resource Protection and Management
- 201 - Plant Genome, Genetics, and Genetic Mechanisms
- 203 - Plant Biological Efficiency and Abiotic Stresses Affecting Plants
- 302 - Nutrient Utilization in Animals
- 303 - Genetic Improvement of Animals
- 305 - Animal Physiological Processes
- 307 - Animal Management Systems
- 315 - Animal Welfare/Well-Being and Protection
- 403 - Waste Disposal, Recycling, and Reuse
- 405 - Drainage and Irrigation Systems and Facilities

- 605 - Natural Resource and Environmental Economics

4. Associated Institute Type(s)

- 1862 Extension
- 1862 Research

V(J). Planned Program (External Factors)

1. External Factors which may affect Outcomes

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

Description

The following factors may significantly affect program outcomes:

Weather conditions such as prolonged drought.

Economic constraints that can threaten potential investment in new water management technology and management.

Restrictions on water use that can impact irrigated agriculture.

Implementation of new legislation and development of regulations by Natural Resource Districts.

Competition for limited water supplies among agriculture, wildlife, recreation and municipalities.

Conflicts between ground water and surface water users.

V(K). Planned Program (Evaluation Studies and Data Collection)

1. Evaluation Studies Planned

- During (during program)

Description

We will use program participant surveys as the primary evaluation method. We will administer a mix of surveys at program completion and use follow-up surveys to determine actions taken. We will use Information from state and federal agencies to estimate the adoption of practices to address natural resource issues. Information from the Nebraska Department of Natural Resources will be used to determine the compliance with the Republican River Interstate Compact. Data from Natural Resource Districts will provide information relative to irrigation water use for making estimates of irrigated crop water consumptive use with comparisons made to the base year of calendar year 2006.

2. Data Collection Methods

- Sampling
- Mail
- On-Site
- Observation
- Other (Agency data)

Description

Most program activity will involve some type of survey of program participants. Some selected programs will have more formal, in-depth surveys after the sequence of program activities to determine practice changes and adoption of new technology. Faculty will collect some data by observing practices within selected geographic regions over a period of time. Data from the Nebraska Department of Natural Resources and Natural Resources Districts will be obtained directly from the individual agencies.

V(A). Planned Program (Summary)**Program # 3****1. Name of the Planned Program**

Sustainable Energy

2. Brief summary about Planned Program

Our **Sustainable Energy** program is focused on using basic and applied research in the life/agricultural sciences coupled with engineering and economic life-cycle analysis to generate knowledge critical to ensuring sustainable energy systems for Nebraska and the US. Particular emphasis will be placed on wind energy, energy conservation, and bio-fuels from grain, grasses, agricultural wastes, and algae. Extension programs will continue to transfer new knowledge to energy producers, agricultural enterprises, businesses, and consumers regarding options for efficient environmentally appropriate energy production and energy saving systems.

3. Program existence : Intermediate (One to five years)

4. Program duration : Long-Term (More than five years)

5. Expending formula funds or state-matching funds : Yes

6. Expending other than formula funds or state-matching funds : Yes

V(B). Program Knowledge Area(s)

1. Program Knowledge Areas and Percentage

KA Code	Knowledge Area	%1862 Extension	%1890 Extension	%1862 Research	%1890 Research
201	Plant Genome, Genetics, and Genetic Mechanisms	0%		21%	
203	Plant Biological Efficiency and Abiotic Stresses Affecting Plants	0%		18%	
205	Plant Management Systems	25%		26%	
511	New and Improved Non-Food Products and Processes	75%		35%	
	Total	100%		100%	

V(C). Planned Program (Situation and Scope)**1. Situation and priorities**

Nebraska, as a major crop and livestock producing state, is well positioned continue its growth in bio- and sustainable energy production, particularly ethanol and soy diesel. Ethanol production from feed grain is a major industry, and there is significant potential for incorporating grass species and crop residue into feedstock streams.

To adequately support these growth areas, we must increasingly focus on expanding our research and extension programs in energy-efficient agriculture, including using on-farm bio- and wind-energy systems. In addition, our programs must focus on biofuel life-cycle analysis, production systems that sustainable consider appropriate levels of crop residue removal, efficient production practices, and basic life science designed to engineer plants to maximize grain and biomass production, while reducing input needs. First-generation grain-based ethanol production continues to be important in Nebraska; our research must increasing focus on maximizing the output of existing production systems, reducing carbon footprints associated with grain ethanol production, exploring bio-fuel production from cellulosic materials. and conducting research on potential third-generation fuel sources such as algae.

Sustainable energy systems rely upon efficient production and optimal resource management. Existing programs investigating feeding wet and dry distillers grain to livestock, developing water-efficient crop cultivars, and producing integrated crop management decision tools will help producers develop systems approaches to crop and livestock production that reduce energy inputs and use natural resources efficiently.

Wind energy will continue to grow in Nebraska. Land use public policy, fair contract arrangements for land owners, and power distribution systems will be critical issues for allowing wind energy to continue to grow.

2. Scope of the Program

- Integrated Research and Extension
- Multistate Integrated Research and Extension

V(D). Planned Program (Assumptions and Goals)

1. Assumptions made for the Program

We will ensure alignment between research and extension efforts throughout this program of work.

We will retain current faculty positions, although the focus of some will change.

We see the continued major role of agriculture in the state.

We will have financial support from state, university and federal programs that support base programs -- although base funding levels will likely decrease.

We will be increasingly dependent on grants to support education, research and extension efforts.

Efficient use of existing energy resources, and the continued development and growth our bio-energy industry will be essential to the economic sustainability of Nebraska agriculture and the livelihood of its citizens.

2. Ultimate goal(s) of this Program

Nebraska's agricultural producers will have increased opportunities to sustainably contribute and produce products for bio-based energy producers.

Nebraska's farms and ranches will have improved access to technologies designed to both save and sustainably produce energy.

Our bio-based fuel industry will continue to thrive, while simultaneously employing improved technologies that increase net energy production.

Nebraska's citizens will use energy resources efficiently.

V(E). Planned Program (Inputs)

1. Estimated Number of professional FTE/SYs to be budgeted for this Program

Year	Extension		Research	
	1862	1890	1862	1890
2011	19.0	0.0	7.0	0.0
2012	19.0	0.0	7.0	0.0
2013	19.0	0.0	7.0	0.0
2014	19.0	0.0	7.0	0.0
2015	19.0	0.0	7.0	0.0

V(F). Planned Program (Activity)

1. Activity for the Program

Conduct research and extension programs to develop/deliver information on new or improved energy products and technologies and emerging efficiencies of production to Nebraska's ag-based industries.

2. Type(s) of methods to be used to reach direct and indirect contacts

Extension

Direct Methods	Indirect Methods
<ul style="list-style-type: none"> • Education Class • Workshop • Group Discussion • One-on-One Intervention • Demonstrations 	<ul style="list-style-type: none"> • Newsletters • Web sites

3. Description of targeted audience

Land owners, agricultural producers, youth, and graduate and undergraduate students.

V(G). Planned Program (Outputs)

1. Standard output measures

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

	Direct Contact Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Year	Target	Target	Target	Target
2011	1000	3000	100	500
2012	1000	3000	100	500
2013	1000	3000	100	500
2014	1000	3000	100	500
2015	1000	3000	100	500

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

2011:1 2012:1 2013:1 2014:1 2015:1

3. Expected Peer Review Publications

Year	Research Target	Extension Target	Total
2011	15	5	20
2012	15	5	20
2013	15	5	20
2014	15	5	20

Year	Research Target	Extension Target	Total
2015	15	5	20

V(H). State Defined Outputs

1. Output Target

- Number of refereed journal publications related to sustainable energy.

2011:20 2012:20 2013:20 2014:20 2015:20

- Number of Agricultural Research Division HATCH projects in sustainable energy.

2011:7 2012:7 2013:7 2014:7 2015:7

- Number of workshops, continuing education programs, web-based curricula and field days/tours related to sustainable energy.

2011:15 2012:15 2013:15 2014:15 2015:15

- Number of new extension publications and other educational resources related to sustainable energy.

2011:5 2012:5 2013:5 2014:5 2015:5

- Number of new products and decision tools developed and made available to clientele related to sustainable energy.

2011:3 2012:3 2013:3 2014:3 2015:3

V(I). State Defined Outcome

O. No.	Outcome Name
1	Nebraska will have access to higher educated workforce trained in the new biology with skills applied to addressing critical science in sustainable energy.
2	Extension will assist land owners involved in negotiating land use contracts with wind energy developers (measured by number of land owners participating in educational programs).

Outcome # 1

1. Outcome Target

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

2. Outcome Type : Change in Knowledge Outcome Measure

2011:10 2012:10 2013:10 2014:10 2015:10

3. Associated Knowledge Area(s)

- 201 - Plant Genome, Genetics, and Genetic Mechanisms
- 203 - Plant Biological Efficiency and Abiotic Stresses Affecting Plants
- 205 - Plant Management Systems
- 511 - New and Improved Non-Food Products and Processes

4. Associated Institute Type(s)

- 1862 Extension
- 1862 Research

Outcome # 2

1. Outcome Target

Extension will assist land owners involved in negotiating land use contracts with wind energy developers (measured by number of land owners participating in educational programs).

2. Outcome Type : Change in Knowledge Outcome Measure

2011:100 2012:100 2013:100 2014:100 2015:100

3. Associated Knowledge Area(s)

- 511 - New and Improved Non-Food Products and Processes

4. Associated Institute Type(s)

- 1862 Extension
- 1862 Research

V(J). Planned Program (External Factors)

1. External Factors which may affect Outcomes

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

Description

Downturn in the state economy could impact outcomes.
 Natural, disease or human-driven catastrophes would impact outcomes.

Complete refocus of University of Nebraska program priorities would affect outcomes.

V(K). Planned Program (Evaluation Studies and Data Collection)

1. Evaluation Studies Planned

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

Description

Evaluation studies will be focused on Action Team "Signature Programs" that are being delivered statewide.

2. Data Collection Methods

- Sampling
- Mail
- On-Site
- Observation

Description

Post meeting evaluation of knowledge gain and intended behavior change.
Followup to educational initiative with survey of actual behavior change and estimated conditional change.

V(A). Planned Program (Summary)**Program # 4****1. Name of the Planned Program**

Childhood Obesity

2. Brief summary about Planned Program

Childhood obesity poses a serious threat to the health of our nation. Over the past four decades, obesity rates in the United States have more than quadrupled among children ages 6 to 11, more than tripled among adolescents ages 12 to 19, and more than doubled among children ages 2 to 5. Today, more than 23 million U.S. children and teens (nearly one in three young people) are either overweight or obese.

Obesity is an even bigger issue in Nebraska. Nebraska's estimated 2007 total population is over 1.7 million, with roughly 1.3 million adults. Of those adults, approximately 38% are considered overweight and another 27% are considered obese (64.1% total compared to 63% for the U.S.), according to 2007 Behavioral Risk Factor Surveillance System data. Problems are also seen in factors related to obesity and other chronic diseases. Fourteen percent of Nebraska youth (9th through 12th grades) are overweight, and another 11% are obese, according to 2007 Youth Risk Behavior Survey data. Obesity also affects the state's economy. In Nebraska, the medical costs associated with adult obesity were \$454 million in 2003 dollars.

The overall goal of Nebraska's Childhood Obesity work is to increase those consuming foods that match their MyPyramid food recommendations and increase their physical activity. Together, these two behavior changes will reduce obesity and the associated medical costs.

3. Program existence : Intermediate (One to five years)

4. Program duration : Long-Term (More than five years)

5. Expending formula funds or state-matching funds : Yes

6. Expending other than formula funds or state-matching funds : Yes

V(B). Program Knowledge Area(s)**1. Program Knowledge Areas and Percentage**

KA Code	Knowledge Area	%1862 Extension	%1890 Extension	%1862 Research	%1890 Research
701	Nutrient Composition of Food	0%		11%	
702	Requirements and Function of Nutrients and Other Food Components	15%		32%	
703	Nutrition Education and Behavior	25%		10%	
724	Healthy Lifestyle	25%		4%	
802	Human Development and Family Well-Being	10%		40%	
806	Youth Development	25%		3%	
	Total	100%		100%	

V(C). Planned Program (Situation and Scope)**1. Situation and priorities**

Childhood obesity will be addressed through targeted audiences: Nutrition Education Programs, Youth Programs, and Adult Programs. These programs will be coupled and informed by basic and applied research in Nutrition, Biochemistry, Food Science, and Children / Youth / Families aimed at understanding fundamental physiological, behavioral, environmental, genetics, and food selection mechanisms that impact obesity and human health.

Nutrition Education Programs (NEP/SNAP-Ed)

UNL Extension implements the NEP program to help provide nutrition education to limited-resource parents with children and youth at risk for meeting their daily nutritional needs due to a lack of knowledge, skills and inadequate nutrition behavior.

Annually, UNL Extension nutrition advisors and extension assistants reach approximately 2,000 families and 4,600 youth in three locations in Nebraska. EFNEP program sites are: Douglas/Sarpy counties, city of Lincoln, and Adam/Hall counties. Program participants are primarily adults with children who live at or below 185% of poverty. However, the majority of the participants (78%) are at or below poverty. Participants are primarily taught in individual and group settings.

Infant/Youth Programs

Nebraska 4-H reaches one in three of those youth who are age eligible through 4-H clubs, out-of-school programs, camps, and special interest groups. Of those, nearly 38% are involved in food and nutrition programming. Signature programs are being identified that target increased healthy food choices and physical activity. These programs will be taught and evaluated statewide.

A new emphasis area for Nebraska focused on preparing young children to be ready to learn. The overall goal of this program is to ensure that children have the opportunity to grow and thrive in responsive and stimulating environments. Work in this area will be a holistic approach focusing on cognitive, social, emotion, and physical development. As a part of this program, childhood nutrition, including obesity prevention, will be targeted outcomes.

Adult Programs

Signature programs for adults will focus on strategies to increase weight loss (10% of body weight) by increasing healthy food choices and physical activity. One such program is Small Steps to Health and Wealth, a 13-week program that combines on-line and face-to-face learning in efforts to promote long-term behavior change. Annually, this program involves over 100 participants and their families.

2. Scope of the Program

- In-State Extension
- In-State Research
- Multistate Research
- Multistate Extension
- Integrated Research and Extension
- Multistate Integrated Research and Extension

V(D). Planned Program (Assumptions and Goals)

1. Assumptions made for the Program

Obesity will continue to be a multi-facted problem that will need to involve resaerch-based strategies that focus on behavior modification.

Knowledge change leads to behavior change which leads to condition change.

Land-grant universities can develop and deliver educational programs to help individuals and families make informed decisions.

We will ensure alignment between research and extension efforts throughout this program of work.

We will retain current faculty positions, although the focus of some will change.

We will have financial support from state, university and federal programs that support base programs -- although base funding levels will likely decrease.

We will be increasingly dependent on grants to support education, research and extension efforts.

2. Ultimate goal(s) of this Program

The overall goal of Nebraska's Childhood Obesity work is to decrease childhood obesity and the related economic costs by increasing those consuming foods that match their MyPyramid food recommendations and physical activity.

V(E). Planned Program (Inputs)

1. Estimated Number of professional FTE/SYs to be budgeted for this Program

Year	Extension		Research	
	1862	1890	1862	1890
2011	37.0	0.0	15.0	0.0
2012	37.0	0.0	15.0	0.0
2013	37.0	0.0	15.0	0.0
2014	37.0	0.0	15.0	0.0
2015	37.0	0.0	15.0	0.0

V(F). Planned Program (Activity)

1. Activity for the Program

The Institute will conduct research and deliver extension education programs that will enable Nebraskans to increase their consumption of foods that match their specific MyPyramid recommendations and increase their physical activity levels. A variety of teaching strategies will be used for program delivery including face-to-face education, distance learning technologies, and use of eXtension programming.

In addition, long-term research strategies are aimed at 1) using use genome-based technologies to develop individualized nutritional strategies that will impact chronic "lifestyle" diseases and obesity, and 2) developing bioactive foods that provide health-promoting functionality when consumed.

2. Type(s) of methods to be used to reach direct and indirect contacts

Extension

Direct Methods	Indirect Methods
<ul style="list-style-type: none"> ● Education Class ● Workshop ● Group Discussion ● One-on-One Intervention ● Demonstrations 	<ul style="list-style-type: none"> ● Public Service Announcement ● Newsletters ● Web sites ● Other 1 (PodCasting)

3. Description of targeted audience

The target audience includes:
 high risk families,
 children,
 families of young children (young children defined as those 0 - 8), and
 adults interested in increasing their overall health.

V(G). Planned Program (Outputs)

1. Standard output measures

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

	Direct Contact Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Year	Target	Target	Target	Target
2011	2500	10000	50000	50000
2012	2500	10000	50000	50000
2013	2500	10000	50000	50000
2014	2500	10000	50000	50000
2015	2500	10000	50000	50000

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

2011:0 2012:0 2013:0 2014:0 2015:0

3. Expected Peer Review Publications

Year	Research Target	Extension Target	Total
2011	10	5	15
2012	10	5	15
2013	10	5	15
2014	10	5	15
2015	10	5	15

V(H). State Defined Outputs

1. Output Target

- Number of scholarly publications and curricula related to childhood obesity.

2011:5 2012:5 2013:5 2014:5 2015:5

- Number of extension in-depth workshops.

2011:20 2012:20 2013:20 2014:20 2015:20

- Number of Agricultural Research Division HATCH projects in childhood obesity, fundamental nutritional sciences, and family wellbeing.

2011:20 2012:20 2013:20 2014:20 2015:20

V(I). State Defined Outcome

O. No.	Outcome Name
1	Youth will consume foods that match their MyPyramid recommendations.
2	Youth will increase the number of minutes spent in daily physical activity to recommended levels.
3	Adults will apply behavior change strategies to increase weight loss
4	Nebraska will have access to higher educated workforce trained in the new biology with skills applied to addressing critical science in child obesity

Outcome # 1

1. Outcome Target

Youth will consume foods that match their MyPyramid recommendations.

2. Outcome Type : Change in Action Outcome Measure

2011:2500 2012:2500 2013:2500 2014:2500 2015:2500

3. Associated Knowledge Area(s)

- 703 - Nutrition Education and Behavior
- 724 - Healthy Lifestyle
- 802 - Human Development and Family Well-Being
- 806 - Youth Development

4. Associated Institute Type(s)

- 1862 Extension
- 1862 Research

Outcome # 2

1. Outcome Target

Youth will increase the number of minutes spent in daily physical activity to recommended levels.

2. Outcome Type : Change in Action Outcome Measure

2011:500 2012:500 2013:500 2014:500 2015:500

3. Associated Knowledge Area(s)

- 724 - Healthy Lifestyle
- 802 - Human Development and Family Well-Being
- 806 - Youth Development

4. Associated Institute Type(s)

- 1862 Extension
- 1862 Research

Outcome # 3

1. Outcome Target

Adults will apply behavior change strategies to increase weight loss

2. Outcome Type : Change in Action Outcome Measure

2011:100 2012:100 2013:100 2014:100 2015:100

3. Associated Knowledge Area(s)

- 701 - Nutrient Composition of Food
- 703 - Nutrition Education and Behavior
- 724 - Healthy Lifestyle
- 802 - Human Development and Family Well-Being

4. Associated Institute Type(s)

- 1862 Extension
- 1862 Research

Outcome # 4

1. Outcome Target

Nebraska will have access to higher educated workforce trained in the new biology with skills applied to addressing critical science in child obesity

2. Outcome Type : Change in Knowledge Outcome Measure

2011:10 2012:10 2013:10 2014:10 2015:10

3. Associated Knowledge Area(s)

- 701 - Nutrient Composition of Food
- 702 - Requirements and Function of Nutrients and Other Food Components
- 703 - Nutrition Education and Behavior
- 724 - Healthy Lifestyle
- 802 - Human Development and Family Well-Being
- 806 - Youth Development

4. Associated Institute Type(s)

- 1862 Extension
- 1862 Research

V(J). Planned Program (External Factors)

1. External Factors which may affect Outcomes

- Economy
- Appropriations changes
- Public Policy changes

Description

A downturn in the state's economy will impact families access to high quality, nutritious foods. Budget restrictions that limit the creation of new knowledge or the curtailment of extension education program would impact outcomes. Public policy changes regarding the support of healthy food choices and the commodities that can help sustain those choices may affect program outcomes.

V(K). Planned Program (Evaluation Studies and Data Collection)

1. Evaluation Studies Planned

- Retrospective (post program)
- Before-After (before and after program)
- Case Study

Description

Research and extension faculty will use a range of evaluation strategies written into the programs developed to assess program impact. Indicators of success have been identified for each goal and will be evaluated using the methods indicated above.

2. Data Collection Methods

- Sampling
- Mail
- On-Site
- Structured
- Other (web-based surveys)

Description

Studies will be conducted through Hatch projects and extension educational programs. All studies will be certified by the Institutional Review Board of the University of Nebraska-Lincoln.

V(A). Planned Program (Summary)

Program # 5

1. Name of the Planned Program

Food Safety

2. Brief summary about Planned Program

IANR supports research and extension education programs aimed at reducing incidence of food borne illness and providing a safer food supply. Projects and programs will focus on:
 eliminating causes of microbial contamination,
 eliminating or mitigating the impact of food allergins,
 educating consumers and food safety professionals, and
 enhancing food production and processing technologies to improve food safety.

These applied research and extension programs will be supported and informed by integrated basic research in the life/agricultural, biochemical, and food sciences. This research is designed to generate knowledge critical to minimizing pathogenic bacteria and toxin producing fungi associated with livestock, crop, and produce production; minimizing transfer and growth of pathogens/fungi toxins during storage and handling. A key component of these efforts involves understanding genomic and physiological environments that promote the growth, development, or susceptibility of pathogens and fungi.

3. Program existence : Mature (More then five years)

4. Program duration : Long-Term (More than five years)

5. Expending formula funds or state-matching funds : Yes

6. Expending other than formula funds or state-matching funds : Yes

V(B). Program Knowledge Area(s)

1. Program Knowledge Areas and Percentage

KA Code	Knowledge Area	%1862 Extension	%1890 Extension	%1862 Research	%1890 Research
501	New and Improved Food Processing Technologies	30%		51%	
711	Ensure Food Products Free of Harmful Chemicals, Including Residues from Agricultural and Other Sources	30%		0%	
712	Protect Food from Contamination by Pathogenic Microorganisms, Parasites, and Naturally Occurring Toxins	30%		49%	
806	Youth Development	10%		0%	
	Total	100%		100%	

V(C). Planned Program (Situation and Scope)

1. Situation and priorities

Agriculture and related food processing are Nebraska's main industry. Thus food safety is critical to consumers, food processors, producers, and the general economy of the state.

Specific priorities include

Conduct basic and applied research that will improve characterization, reduction, and elimination of food safety hazards from farm to consumer.

Provide education on safe food handling practices for consumers, including such programs as Serv Safe, HAACP

education for food processors, and Quality Assurance programming for producers.

2. Scope of the Program

- In-State Extension
- In-State Research
- Multistate Research
- Multistate Extension
- Integrated Research and Extension
- Multistate Integrated Research and Extension

V(D). Planned Program (Assumptions and Goals)

1. Assumptions made for the Program

It is assumed that:

University of Nebraska-Lincoln has faculty resources to address research and extension program needs related to food safety.

We will ensure alignment between research and extension efforts throughout this program of work.

We will retain current faculty positions, although the focus of some will change.

We will have financial support from state, university and federal programs that support base programs -- although base funding levels will likely decrease.

We will be increasingly dependent on grants to support education, research and extension efforts.

Producers, processors, and consumers will need improved knowledge regarding food safety concepts in order to maintain a safe food supply and reduce health risks.

Producers, processors, and consumers will adopt new practices if those practices demonstrate effectiveness and economic impact.

2. Ultimate goal(s) of this Program

The ultimate goal of this program is a safe food supply that results in decreased food borne illness.

V(E). Planned Program (Inputs)

1. Estimated Number of professional FTE/SYs to be budgeted for this Program

Year	Extension		Research	
	1862	1890	1862	1890
2011	28.0	0.0	13.0	0.0
2012	28.0	0.0	13.0	0.0
2013	28.0	0.0	13.0	0.0
2014	28.0	0.0	13.0	0.0
2015	28.0	0.0	13.0	0.0

V(F). Planned Program (Activity)

1. Activity for the Program

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

2. Type(s) of methods to be used to reach direct and indirect contacts

Extension

Direct Methods	Indirect Methods
<ul style="list-style-type: none"> ● Education Class ● Workshop ● Group Discussion ● One-on-One Intervention ● Demonstrations 	<ul style="list-style-type: none"> ● Public Service Announcement ● Newsletters ● Web sites ● Other 1 (Pod Casts)

3. Description of targeted audience

The target audience for this program includes:
 producers,
 food processing and retail establishment owners/workers, and
 consumers.

V(G). Planned Program (Outputs)

1. Standard output measures

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

	Direct Contact Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Year	Target	Target	Target	Target
2011	1500	2500	2500	20000
2012	1500	2500	2500	20000
2013	1500	2500	2500	20000
2014	1500	2500	2500	20000
2015	1500	2500	2500	20000

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

2011:0 2012:0 2013:0 2014:0 2015:0

3. Expected Peer Review Publications

Year	Research Target	Extension Target	Total
2011	5	3	8
2012	5	3	8

Year	Research Target	Extension Target	Total
2013	5	3	8
2014	5	3	8
2015	5	3	8

V(H). State Defined Outputs

1. Output Target

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

2011:5 2012:5 2013:5 2014:5 2015:5

- Number of extension in-depth workshops.

2011:20 2012:20 2013:20 2014:20 2015:20

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

2011:13 2012:13 2013:13 2014:13 2015:13

V(I). State Defined Outcome

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

Outcome # 1

1. Outcome Target

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

2. Outcome Type : Change in Action Outcome Measure

2011:200 2012:200 2013:200 2014:200 2015:200

3. Associated Knowledge Area(s)

- 501 - New and Improved Food Processing Technologies
- 711 - Ensure Food Products Free of Harmful Chemicals, Including Residues from Agricultural and Other Sources
- 712 - Protect Food from Contamination by Pathogenic Microorganisms, Parasites, and Naturally Occurring Toxins
- 806 - Youth Development

4. Associated Institute Type(s)

- 1862 Extension
- 1862 Research

Outcome # 2

1. Outcome Target

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

2. Outcome Type : Change in Action Outcome Measure

2011:300 2012:300 2013:300 2014:300 2015:300

3. Associated Knowledge Area(s)

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

4. Associated Institute Type(s)

- 1862 Extension
- 1862 Research

Outcome # 3

1. Outcome Target

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

2. Outcome Type : Change in Knowledge Outcome Measure

2011:20

2012:20

2013:20

2014:20

2015:20

3. Associated Knowledge Area(s)

- 501 - New and Improved Food Processing Technologies
- 711 - Ensure Food Products Free of Harmful Chemicals, Including Residues from Agricultural and Other Sources
- 712 - Protect Food from Contamination by Pathogenic Microorganisms, Parasites, and Naturally Occurring Toxins
- 806 - Youth Development

4. Associated Institute Type(s)

- 1862 Extension
- 1862 Research

V(J). Planned Program (External Factors)

1. External Factors which may affect Outcomes

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

Description

- Natural, disease, or human-driven catastrophes will affect outcomes.
- Economic constraints may threaten potential new technologies that would increase food safety.

V(K). Planned Program (Evaluation Studies and Data Collection)

1. Evaluation Studies Planned

- Retrospective (post program)
- Case Study

Description

A statewide survey instrument will be used to collect knowledge and behavior change data from food safety program participants (both consumers and food processors). Case study methodology will be used to assess the impact of training programs on behavior change of producers.

2. Data Collection Methods

- Sampling
- Mail
- On-Site
- Structured
- Other (web-based)

Description

Program participant surveys will be a primary evaluation method. Follow-up surveys will help to determine if action was taken. Information from state and federal agencies will be used to estimate the incidence of food borne illnesses. Research conducted through Hatch projects and extension will be certified by the Institutional Review Board at the University of Nebraska-Lincoln.