PLAN OF WORK REPORT OF ACCOMPLISHMENT

University of Nebraska Agricultural Research Division
Institute of Agriculture and Natural Resources
University of Nebraska-Lincoln

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Federal Fiscal Years
2000 to 2004

2003 Annual Report
PLAN OF WORK
University of Nebraska Agricultural Research Division

INTRODUCTION

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Annual Report
University of Nebraska
Agricultural Research Division

I. INTRODUCTION:

The University of Nebraska Agricultural Research Division is a division of the University of Nebraska Institute of Agriculture and Natural Resources (IANR). Other divisions include the Cooperative Extension Division and the College of Agricultural Sciences and Natural Resources.

This annual report describes the Agricultural Research Division program impacts and accomplishments for fiscal year 2003 as required by the Agricultural Research, Extension, and Education Reform Act of 1998. It includes the elements identified in the USDA document, "Guidelines for Land Grant Institution - Annual Report." This federal annual report is based on the implementation of the current Strategic Plan of the Institute of Agriculture and Natural Resources and on emerging issues identified through stakeholder input in anticipation of beginning the next revision of the IANR Strategic Plan. This federal annual report is for the University of Nebraska Agricultural Research Division only, but was developed in conjunction with University of Nebraska Cooperative Extension Division's annual report.

In FY 2003, Agricultural Research Division expenditures in support of the programs described in this plan totaled $72,995,556. Of this amount, Federal Formula Funds provided $3,514,633 or 4.8% of the total funds expended.

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Darrell W. Nelson, Dean and Director
Agricultural Research Division

2003 Agricultural Research Division
Plan of Work
Annual Report

A. Planned Programs

Federal Goal I. To achieve an agricultural production system that is highly competitive in the global economy.

Overview - Research Results Related to Goal 1

Under this goal area, research programs relate to the production, marketing and processing of the major livestock species, traditional field crops, specialty crops such as dry edible beans and turf. The research also relates to new crops, increased instate production and processing and development of new products and services. There were a number of significant outputs from the research programs which will be mentioned here. Impact statements are enclosed at the end of this section providing more detail.

University of Nebraska scientists studied new technologies for creating value-added products from renewable and recyclable resources, specifically corn. Textile products derived from cornhusk fiber are more comfortable than many synthetics. They also show superior skin-protective attributes. It is estimated that the cornhusk-based textiles industry could be worth over $2 billion annually.

Research conducted by Nebraska weed scientists has been used to help develop and calibrate WeedSOFT software. This weed management decision-making tool is improved and expanded annually as new research results are incorporated. WeedSOFT is helping producers reduce crop herbicide use and associated costs, improve weed management and reduce weed related yield losses. A survey of WeedSOFT users in six states indicated that this software is responsible for about $13 million annually in cost savings and increased earnings for crop producers.

Examples of accomplishments are included in the attached impact statements which are organized by key themes. These examples are ample evidence of the impact that the Agricultural Research Division outputs are making towards the specific Nebraska ARD goals under Federal Goal 1. The Nebraska goals are:

1. Enhance plant and animal production systems to be more profitable and sustainable.
2. Support agribusiness and economic development, including product marketing and value-added processing of agricultural commodities.
3. Increase public/consumer understanding of food systems.

Goal I Resources

Source of Funds	Federal	State	All other	Total
FY 2003 Expenditures	$2,456	$20,931	$26,473	$49,861

Faculty SYs in FY 2003 - 109.4

* Includes Hatch, Multistate, McIntire Stennis and Animal Health Funds

Impact Statements Related to Federal Goal I - Identified by Key Themes

Category: Competitive Agricultural Systems in a Global Economy
Key Theme: Adding value to new and old agricultural products

Impact Statement: Turning Cornhusks into Textiles
(Relates to Nebraska Subgoals 1&2, Output Indicators 4, and Outcome Indicators 3 & 4)

Issue:

Developing new uses and markets for corn, Nebraska's leading crop, is essential for farmers and rural economies.

What has been done?

A University of Nebraska textiles scientist has found a way to turn cornhusks into textiles. He has developed a process that efficiently, inexpensively converts cellulose in cornhusks into textile fibers that can be made into fabric. The university is patenting his invention. Initial research shows cornhusks produce a high quality textile with good performance characteristics using this process. Natural off-white cornhusk fiber is attractive, more comfortable than many synthetics and easy to dye.

Impact:

Corn is Nebraska's largest crop. The economic impact of turning husks into textiles could be significant for the state and nation. The United States produces about 20 million tons of cornhusks annually which could be used to make at least 2 million tons of fibers worth about $2 billion annually. And the textiles industry is huge so there's a ready market for new, functional natural products. The environment might benefit, too, because corn requires fewer chemicals to grow than cotton or linen plants, the primary sources of U.S. fabric fibers.

Funding:

University of Nebraska Agricultural Research Division
University of Nebraska-Lincoln College of Education and Human Sciences
Hatch Act

Scope of Impact: National

Summary:

Turning cornhusks into textiles will create a new, higher-value market for Nebraska's leading crop. A University of Nebraska textiles scientist has developed a patented process that efficiently, inexpensively converts cellulose in cornhusks into textile fibers that can be made into fabric. Initial research shows cornhusks produce a high quality textile with good performance characteristics using this process. The nation produces about 20 million tons of cornhusks annually, which could produce at least 2 million tons of fibers worth about $2 billion annually.

Category: **Competitive Agricultural Systems in a Global Economy**
Greater Harmony Between Agriculture and the Environment
Key Theme: ***Agricultural Profitability***

Impact Statement: WeedSOFT Aids Weed Management Decisions
(Relates to Nebraska Subgoal 1, Output Indicators 1 & 5, and Outcome Indicators 3 & 5)

Issue:

Deciding how, when or whether to treat weeds in crops is challenging. Farmers must consider economic, environmental and regulatory factors along with the crop and weed situation in that particular field.

What has been done?

To help growers, crop consultants and Cooperative Extension educators make better weed management decisions, University of Nebraska agronomists developed WeedSOFT software. This weed management decision-making tool incorporates NU Institute of Agriculture and Natural Resources and other states' research. Software is improved and expanded annually. The latest versions provide comprehensive ecological and economic information on weed management. WeedSOFT was introduced in Nebraska in 1992. Today it is used by at least 560 people in six states. As part of an Integrated Pest Management project to improve weed management and reduce herbicide use, researchers in several states are promoting wider use of this tool in the north central region. State-specific versions of WeedSOFT now are available for Indiana, Illinois, Kansas, Missouri, Wisconsin and Nebraska.

Impact:

WeedSOFT is helping producers reduce crop herbicide use and associated costs, improve weed management and reduce weed-related yield losses. A survey of WeedSOFT users across the North central region indicated this software is responsible for about $13 million annually in cost savings and increased earnings for crop producers.

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Funding:

USDA-CSREES
North Central Regional IPM Project
NU Agricultural Research Division
NU Cooperative Extension
Hatch Act

Scope of Impact: Regional

Summary:

Deciding how, when or whether to treat weeds in crops is challenging. WeedSOFT, weed management decision support software developed at NU, helps growers and others make better decisions. This comprehensive weed management tool includes economic, environmental and regulatory considerations for all common Nebraska crops. Producer using WeedSOFT reduced crop herbicide use and associated costs, improved weed management and reduced weed-related yield losses. A survey of WeedSOFT users indicated this software is responsible for about $13 million annually in cost savings and increased earnings for crop producers. Adapted versions of WeedSOFT now are being used in five other states.

Federal Goal II. A Safe, Secure Food and Fiber System

Food animal production and food processing are major components of the Nebraska economy and the Nebraska Agricultural Research Division maintains a significant food safety research effort. Research faculty working in this area are working closely with the food industry and regulatory industries to focus research efforts in the most critical problems as well as future issues. Significant effort is also being made on research of pre-harvest food safety areas, in particular, working with livestock producers. This work is integrated closely with efforts of Cooperative Extension to use the food safety research outputs to effectively conduct food safety education and demonstration programs.

The Nebraska goals under this federal goal are:

1. Animal and plant production systems and food processing and production systems to be enhanced to improve food safety and quality

2. Research based information will increase awareness of consumers, producers, food processors, food handlers and extension personnel on food safety issues and technologies.

University of Nebraska food scientists are the first to study a new vaccine for reducing *E. coli* O157:H7 in cattle before slaughter. In two years of feedlot trials, the vaccine reduced the proportion of cattle shedding *E. coli* in manure by an average of 59%. In comparison, a common feed additive, *Lactobacillus acidophilus,* reduced prevalence by an average of 35%. There are implications in the findings that using both the vaccine and feed additive may reduce *E. coli* in manure to a greater extent. This study is the first vaccine trial to be conducted in a feedlot setting.

Goal II Resources

Source of Funds	Federal Formula *	State	All other sources	Total
FY 2003 Expenditure ($ x 1000)	$145	$1,002	$1,408	$2,774

Faculty SYs in FY 2003 - 7.3

* Includes Hatch, Multistate, McIntire Stennis and Animal Health Funds

Impact Statements Related to Federal Goal II - Identified by Key Themes

Category: Safe and Secure Food and Fiber Systems
Key Theme: Food Safety

Impact Statement: *E. coli* Interventions Show Promise
(Relates to Nebraska Subgoal 1, Output Indicator 1, and Outcome Indicators 1 & 2)

Issue:

Potentially deadly *E. coli* 0157:H7 bacteria are a major human health concern. Finding ways to control the bacteria in cattle before slaughter is a critical step in reducing chances it will reach consumers.

What has been done?

Intensive University of Nebraska research is yielding information on controlling *E. coli* in feedlots. The latest findings showed that a new vaccine and a beneficial bacterial feed additive each significantly reduced *E. coli* O157:H7 in feedlot cattle, and that using both may offer added protection. Vaccination of cattle reduced *E. coli* prevalence an average of 59 percent compared with unvaccinated steers. Feeding cattle a commercially available additive reduced *E.coli* prevalence by 35%. Future study will examine the combined effects of vaccination and feed additive. This was the first research demonstrating the vaccine's effectiveness in a feedlot situation.

Impact:

Controlling *E. coli* will increase food safety and human health. The findings from this study provide the first systematic information on the performance of a vaccine and a feed additive for controlling *E. coli* in a natural setting. Evidence of the vaccine's efficacy will help it move toward commercialization. The potential reduction in bacterial contamination along with reductions in food borne illness will improve profitability in beef production.

Funding:

USDA National Research Initiative competitive grant
Nebraska Legislative Bill 1206
American Meat Institute
Hatch Act
NU Agricultural Research Division

Scope of Impact: National

Summary:

University of Nebraska research is providing evidence for controlling *E. coli* O157:H7 in cattle before slaughter to reduce chances of food borne illness among consumers. The findings show that a new vaccine and a beneficial bacterial feed additive each significantly reduced the bacteria in feedlot cattle, and suggest that using both may offer added protection. Control of *E. coli* in beef cattle will increase profitability of beef production and decrease costs associated with food-borne illness for consumers.

Federal Goal III. A Healthy Well-nourished Population

The Nebraska goal in this area is to enhance the quality of life of individuals and families through healthy lifestyles including better nutrition and reduction of high risk activity. Particular areas of research emphasis include lipid metabolism, bioavailability of nutrients, eating behaviors and disorders, biochemistry of cardiac illnesses and function of health care and family support systems. In addition to being incorporated in Cooperative Extension educational programs, research results are also used by a broad range of health care professionals, educators, and marketers and consumers of all ages.

A University of Nebraska nutrition scientist is collaborating on an eleven-state study to understand why young adults eat so few fruits and vegetables and how to change these behaviors. Her preliminary research identified the best methods for reaching young adults with nutrition information. Researchers use these findings to develop new, customized approaches to encourage young adults to improve their habits. Educations materials are customized for young adult, who have the least healthy diets. This customized approach should be the basis of more effective nutrition education efforts for young adults as well as other groups and individuals.

The above examples and the impact statement to follow identify the types of contributions being made by the Institute of Agriculture and Natural Resources research activities to Federal Goal III.

Goal III Resources

Source of Funds	Federal Formula *	State	All other sources	Total
FY 2003 Expenditures ($ x 1000)	$77	$906	$834	$1.816

Faculty SYs in FY 2003 - 6.7

* Includes Hatch, Multistate, McIntire Stennis and Animal Health Funds

Impact Statements Related to Federal Goal III - Identified by Key Themes

Category: Healthy, Well-Nourished Population
Key Theme: **Human Health**

Impact Statement: Improving Young Adults Eating Habits
(Relates to Nebraska Subgoal 1, and Output Indicator 1, and Outcome Indicator 1)

Issue:

Most young adults eat a pretty lousy diet. Their meals fall far short on fruits and vegetables at a time when they're starting on their own and establishing eating habits that often last a lifetime.

What has been done?

A University of Nebraska nutrition scientist is collaborating on an 11-state study to understand why young adults eat so few fruits and veggies and how to change these behaviors. Her preliminary research identified the best methods for reaching young adults with nutrition information. Researchers used these findings to develop new, customized approaches to encourage young adults to improve their habits. They developed newsletters, manuals and other information tailored to different stages of readiness to change and are testing them nationwide. This research will be the foundation for a broader national nutrition campaign targeting other groups and individuals.

Impact:

Experience shows that one-size-fits-all campaigns to change behavior don't work because people go through stages in their willingness to change. Developing information that nutrition educators can match to an individual's stage of change will result in improved eating habits and reduction in chronic disease development.

Funding:
USDA National Research Initiative
NU Agricultural Research Division
NU College of Human Resources and Family Sciences
Hatch Act

Scope of Impact: National

Summary:

When it comes to changing someone's eating habits, a one-size approach often fails. That's because people go through phases in their willingness to change. An NU nutrition scientist is working on multi-state research that has developed and is testing newsletters, manuals and other educational information tailored to different phases of change. These materials are customized for young adults, who have among the least healthy diets and eat the fewest fruits and vegetables. This customized approach should be the basis of more effective nutrition education efforts targeting young adults. It also will be the foundation for broader national nutrition campaigns targeting other groups and dietary changes.

Federal Goal IV. To Achieve Greater Harmony (Balance) Between Agriculture and the Environment

Research activities in support of federal goal area IV have increased in recent years as a result of redirected research resources and of improved external grant support. Improved natural resources management and environmental quality, while maintaining a productive and profitable agricultural industry, is clearly identified as one of the three major themes in the Nebraska ARD Strategic Plan. The Nebraska goals under this federal goal area are:

Research activities in support of federal goal area IV have increased in recent years as a result of redirected research resources and improved external grant support. Improvement of natural resources and environmental quality while maintaining a productive and profitable agricultural industry is one of three major themes in the Nebraska ARD Strategic Plan. The Nebraska goals are:

1. Improved environmental quality by conserving and enhancing air, soil and water resources
2. Improved ecosystem management for sustained productivity and enhanced biodiversity.
3. Increased information and expertise on natural resources and environmental issues for facilitating policy development and successful implementation programs.

Buffer strips are enhancing water quality efforts across the U.S. University of Nebraska researchers have developed a simple, accurate sampling device that measures water flows into and out of buffers so that performance can be assessed in the field. The sampler captures a representative fraction of the water flowing through the buffer. Lab analyses of the sample reveals how effective the strip is at keeping contaminants from streams. The sampler is being adapted for use by natural resources and conservation agencies.

UNL scientists are studying the interaction between agriculture and surface water to develop a model lake classification system suited to agricultural areas. They have sampled more than 300 Nebraska lakes to conduct computer modeling that compares current and historic water quality. The comparisons will lead to more accurate methods for assessing current water quality. Finding ways to remotely monitor water quality, by airplane or satellite, is a major goal. Ultimately, the system will increase the ability to protect and maintain lake water quality in agricultural regions.

In the 1990's, insecticides used to control western corn rootworms began to fail in central Nebraska counties. This major corn pest had become resistant to a common adult rootworm insecticide. A University of Nebraska scientist has helped farmers identify alternatives to adult control, mapped the extent and spread of resistance, and encouraged practices to limit further resistance. This research identified the biochemical and genetic mechanism for organophosphate resistance and how resistance is inherited. NU researchers are applying these findings to a computer model that simulates field conditions and predicts the effectiveness of rootworm control accounting for management and cropping practices. This will provide more accurate predictions of the outcome of specific management approaches.

Goal IV Resources

Source of Funds	Federal Formula *	State	All other sources	Total
FY 2003 Expenditures ($ x 1000)	$732	$7,154	$6,577	$14,464

Faculty SYs in FY 2003 - 48.2

* Includes Hatch, Multistate, McIntire Stennis and Animal Health Funds

Impact Statements Related to Federal Goal IV - Identified by Key Themes

Category: Greater Harmony between Agriculture and the Environment
Key Theme: Riparian Management

Impact Statement: Buffer strip assessment tool
(Relates to Nebraska Subgoal 1, Output Indicator 6, and Outcome Indicator 3)

Issue:

Strips of vegetation between crop fields and streams filter sediment and chemical runoff to protect waterways from pollution. While their water quality protection value is well recognized, there has been no practical way to measure buffer strip performance under real-world conditions.

What has been done?

University of Nebraska researchers have developed a simple, accurate sampling device that measures water flows into and out of buffers so that performance can be assessed in the field. Their sampler captures a tiny but representative fraction of the water flowing through the buffer. Lab analysis of the sample reveals how effective the strip is at keeping contaminants from streams. This devise will help other researchers more accurately assess buffer strip design and construction. A simpler version is being developed for natural resources and conservation agencies to use.

Impact:

Buffer strips are the focus of numerous federal, state and local water quality protection efforts. This in-field sampler will lead to more accurate buffer strip evaluation under Great Plains growing conditions. This should result in better buffer strip design and construction and, ultimately, higher water quality.

Funding:
NU Agricultural Research Division
USDA National Agroforestry Center
Hatch Act
Nebraska Corn Board

Scope of Impact: National

Summary:

Vegetative buffer strips between crop fields and streams filter sediment and chemical runoff to protect water quality. Buffer strips are key to many surface water protect efforts yet there has been no practical way to measure their performance under real-world conditions. NU Institute of Agriculture and Natural Resources engineers have devised a simple, accurate tool to evaluate buffer strip's effectiveness in the field. Their device takes a tiny but representative water sample that is analyzed to learn how well the buffer strip is performing. This device is designed for use by researchers. A simpler version is being developed for natural resources and conservation agencies. Both will help more accurately evaluate buffer strip design and construction, which should lead to better buffer designs and improved water quality.

Category: Greater Harmony between Agriculture and the Environment
Key Theme: Water Quality

Impact Statement: Monitoring Lake Water Quality
(Relates to Nebraska Subgoal 2, Output Indicators 2 & 6, and Outcome Indicator 1)

Issue:

Agriculture is the dominant influence on lakes and reservoirs in Nebraska. However, most national criteria used to monitor and classify lake water quality weren't designed with agriculture areas in mind.

What has been done?

University of Nebraska scientists are studying the interaction between agriculture and surface water to develop a model lake classification system suited to agricultural areas. They have sampled more than 300 Nebraska lakes and reservoirs and are developing computer models to compare current and historical water quality to develop tools to more accurately assess water quality. Finding ways to remotely monitor water quality instead of sampling water at each lake is a major goal. Researchers are developing "spectral signatures" of the lakes using equipment that measures algae concentrations based on reflected light patterns. The extent of algae blooms help indicate a lake's nutrient levels and water quality. When perfected, measurements could be made from an airplane or satellite.

Impact:

Developing research-based tools to classify and monitor lakes and reservoirs in agricultural areas should help natural resources and environmental agencies protect water quality and determine which ones are the best candidates for restoration. Remote sensing of water quality should make monitoring easier and less expensive.

Funding:
U.S. Environmental Protection Agency
Nebraska Department of Environmental Quality
NU Agricultural Research Division
Hatch Act

Scope of Impact: **National**

Summary:

NU scientists are studying the interaction of agriculture and surface water to develop a lake classification and water quality monitoring system suitable for agricultural areas. They have sampled more than 300 Nebraska lakes and reservoirs and are developing computer models to compare current and historical water quality to develop tools to more accurately assess water quality. More accurate assessments will reduce costs associated with restoration. In addition, development of ways to remotely monitor water quality will reduce costs associated with sampling water. Ultimately, their system should help better protect and maintain lake water quality in agricultural regions.

Category: **Greater Harmony between Agriculture and the Environment**
Key Theme: ***Sustainable Agriculture***

Impact Statement: Learning from Rootworm Resistance
(Relates to Nebraska Subgoal 1, Output Indicator 2 , and Outcome Indicator 3)

Issue:

In the 1990s, insecticides used to control western corn rootworms began to fail in some central Nebraska counties. This major corn pest had become resistant to a common adult rootworm insecticide.

What has been done?

University of Nebraska entomologists have extensively studied this problem to preserve the effectiveness of future insect-fighting technologies. Nebraska scientists helped farmers identify alternatives to adult rootworm control, mapped the extent and spread of resistance, and encouraged practices to limit further development. They also identified the biochemical and genetic mechanisms for organophosphate resistance and how resistance is inherited, and developed a test to check rootworms for resistance. In collaboration with a Mississippi State computer modeling specialist, Nebraska researchers are applying these findings to a computer model that simulates field conditions and predicts how long a rootworm control will be effective, based on factors such as management and cropping practices. They have verified the model's accuracy by comparing it to what happened with resistance in Nebraska. They're also working with University of Maryland scientists to map genes associated with resistance.

Impact:

What scientists have learned from Nebraska's rootworm resistance should help regulators, industry and producers preserve the effectiveness of new insect control tools, such as Bt corn for rootworms and other new, more environmentally friendly technologies. The computer model should provide more accurate predictions of the outcome of specific management approaches and improve decisions about how to use these tools. This will reduce costs by improving production in an way that is safe for the environment.

Funding:
USDA
NU Agricultural Research Division
Hatch Act

Scope of Impact: **Regional**

Summary:

In the 1990s, insecticides to control western corn rootworm began to fail in parts of Nebraska. This major pest had become resistant to a common adult rootworm insecticide. NU entomologists are working to prevent similar problems in the future. Institute of Agriculture and Natural Resources scientists have extensively studied rootworm resistance to organophosphate insecticide in the field and the lab. They have learned a great deal about the biochemical and genetic mechanisms of resistance. In collaboration with Mississippi State, they are incorporating their findings into a computer model that simulates field conditions and predicts whether resistance develops based on factors such as management and cropping practices. Their goal is to identify ways to preserve the effectiveness of new insect control tools, such as Bt corn for rootworms and other environmentally friendly technologies that will increase production.

Federal Goal V. To Enhance Economic Opportunities and the Quality of Life Among Families and Communities

The demographics of Nebraska are changing at such a rapid pace that policy-makers have difficulty keeping adequately informed. With a higher proportion of elderly, families with income below poverty level, and immigrants with limited English skills, many areas of the state need enhanced entrepreneurial opportunities, business management and computer skills for small home-based and family owned businesses. ARD research programs deal with policy issues as well as research to assist educational programs in this area. The research programs are closely linked to Cooperative Extension educational program activities. The specific Nebraska goals related to this area are:

1. Enhanced basic life skills for Nebraska's children, youth and adults.
2. To enhance business and livable employment opportunities.

State and federal public policy decisions are often made with little understanding of their impact on rural people. To provide objective information on rural Nebraskans views and concerns, the University of Nebraska rural sociologist launched the Nebraska Rural Poll in 1996. This scientific poll annually surveys 7,000 randomly selected residents in the state's 87 rural counties on issues related to public policy, community, work and quality of life. Results are analyzed and shared with state and federal lawmakers, decision-makers, the public and communities. In addition to a set of standing questions, researchers ask a few different questions each year that address emerging issues, such as taxation, farm policy or school consolidation. Results over time also track trends and changes for rural Nebraskans and provide a rural perspective for policy discussions.

Goal V **Resources**

Source of Funds	Federal Formula *	State	All other sources	Total
FY 2003 Expenditures ($ x 1000)	$93	$1,021	$247	$1,362
Faculty SYs in FY2003	- 5.8			

* Includes Hatch, Multistate, McIntire Stennis and Animal Health Funds

Impact Statements Related to Federal Goal V - Identified by Key Themes

Category: Economic Development and Quality of Life for People and Communities
Key Theme: Impact of Change on Rural Communities

Impact Statement: Nebraska Rural Poll Provides Rural Perspective
(Relates to Nebraska subgoal 3, Output Indicators 7 & 8, and Outcome Indicator 4)

Issue:

State and federal public policy decisions often are made with little understanding of their impact on rural people.

What has been done?

A University of Nebraska rural sociologist conduct an annual scientific poll to gather objective information on rural Nebraskans' views and concerns. Each year since 1996, 6,500 randomly selected residents in the state's 83 rural counties have participated. The survey asks about issues related to public policy, community, work and quality of life. Results are analyzed and shared with state and federal lawmakers, decision-makers, the public and communities. In addition to a set of standing questions, researchers ask about issues that address emerging concerns such as taxation, farm policy or school consolidation. Results of rotating questions provide rapid feedback to decision-makers on these issues. Results over time also track trends and changes for rural Nebraskans and provide a rural perspective for policy discussions. Researchers in other states have developed their own rural polls modeled after Nebraska's survey. This will lead to a means for comparing concerns across states

Impact:

This poll provides objective information about the needs and concerns of rural Nebraska. Decision-makers now use Nebraska Rural Poll results in policy decisions. Results have been included in testimony before several legislative hearings and policy-makers say this information helps them make more informed decisions. Nebraska Gov. Mike Johanns said: "As governor, I believe it is vital to stay in touch with the issues important to citizens in all parts of the state. The information compiled in the Nebraska Rural Poll will be a very useful tool as we make decisions which will affect rural Nebraska."

Funding:
Partnership for Rural Nebraska
NU Cooperative Extension
NU Agricultural Research Division
Hatch Act

Scope of Impact: Multistate

Summary:

Policy-makers and community leaders have a better understanding of rural Nebraska concerns and opinions because of the Nebraska Rural Poll. The annual poll asks rural people's views on work, community, quality of life and public policy issues. The results are shared in a variety of ways with state and federal lawmakers, decision-makers, the public and communities. The poll is expanding to other states and will provide important information comparing rural concerns.

B. Stakeholder Input Process

The processes used for stakeholder input for the Agricultural Research Division were described in detail in the initial ARD Plan of Work. Nebraska has had an extensive system of stakeholder input in place for many years. The Agricultural Research Division and the Cooperative Extension Division collaborate routinely in the planning and development of programs. These divisions, as part of the Institute of Agricultural and Natural Resources (IANR), have been partners in development of Strategic Plans for over 10 years. Several of the stakeholder input processes described in the 2003 Annual Progress Report for the Cooperative Extension Division will impact Agriculture Research Division planning.

a) Actions Taken to Seek Stakeholder Input

IANR conducted over 30 listening sessions with approximately 700 Nebraskans in 2003. The sessions were held all across the state. While the sessions were open to the general public, special invitations were made to ensure representation by underserved groups. The participants included limited resource audiences, state and local agency representatives, volunteer organization representatives, school officials, in-state clientele and out-of state stakeholders. The findings from the listening sessions have been reviewed with administrators and faculty. Both IANR and ARD's next five-year strategic plan is based on the results from the sessions.

Most IANR departments, research and extension centers, interdisciplinary centers and program areas have external advisory groups representing stakeholders and users. These groups meet at least annually and provide input on current and future programs of the units. The Agronomy Department Advisory Board has 25 members who meet twice annually. They provided information on strategic issues related to Agronomy and Horticulture teaching, research and extension. An Animal Science Department Advisory Committee was established in 2001 and has met several times. It has 27 members from various segments of the livestock, meat, and feed industry.

The Northeast Nebraska Experimental Farm Association serves as the stakeholder input group for the Northeast Research and Extension Center and Haskell Agricultural Laboratory. This group consists of representatives from each of the counties in the northeast district and meets annually to provide input on program needs at NEREC. Other research centers with advisory committees which meet annually include the High Plains Agricultural Lab and the Gudmundsen Sandhills Lab. Examples of programs which have advisory committee meetings which meet at least annually include the Republican River Basin Irrigation Management Demonstration Project and the *E. coli* 0157:H7 Food Safety Research Program.

The Cooperative Extension Division has organized action teams for major program areas to plan and implement educational programs. Many of the members of these action teams are faculty with joint research and extension appointments. In 2002, each action team was required to develop a process for obtaining appropriate stakeholder input for that program area. Results from these processes have resulted in using stakeholder input to direct extension education for the future and research programs which provide the scientific information for the educational programs.

b) Brief Statement of the Process Used by the Recipient Institution to Identify Individuals in Groups Who are Stakeholders and to Elicit Input from Them

The Animal Science Advisory Committee began by familiarizing members with the department's research, extension, and teaching programs. Currently, the Committee is providing input on future needs.

The Department of Nutrition and Health Science (formerly Nutritional Science and Dietetics) meets twice per year with its Community Nutrition Partnership Council. This Council helps to coordinate nutrition education for limited resource audiences. The members of the Council represent a broad group of state and local agencies, volunteer organizations, school officials, and others. They provide valuable input both on extension needs for Cooperative Extension and research needs for these types of programs.

The Department of Biological Systems Engineering advisory council consists of both in-state and out-of-state stakeholders who help to provide perspectives on research and education needs at regional and national levels

The Department of Agricultural Leadership, Education, and Communication's Advisory Council meets twice annually and consists of representatives from clientele groups throughout the state.

The above examples are only a part of the on-going stakeholder process. While the types of membership for these advisory groups vary, in all cases the intent is to have a membership selection process which allows for good representation from all clientele groups and rotation of membership to allow different views to be brought in.

c) A Statement of How Collected Input was Considered

In nearly every case with the examples of advisory groups mentioned above, minutes of meetings and reports are maintained and revisited periodically to see if programs are adjusted to respond to the recommendations. It is essential for active advisory groups to continue that the membership is able to review and reflect upon what impact a group has had in earlier recommendations. Stakeholder input has been valuable to units in making decisions on which programs to emphasize or initiate as well as which programs to de-emphasize. Stakeholder input is often critical in helping units and administrators make decisions on which areas are highest priorities for filling faculty positions. Since the filling of faculty positions is a critical element in refocusing programs, reaffirming priorities, or identifying emerging issues to address, the stakeholder input is very valuable in helping units and the Agricultural Research Division in making these decisions. Currently, the new five-year IANR Strategic Plan has been drafted. The plan is based on the results of the listening sessions, reactions and input from the faculty and consideration of federal priorities. The University of Nebraska continues to be involved in a state budget reduction process. Stakeholder input is important in deciding what program areas must be reduced to accomplish the budget reduction.

C. Program Review Process

Nebraska has made no significant changes in program review processes since the 5-Year Plan of Work was submitted. The scientific peer review process used the by Agricultural Research Division as described in the 5-Year Plan of Work remains the same.

D. Evaluation of the Success of Multi and Joint Activities

1) Did the planned programs address the critical issues of strategic importance, including those identified by the stakeholders?

Critical issues of strategic importance identified by stakeholders are directly reflected in the IANR Strategic Plan. The Strategic Plan serves as a fundamental document which guides decision-making process on programs to emphasize and staffing decisions. ARD faculty currently participate in multi-state projects which are provided research funding support through the multistate 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 multistate activity. A list of current ARD participation in multistate committees and the related federal goals is attached as Appendix 1.

2) Did the planned programs address the needs of under-served and under-represented populations of the state?

ARD research programs related to human nutrition and healthy lifestyles were highlighted under the federal goals and key themes. The results of this research feed science-based information directly into Cooperative Extension programs which target under-served and under-represented populations. Nutritional sciences research includes the project on evaluating the nutritional characteristics of meat from American bison. This is important because the growth, production and use of American bison as a healthy meat source is increasing and the fact that bison herds have been started on Nebraska's Native American reservations. A research project on assessing managerial and work force development in food service management is providing information useful for effective training of low income and minority populations working in the food service area.

3) Did the planned programs describe the expected outcomes and impacts?

Output and outcome indicators were described in the 5-Year Plan of Work submitted in 2000. The impacts of the example projects described in the accomplishments and results section relate directly to these output and outcome indicators.

4) Did the planned programs result in improved program effectiveness and/or efficiency?

Effective documentation of research programs, joint program output and outcomes, and ultimately impacts is an important part of our program activity. Individual faculty members are expected to identify outcomes and impacts in their annual faculty reports. The impact reports that are included in the accomplishment section of this report are developed for use by stakeholders and originate with the impacts identified by individual faculty annually. Having to document individual impacts, as well as interdisciplinary and joint program impacts keeps faculty focused on the need

for productive programs.

The joint planning of multistate project activity results in less duplication and more cooperative program efforts. Many University of Nebraska IANR faculty have joint Agricultural Research Division and Cooperative Extension Division appointments. Therefore, joint planning is assured and this results in research programs that are directly related to Cooperative Extension's education needs. This arrangement definitely improved program effectiveness and/or efficiency.

U.S. Department of Agriculture
Cooperative State Research, Education, and Extension Service
Supplement to the 5-Year Plan of Work
for Multistate Extension Activities and Integrated Activities

Institution: **University of Nebraska Agricultural Experiment Station**
State: **Nebraska**
Check one: ____ Multistate Extension Activities
_X_ Integrated Activities (Hatch Act Funds)
____ Integrated Activities (Smith-Lever Act Funds)

		Estimated Costs				
	Title of Planned Program/Activity	**FY 2000**	**FY 2001**	**FY 2002**	**FY 2003**	**FY 2004**
Goal 1:	Integrated Crop Management Integrated Livestock Systems Management Integrated Pest Management Sustainable Agricultural Production Systems	$562,880	$633,823	$789,573	$789,573	$789,573
Goal 2:	Pre and Post Harvest Plant and Animal Food Safety Food Processing and Food Service Management Food Safety	$113,754	$81,427	$61,439	$61,439	$61,439
Goal 3:	Human Nutrition, Health and Safety Health Care	$21,645	$8,375	$16,052	$16,052	$16,052
Goal 4:	Natural Resources Management and Protection Environmental protection Environmental and Natural Resources Policy	$182,627	$299,047	$339,003	$339,003	$339,003
Goal 5:	Family Strengths Family Housing Telecommunications for Rural Areas Community Strengths	$130,934	$64,030	$40,727	$40,727	$40,727
Total		$1,011,840	$1,086,702	$1,246,794	$1,246,794	$1,246,794

Darrel Nelson — Dean and Director
April1, 2004 — Date

F. INTEGRATED RESEARCH AND EXTENSION ACTIVITIES

Below are a few examples of integrated Research and Extension activities.

Goal 1

Activity: Integrated Crop Management

Broad leaf weeds such as western ragweed ((Ambrosia psilostachya), hoary vervain (Verbena stricta), and smooth sumac (Rhus glabra) are becoming an increasing problem in Nebraska rangeland and pastures. They compete with pasture grasses for light and nutrients, which reduces grass stand and forage production, especially during drought years. Presence of these weed species also lowers rental rates, or sale prices of infested grassland. In response to a large number of questions on how to manage those weeds, we (Knezevic et al. 2001-2003) field studies were conducted on mechanical and chemical control methods. These sites were also used for demonstrations and workshops. Data from a survey from 2003 indicated that the 87% of the participants in the 2002 workshop made changes to their business/operation based on what they learned from the 2002 workshop. In addition, 83% of participants of the 2003 workshop indicated that they will make changes to their business/operation based on what they learned from the 2003 workshop. Objective of these field workshops was to improve knowledge of various landowners about the principles of integrated weed management and how to apply them to control western ragweed, hoary vervain and smooth sumac in their pastures.

Activity: Integrated Livestock Management

Calf scours, or diarrhea, is a leading cause of death and sickness in beef calves but ranchers have a new tool to combat this costly threat. University of Nebraska Institute of Agriculture and Natural Resources veterinary research and extension scientists designed and successfully tested a calving system that greatly reduces scours outbreaks by managing cow-calf pairs and pregnant cows to minimize calf contact with scours-causing germs. Since few calves get sick, this system also greatly reduces the need for antibiotics. It also greatly reduces labor needed to treat sick calves. The owner of a 900-head herd estimates savings of up to $50,000 annually since implementing the calving system because of improved calf performance, greatly reduced treatment costs and having more calves to sell.

Activity: Integrated Pest Management

Deciding how, when or whether to treat weeds in crops is challenging. WeedSOFT, weed management decision support software developed by University of Nebraska research/extension agronomists, helps growers and others make better decisions. This comprehensive weed management tool includes economic, environmental and regulatory considerations for all common Nebraska crops. WeedSOFT helps producers reduce crop herbicide use and associated costs, improve weed management and reduce weed-related yield losses. A survey of WeedSOFT

users indicated this software is responsible for about $13 million annually in cost savings and increased earnings for crop producers. Adapted versions of WeedSOFT also now are used in six other states. A central Nebraska crop consultant said the program "is easy to use and offers unbiased information. It is a well-rounded program and it's worth its weight in gold."

Activity: Sustainable Agriculture Production Systems

Some Nebraska farmers may soon raise a new type of "stock" in unused hog barns or other farm buildings. University of Nebraska research shows freshwater prawns can be relatively easily raised in indoor tanks that could be located in empty farm buildings. The university is patenting some specialized equipment researchers devised for indoor prawn production, and Cooperative Extension is developing educational programs. Raising prawns might provide additional or alternative income for some farmers. University researchers estimate farmers could raise 10 to 12 pounds of prawns per 1,000 gallons of water annually in vacant livestock buildings. Prawns bring $6 to $10 per pound, depending on size and market prices.

Goal 2

Activity: Pre and Post Harvest Plant and Animal Food Safety

University of Nebraska research and extension is providing information about how best to control *E. coli* O157:H7 in cattle before slaughter to reduce chances the dangerous foodborne illness culprit reaches consumers. The latest findings show that a new vaccine and a beneficial bacterial feed additive each significantly reduced the bacteria in feedlot cattle, and that using both may offer added protection. In two years of feedlot trials, a vaccine being developed in Canada proved most effective, reducing *E. coli* prevalence an average 59 percent, compared with unvaccinated steers. Feeding a commercially available *Lactobacillus acidophilus* feed additive reduced prevalence an average of 35 percent. These findings provide objective information for the beef industry and for those developing these new tools.

Activity: Pre and Post Harvest Plant and Animal Food Safety

Awareness and caution are among the best defenses against intentional or accidental livestock disease threats. Nebraska Cooperative Extension and Agricultural Research is heading a biosecurity training effort to safeguard the state's $6 billion livestock industry. This program, which also includes Kansas and Iowa, teaches veterinarians, producers, youth and others how to prevent or contain disease outbreaks spread accidentally or through bioterrorism. A new Web site at http://farmandranchbiosecurity.com, meetings and publications are part of the effort. Institute of Agriculture and Natural Resource's training programs for food processors also emphasize biosecurity and preventative measures to minimize risks to the food supply. This training has helped more than 1,500 Nebraska livestock producers and food processors guard against intentional or accidental biosecurity treats and is expanding the number of people on the lookout for such problems.

Activity: Food Processing and Food Service Management Food Safety

Food allergies are a worldwide concern and cause as many as 200 deaths and countless allergic reactions annually in the United States. Research and training by toxicologists in the University of Nebraska's internationally recognized Food Allergy Research and Resource Program are helping the food industry protect the nation's 6-7 million allergic consumers. The food industry uses the team's fast, accurate tests to detect traces of allergenic foods on food or equipment. The IANR research and extension team also trains food manufacturers nationwide on broad food allergy issues. At one training session, 100 industry representatives changed a manufacturing practice and estimated avoiding potential recall costs of $500,000 each.

Food irradiation is a technology to reduce food borne pathogens and has been available for 50 years. The educational/survey research program was conducted in five grocery stores in two Nebraska communities during the time frame that grocery stores have in-store demos and free samples. About twenty-five percent perceived a difference in the taste of the irradiated meat sample. Sixty-five percent said they either liked or liked very much the irradiated meat; thirty-two percent stated that they neither liked or disliked the irradiated meat. Only four percent stated that they either disliked or disliked very much the irradiated meat sample. When asked if they would purchase irradiated meat if it was available, eighty-two percent responded either definitely yes or probably yes.

Goal 3

Activities: Human Nutrition, Health and Safety and Health Care

A University of Nebraska nutrition researcher is collaborating with Extension Specialists and Educators on an 11-state study to understand why young adults eat so few fruits and veggies and how to change these behaviors. Her preliminary research identified the best methods for reaching young adults with nutrition information. Researchers used these findings to develop new, customized approaches to encourage young adults to improve their habits. Extension is supporting this effort by helping to develop newsletters, manuals and other information tailored to different stages of readiness to change and are testing them nationwide. Extension also plays a role in the recruitment of subjects for this project. This research will be the foundation for a broader national nutrition campaign targeting other groups and individuals.

Goal 4

Activity: Natural Resources Management and Protection

Interseeding legumes in eastern Nebraska's predominantly smooth bromegrass pastures increased productivity, feed availability and forage quality, University of Nebraska research shows. Institute of Agriculture and Natural Resources research showed that interseeding alfalfa, birdsfoot trefoil and kura clover improved pastures from July through September when brome performance typically drops. This is part of ongoing Institute of Agriculture and Natural Resources research to help livestock producers make the best of pastures all season long. Interseeding legumes in bromegrass pastures improved beef gains by an average 25 to 40 pounds per acre. That translates into about $10 to $20 an acre of additional income. Research continues but scientists have documented about a $7 million economic benefit for 1,600 producers who participated in Nebraska Cooperative Extension workshops based on this research.

Activity: Environmental Protection

Vegetative buffer strips between crop fields and streams filter sediment and chemical runoff to protect water quality. Buffer strips are key to many surface water protection efforts, yet there has been no practical way to measure their performance under real-world conditions. Institute of Agriculture and Natural Resources research and extension engineers have devised a simple, accurate tool to evaluate buffer strips effectiveness in the field. Their device takes a tiny but representative water sample that is analyzed to learn how well the buffer strip is performing. This device is designed for use by researchers. A simpler version is being developed for natural resources and conservation agencies. Both will help more accurately evaluate buffer strip design and construction, which should lead to better buffer designs.

Activity: Environmental and Natural Resources Policy

In 1999, the University of Nebraska’s School of Natural Resources and Cooperative Extension embarked on an integrated research and extension program to test the concept of “market-driven” or “productive” conservation. Woody plants that produce commercially valuable specialty products were integrated into agroforestry configurations such as windbreaks, riparian buffers, and hillside and flatland alleycropping arrangements. In conjunction with field research, market assessments and marketplace participation, a major extension program was launched to educate landowners of the value of integrating woody florals and other specialty woody crops into conservation plantings. From 1999-2002, more than 40 presentations, field days and day-long workshops on specialty forest products and their markets were conducted statewide for approximately 1,000 extension educators, tree care professionals, landowners and producers. Since early 2002, (when the first sales occurred), at least 20 landowners in Nebraska have integrated woody florals and other specialty products into their farming and land use systems, major investments independent of any federal or state subsidy programs. The key to stimulating landowner adoption of this new approach to agroforestry was UNL’s provision of a comprehensive package that directly addressed all major landowner concerns, and the

unambiguous demonstration of woody floral profitability and marketability. This package contained practical, straightforward research-based information on species/cultivar selection, sources and prices of planting stock, production, harvesting, processing and packaging guidelines, labor requirements, and real-world cost, price and market information. This program will provide input to Natural Resources District environmental policy decisions regarding the use of Environmental Quality Incentive Program and other cost share funding.

Goal 5

Activity: Family Strengths

The research and extension program activity in Family Strengths is an ongoing effort with the leadership provided by members of the Building Strong Families Action Team. This team which coordinates programming has faculty with joint research and extension appointments in areas related to families. These programs built on research of Dr.'s DeFrain and Stinnett: Strengths of Families. NU for Families' team is also writing a book of family related activities for public sale from activities built around Strengths of Families.

Activity: Family Housing

Lead poisoning causes serious physical and mental health problems in children, particularly those under age 6. Lead paint is a leading cause of childhood lead poisoning, and all the homes east of 72nd Street in Omaha were built before 1978, when lead paint was banned. In one older northeast Omaha neighborhood, 42 percent of children tested positive for lead from 1992 to 1998, and the U.S. Environmental Protection Agency designated the area as a potential Superfund cleanup site due to lead-contaminated soil. University of Nebraska extension and research faculty teach classes in Omaha on how to reduce lead contamination through housekeeping, nutrition and landscaping, and during common maintenance projects. Thanks to what they learned, most participants made changes to reduce the risk of lead poisoning in their homes. For example, a 2-year-old boy's lead levels declined after his mom took the classes and changed her housekeeping and food preparation methods.

Activity: Telecommunications for Rural Areas

The Nebraska Rural Initiative, a University of Nebraska systemwide effort, aims to help rural communities improve economic development and income opportunities. The initiative taps the research and outreach capable resources of all four NU campuses to address rural issues with Cooperative Extension playing a key role. Early initiative efforts have included projects to help small businesses increase profits through technology; training northwest Nebraska businesses how to expand hunting and outdoor recreation tourism markets; and coordinating a statewide training team for entrepreneurship and small business development. Thus linking individuals with faculty of NU who can provide information resources to strengthen community and/or business goals.

Activity: Community Strengths

Policy-makers and community leaders have a better understanding of rural Nebraska concerns and opinions, thanks to the Nebraska Rural Poll. Launched in 1996 by a University of Nebraska Institute of Agriculture and Natural Resources research and extension's rural sociologist, the annual poll asks rural people's views on work, community, quality of life and public policy issues. Researchers quickly analyze and share results widely with state and federal lawmakers, decision-makers, the public and communities. This poll helps track trends and changes in rural Nebraska and provides a rural perspective for policy discussions. Decision-makers say this objective information helps them make better informed policy choices.

Appendix I

Multi-State Research Committees with Current Agricultural Research Division Faculty Participation

No.	Title	Participating Unit *	Federal Goal
NC-7	Conservation, Management, Enhancement and Utilization of Plant Genetic Resources	Agro/H PREC	1
NC-94	Impact Climate and Soils on Crop Selection and Management	SNRS	4
NC-100	RRF Administration, Planning and Coordination		NA
NC-107	Evolving Pathogens, Targeted Sequences, and Strategies for Control of Bovine Respiratory Disease	VBS	1
NC-125	Biological Control of Soil- and Residue-borne Plant Pathogens	Plant Path	1
NC-129	Mycotoxins in Cereal Grains	Plant Path	2
NC-131	Molecular Mechanisms Regulating Skeletal Muscle Growth and Differentiation	An Sci	1
NC-136	Improvement of Thermal and Alternative Processes for Foods	IAPC	2
NC-170	Mediating Exposure to Environmental Hazards through Textile Systems	TCD	1
NC-189	Forage Protein Characterization and Utilization for Cattle	An Sci	1
NC-205	Ecology and Management of European Corn Borer and other Stalk-boring Lepidoptera	NEREC Ent	1
NC-213	Marketing and Delivery of Quality Cereals and Oilseeds	FS&T Agro/H	1
NC-215	Persistence of Heterodera Glycines and other Regionally Important Nematodes	Plant Path PREC	1
NC-218	Assessing Nitrogen Mineralization and other Diagnostic Criteria to Refine Nitrogen Rates for Crops and Minimize Losses	Agro/H	1
NC-219	Using Stage Based Intervention to Increase Fruit and Vegetable Intake in Young Adults	Nutr	3
NC-223	Rural Low-Income Families: Tracking Their Well-Being and Functioning in the Context of Welfare Reform	FCS	5
NC-224	Competitiveness and Value-Added in the U.S. Grain and Oilseed Industry	Ag Econ	1

No.	Title	Participating Unit *	Federal Goal
NC-225	Improved Grazing Systems for Beef Cattle Production	An Sci	1
NC-226	Development for Pest Management Strategies for Forage Alfalfa Persistence	Ent Agro/H	1
NC-227	Ergot - a New Disease of U. S. Grain Sorghum	Agro/H	1
NC -229-	Porcine Reproductive & Respiratory Syndrome (PRRS): Mechanisms of Disease and Methods for the Detection, Protection and Elimination of PRRS Virus	VBS	1
NC-230	Integrating Biophysical Functions of Riparian Systems with Management Practices and Policies	BSE	4
NC-503	Host Plant Control Resistance to and Best Management Practices for Karnal Bunt of Wheat	Agro/H	1
NC-504	Soybean Rust - A New Pest of Soybean Production	Pant Path	1
NC-1004	Genetic and Functional Genomic Approaches to Improve Production Quality of Pork	An Sci	1
NC-1005	Landscape Ecology of White-tailed Deer in Agro-forest Ecosystems: a Cooperative approach to Support Management	SNRS	4
NC-1007	Enteric Diseases of Swine and Cattle Prevention Control and Food	VBS	1
NC-1100	North Central Regional Center for Rural Development	Ag Econ	5
NC-1119	Management Systems to Improve the Economic and Environmental Sustainability of Dairy Enterprises	An Sci Ag Econ	1
NC-1142	Regulation of Photosynthetic Processes	Biochem	1
NC-1167	N–3 Polyunsaturated Fatty Acids and Human Health and Disease	Nutr	3
NCA-1	Crop Soil Research	Agro/H	NA
NCA-2	Animal Health Advisory Committee	VBS	NA
NCA-4	Horticultural Crops	Agro/H	NA
NCA-5	Human Sciences	Home Ec	NA
NCA-6	Livestock Production	An Sci	NA

No.	Title	Participating Unit *	Federal Goal
NCA-10	Forestry and Forest Products	SNRS	NA
NCA-12	Agricultural Economics	Ag Econ	NA
NCA-13	Rural Sociology	Ag Econ	NA
NCA-14	Plant Pathology	Plant Path	NA
NCA-15	Entomology and Economic Zoology	Ent	NA
NCA-16	Agricultural Engineering	BSE	NA
NCA-22	Food Science and Human Nutrition	FS&T, Nutr	NA
NCA-23	Fisheries and Wildlife	SNRS	NA
NCA-24	Agricultural Education Research	AgLEC	NA
NCR-3	Soil Survey	CSD	1
NCR-9	Midwest Plan Service	NEREC BSE	1
NCR-13	Soil Testing and Plant Analysis	Agro/H	1
NCR-22	Small Fruits and Viticulture Research Committee	Agro/H	1
NCR-25	Disease of Corn and Sorghum	Plant Path	1
NCR-31	Ecophysiological Aspects of Forage Management	Agro/H	1
NCR-42	Committee on Swine Nutrition	An Sci	1
NCR-46	Development, Optimization, and Delivery of Management Strategies for Corn Rootworms	Ent	1
NCR-52	Family Economics Committee	FCS	5
NCR-57	Reproductive Physiology	An Sci	1
NCR-59	Soil Organic Matter: Formation, Function, and Management	Agro/H	1
NCR-65	Social Change in the Market Place: Consumer/Retail/Producer Interface	TCD	5
NCR-84	Potato Breeding and Genetics Technical Committee	Agro/H	1
NCR-87	Beef Cow-Calf Nutrition and Management	An Sci	1
NCR-89	Swine Management Research	NEREC An Sci	1

No.	Title	Participating Unit *	Federal Goal
NCR-97	Regulation of Adipose Tissue Accretion in Meat Animals	An Sci	1
NCR-103	Specialized Soil Amendments, Products, Growth Stimulants, and Soil Fertility Management Systems	WCREC Agro/H	1
NCR-125	Biological Control of Arthropod Pests	SCREC Ent	4
NCR-131	Animal Care and Behavior	AnSci	1
NCR-137	Soybean Diseases	Plant Path	4
NCR-148	Migration and Dispersal of Agriculturally Important Biotic	Ent	1
NCR-167	North Central Regional Corn Breeding Research Committee	Agro/H	1
NCR-170	Research Advances in Agricultural Statisticians	Biometry	1
NCR-173	Biochemistry and Genetics of Plant-Fungal Interactions	Plant Path	1
NCR-174	Synchrotron X-ray Sources in Soil Science Research	SNRS	1
NCR-180	Site Specific Management	Agro/H SCREC	1
NCR-184	Management of Disease of Small Grains	Plant Path	1
NCR-189	Air Quality Issues Associated with Animal Facilities	BSE	4
NCR-192	North Central Regional Turfgrass	Agro/H	1
NCR-193	Maintaining Plant Health: Managing Insect Pests and Diseases of Landscape Plants	SNRS	1
NCR-194	Research on Cooperatives	Ag Econ	5
NCR-197	Agricultural Safety and Health Research	BSE	3
NCR-199	Implementation and Strategies for National Beef Cattle Evaluation	Biometry	1
NCR-200	Management Strategies to Control Major Soybean Virus Diseases in NCR	Plant Path	1
NCR-201	Integrated Pest Management	Agro/Hort Ent	1
NCR-202	Health and Survival of Honey Bee Colonies	Ent	1

No.	Title	Participating Unit *	Federal Goal
NCR-203	Impact of Human Capital Development on the Quality of Rural Community Life	AgLec	5
NCR-204	The Interface of Molecular and Quantitative Genetics in Plant and Animal Breeding	Agro/H	1
NCR-206	Nutrition and Management of Feedlot Cattle to Optimize Performance, Carcass Value and Environmental Capability	An Sci	1
NE-127	Biophysical Models for Poultry Production Systems	An Sci	1
NE-1010	Forage Crop Genetics and Breeding to Improve Yield and Quality	Agro/H	1
NRSP-1	Research Planning Using the Current Research Information System (CRIS)	ARD	NA
NRSP-3	The National Atmospheric Deposition Program (NADP) -	SNRS	4
NRSP-8	National Animal Genome Research Project	An Sci	1
S-295	Enhancing Food Safety Through Control of Food-Borne Disease Agents	FS&T	2
S-1002	New Technologies for Utilization of Textile Materials	TC&D	3
S-1005	Sources, Dispersal and Management of Stable Flies on Grazing Beef and Dairy Cattle	Ent WCREC	1
S-1007	Science and Engineering for a Biobased Industry and Economy	BSE	1
S-1008	Genetic Selection and Crossbreeding to Enhance Reproduction and Survival of Dairy Cattle	An Sci	1
S-1010	Dynamic Soybean Pest Management for Evolving Agricultural Technologies and Cropping Systems	Ent	1
W-112	Reproductive Performance in Domestic Ruminants	An Sci	1

No.	Title	Participating Unit *	Federal Goal
W-150	Genetic Improvement of Beans (Phaseolus vulgaris L.) for Yield, Disease Resistance and Food Value	Agro/H	1
W-173	Stress Factors of Farm Animals and Their Effects on Performance	Biometry	1
W-186	Genetic Variability in the Cyst and Root Knot Nematodes	Plant Path	1
W-190	Agricultural Water Management Technologies, Institutions and Policies Affecting Economic Viability and Environmental Quality	Ag Econ	4
W-1002	Nutrient Bioavailability -Phytonutrients and Beyond	Nutr	3
W-1177	Enhancing the Global Competitiveness of U S Red Meat	PREC An Sci	1
WCC-11	Turfgrass Research	Agro/H	1
WCC-55	Rangeland Resource Economics and Policy	Ag Econ	1
WCC-60	Science and Management of Pesticide Resistance	Ent	1
WCC-66	Integrated Management of Russian Wheat Aphid and Other Cereal Aphids	PREC Ent	1
WCC-72	Agribusiness Research Emphasizing Competitiveness	Ag Econ	5
WCC-77	Biology and Control of Winter Annual Grass Weeds in Winter Wheat	PREC Agro/H	1
WCC-92	Beef Cattle Energetics	An Sci	1
WCC-95	Vertebrate Pests of Agriculture, Forestry, and Public Lands	SNRS	4
WCC–97	Research on Diseases of Cereals	Plant Path	
WCC-203	Animal Utilization of Products from Processing Agricultural Commodities	An Sci	1

* Unit Abbreviations

Ag Econ	Agricultural Economics
AgLEC	Agricultural Leadership, Education and Communication
Agro/H	Agronomy and Horticulture
An Sci	Animal Science
Biochem	Biochemistry
BSE	Biological Systems Engineering
Biometry	Biometry
CSD	Conservation and Survey Division
Ent	Entomology
FCS	Family and Consumer Science
FS&T	Food Science and Technology
IAPC	Industrial Ag Products Center
Nutr	Nutritional and Health Sciences
Plant Path	Plant Pathology
SNRS	School of Natural Resource Sciences
TCD	Textiles, Clothing and Design
VBS	Veterinary and Biomedical Sciences
NEREC	Northeast Research and Extension Center
PREC	Panhandle Research and Extension Center
SCREC	South Central Research and Extension Center
WCREC	West Central Research and Extension Center