2009 North Dakota State University Combined Research and Extension Annual Report of Accomplishments and Results

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I. Report Overview

1. Executive Summary

Agriculture is the industry whose activities, resource use, economic contributions, and employment is dominant in the life of North Dakota. Nearly one fourth of our economic base is from agriculture. Almost 90 percent of North Dakota's land area is in farm and grazing land. The North Dakota Agricultural Experiment Station (ND AES) and the NDSU Extension Service are leaders in researching new economic opportunities and providing educational and other services for the citizens of the state.

In 2009, North Dakota led the nation in the production of all wheat, spring wheat, durum wheat, barley, canola, all sunflower, oil sunflower, non-oil sunflower, flaxseed, all dry edible beans, pinto beans, navy beans, dry edible peas, lentils, and honey. The state ranks third in sugar beet and oats; seventh in potatoes; and eleventh in soybeans. The total value of the 2009 crop production in North Dakota was estimated at $5.53 billion. Although a short growing season and low rainfall limits crop diversification and crop yields, North Dakota remains one of the most agriculturally diverse states in the nation with more than 40 different crops grown. North Dakota also has a stable beef cow industry with about 900,000 cows.

North Dakota's agricultural sector is facing both challenges and opportunities. In terms of climate change, North Dakota has experienced 17 years of generally higher than normal precipitation. This has challenged farmers to adjust by changing the crops they produce and managing soil moisture conditions through practices such as tiling. Increased crop and livestock costs of production have increased the challenge for farmers to remain profitable and have called for research and extension assistance focused on cost efficient production practices. Despite such challenges, new opportunities are developing in several areas, especially for biofuel and wind energy development. ND AES and Extension Service are responding to these needs with creative research and education that enhances the productivity, lives, and communities of our citizens. Here are several examples of recent contributions in the areas of global food security, climate change, sustainable energy, food safety, and citizen and leadership development.

Global food security

Genome sequences of plant and animals provide a detailed view of organisms or crop varieties. Such information is critical in development of comprehensive approaches to combat disease and improve varieties. Genome sequencing has revolutionized both animal health and crop improvement strategies for rice, sorghum and maize. A team of researchers at NDSU has focused on the wheat genome and is using a radiation hybrid mapping approach to prepare the wheat genome for genomic sequencing. Radiation is used to break the wheat chromosome in order to create a panel of genes that can be used to map gene presence or absence. This mapping approach will be used in guiding the researchers as they sequence the large genome. The maps provide valuable information and easy access to genes for the development of new strategies for crop manipulation and breeding to better serve the needs of a growing world and population.

In 2009, the ND AES and the research extension centers continued to develop new varieties of crops. New varieties released in 2009 included Barlow hard red spring wheat, Mott hard red spring wheat, Ashtabula conventional soybean, and Rockford white-hulled oat. Development of these new varieties helps improve the efficiency of crop production and also adds significantly to the economy of the state. Development of new crop varieties also gives producers greater opportunities for competition in a global market. Similar research advances are ensuring the next generation of beans and pulses through an active pulse crop breeding program. North Dakota is the No. 1 producer of dry peas and lentils. Researchers are currently evaluating 35 new lines of dry peas and 223 new lines in single plot trials. While 32 new lines of advanced and 215 entries as early generation lentils are also in ongoing field trials. Researchers are also assessing superior dry peas, lentil and chickpeas from seed and germplasm exchanges with countries including Bulgaria, Australia and Canada. Plants with good architecture, resistance to lodging and disease resistance with adaptability will be assessed.

Climate change

George Lake located in South-central North Dakota could help provide researchers clues as to the climate mechanisms that trigger drought and other climate changes. Researchers from NDSU, the University of Nebraska, Brown University, Duke University and Illinois State Museum in collaboration with the Central Grasslands Research Extension Center at Streeter have collected samples from the lake in an effort to assess the presence of various organic compounds (alkenones) which are used as biomarkers to reconstruct climate variables such as temperature and precipitation. Samples were collected in the summer months from various depths of the lake and again in the winter to obtain sediment from the bottom of the ice covered lake. DNA testing also carried out found that the lake has similar algae to that found in Antartica's Ace Lake; the cold

conditions of George Lake coupled with its high sodium concentrations result in high concentrations of alkenones. Data indicates that the researchers are able to track temperature change annually back nearly 10,000 years.

Sustainable energy

Rising oil and gas costs and concerns as to the long term environmental impacts of consuming fossil fuels have resulted in an intensive interest in wind energy development in North Dakota. Rural areas of ND also view wind energy as an economic development opportunity and a means to increase income if they allow wind turbine installation on a property. A team from NDSU consisting of a biofuels economist, a farm economist, farm management specialist, and energy educator held educational sessions in the state to discuss wind energy financing, regulation, energy efficiency and wind turbine leasing. A publication "Wind turbine lease and considerations for landowners" has been developed as a means to offer guidance to landowners before they sign contracts with energy companies. An online tool has also been developed to help individuals evaluate the investment potential of wind energy using localized wind information and an online discussion forum is available to foster peer education on wind energy. Currently ND has about 500 wind towers in operation.

Food safety

Culture, language and literacy are among some of the barriers that new Americans to the country face and can be challenges that prevent them from adopting safe food handling practices. A group of NDSU extension agents, researchers and collaborators at NDSU and the University of Minnesota, tribal college and public health agencies have focused on approaches to help new Americans overcome these barriers. The group has found that aside from culture, language and literacy, distance to acceptable markets, transportation and the confusion between food safety and the relationships to chronic diseases are also important factors in understanding food safety. The team has designed a series of hands on lessons that focus on three risk areas: proper chilling of leftovers, thawing frozen meat and safe temperatures for serving and eating meat containing dishes. The team has also developed a web site, videos and information for new Americans in 24 languages. The project can potentially provide a model for food safety education for diverse populations. In the state of ND these projects are focused on new Americans from Bosnia, Kurdistan, Liberia, Somalia and the Sudan.

More than 700 North Dakotans participated in the BBQ Boot Camp in the summer of 2009 as a means to learn the secrets of grilling tasty steaks, burgers, chops and other meats. In partnership members of the food science faculty, and the NDSU extension service provided boot camps at various locations around the state in efforts to ensure safer handling of meat. The program introduced people to new cooking methods and practices, meat cut selection, food safety and proper cooking temperatures and the use of meat thermometers, rubs, marinades, seasonings as well as the use of charcoal or gas cooking. Participants also heard about current topics in the pork, beef and lamb industries including activities at NDSU in research and extension.

Citizenship and leadership development (4-H)

Having a parent, sister, or brother deployed for military duty can be stressful and scary for a child. In order to ease the trauma, NDSU's Center for 4-H Youth Development teamed up with all US military branches and organizations such as the American Legion, and the National Association for Child Care Resource and Referral Agencies to develop a program called Operation Military Kids (OMK). This national program creates a network of support for military families and connects them through recreational, emotional social and educational programs. The first ND OMK camp was established in 2009 to provide youth groups of different ages a variety of experiences including outdoor skills such as archery, air rifle training, camp cooking and technology such as digital photography, videography and robotics. The ND OMK initiative also worked to heighten community awareness of challenges to the youth of military families facing the deployment of a loved one. As part of this initiative, non military groups wrote letters of support to military children and their families to thank them for their sacrifice and service to the US.

A new extension service leadership development activity commenced in Jamestown in an effort to enhance community activity in building and revitalizing its civic center. Participants in the Rural Leadership ND (RLND) program began working on projects to benefit the community. Some projects focused on developing plans to attract new events to the center while others opted to develop plans for a multipurpose activity center. The short course participants learned a range of leadership skills leadership including effective communication, understanding behavioral styles, understanding and managing conflict and identification of community assets or capitals (natural, cultural, social, human, political, financial and built). The RLND program enables participants from farms, ranches and rural communities to become effective leaders with empowerment to overcome the challenges that face rural North Dakotans. Participants attend instate seminars and a study tour of Washington DC. An additional seminar to Manitoba, Canada in 2009 was also added allowing participants to learn about Canadian agriculture, trade, water and cultural issues. Community projects developed from the leadership program included playground equipment installation in Ray, repair and enhancement of residences in New Town, emergency service enhancement in Berthold, a key club in Rolla, a business center in Northwood and a community cooperative childcare facility in Stanley. To date about 55 people have participated and graduated from the RLND program since its inception in 2003.

Total Actual Amount of professional FTEs/SYs for this State

Year: 2009	Extension		Research	
	1862	1890	1862	1890
Plan	85.0	0.0	50.0	0.0
Actual	75.0	0.0	36.0	0.0

II. Merit Review Process

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

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

2. Brief Explanation

Program leaders from the North Central Region met and exchanged ideas on plans of work and logic models in agriculture and natural resources, family and consumer science, 4 H youth development, and community resource development. Program leaders from the Great Plains (North Dakota, South Dakota, Nebraska, and Kansas) met and exchanged ideas on professional development, evaluation, and program planning tools.

Research programs were subjected to reviews prior to, during and at the conclusion of each research project. Research faculty who participate in multi state research projects received a critical review of their contributing project from fellow committee members, the administrative adviser and the North Central Multi State Research Committee. Many faculty have competitive grants which are awarded on the basis of scientific merit and have an external peer review. Each research faculty member with the North Dakota Agricultural Experiment Station was required to have a station project that was reviewed for scientific merit by a Project Review Committee that is comprised of one faculty member from each discipline. All research was peer reviewed, either internally or externally, prior to publication.

III. Stakeholder Input

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

- Use of media to announce public meetings and listening sessions
- Targeted invitation to traditional stakeholder groups
- Targeted invitation to non-traditional stakeholder groups
- Targeted invitation to traditional stakeholder individuals
- Survey of traditional stakeholder groups
- Survey of traditional stakeholder individuals
- Survey specifically with non-traditional groups

Brief explanation.

Establishing linkages with the public enables us to discover information about community/county/district/state assets and needs. Methods such as holding public meetings or listening sessions, using targeted invitations, and surveys are used for stakeholder input on an on going basis. Using several methods to collect data ensure that high priority issues are identified, people that have a self interest in the issue are brought to the planning meetings, and an educational design is developed to address the issue using a variety of delivery methods. A tool that is being used more extensively is the turning point technology. It has been used in the classroom for some time but has a great utilization for the public to express their concerns anonymously in public forums or gatherings.

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

1. Method to identify individuals and groups

- Use Advisory Committees
- Use Internal Focus Groups
- Use External Focus Groups
- Open Listening Sessions
- Needs Assessments
- Use Surveys

Brief explanation.

The State Board for Agricultural Research and Education (SBARE) is charged with determining the causes of any adverse economic impacts on crops and livestock produced in this state; developing ongoing strategies for the provision of research solutions to negate adverse economic impacts on crops and livestock produced in this state; developing ongoing strategies for the dissemination of research information through the Extension Service; annually evaluating the results of research and extension activities and expenditures; and reporting the findings to the North Dakota Legislative Council and the State Board of Higher Education.

County commissioners actively participate in county extension program reviews. The county extension budgeting process also results in strong engagement from county government.

The North Dakota Department of Human Services and NDSU Extension Service formed a statewide Family Life Education Committee. The committee is composed of state legislators, an Extension specialist, an Extension Human Development Agent, citizens with a parenting self interest, two administrators from the Child Division of the State Department of Human Services and the Extension Assistant Director, Nutrition, Youth and Family Science. As a result of this partnership, the state Department of Human Services provides funding opportunities to six state family life education centers through a request for proposal process. The availability of designated funds also directs the focus of the parenting education programs provided through the six family life education center coordinators.

The ND Department of Health, under the direction of the Governor of North Dakota, formed an alliance of organizations in ND that provide significant support and leadership for health related initiatives. NDSU Extension is represented on this coalition. Networking among these professionals is invaluable, in addition to the legislative work.

A number of government and non governmental units have formed a coalition to address the financial needs of North Dakotans. Saving more and reducing credit card debt are two of the key issues being addressed. NDSU Extension is a part of the team.

The Rural Leadership ND Council serves as a stakeholder advisory board of agricultural, business, public, and non-profit entities to provide program review and assessment of current needs related to rural community development issues. Council membership is based on a nomination process.

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

1. Methods for collecting Stakeholder Input

- Meeting with traditional Stakeholder groups
- Survey of traditional Stakeholder groups
- Meeting with traditional Stakeholder individuals
- Survey of traditional Stakeholder individuals

Brief explanation.

The State Board for Agricultural Research and Education (SBARE) meets bimonthly. Both the Extension Service and the Experiment Station are represented on the board, affording opportunities for input and program directions.

County commissioners are met with at least once a year and in most cases twice for input.

The statewide Family Life Education Committee meets quarterly where input is sought for programming and direction.

The Rural Leadership ND Council serves as a stakeholder advisory board and meets two to three times per year to help guide Extension program directions.

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 Action Plans
- To Set Priorities

Brief explanation.

{NO DATA ENTERED}

Brief Explanation of what you learned from your Stakeholders

The State Board for Agricultural Research and Education (SBARE) is charged with developing ongoing strategies for the dissemination of research information through the Extension Service; annually evaluating the results of research and extension activities and expenditures; and reporting the findings to the North Dakota Legislative Council and the State Board of Higher Education. Their findings directly affect the budgeting process.

The staff from the seven research extension centers (RECs) uses the input from winter meetings with their advisory boards to set program direction for their center.

During county staff evaluations each year, programming input is gathered from commissioners who take part in the staff evaluations. This arrangement helps assure that extension programs are grass roots driven and are focused on local issues and needs.

The statewide Family Life Education Committee, composed of state legislators, an Extension specialist, an Extension Human Development Agent, citizens with a parenting self interest, two administrators from the Child Division of the State Department of Human Services and the Extension Assistant Director, Nutrition, Youth and Family Science determine the availability of designated funds which direct the focus of the parenting education programs provided through the six family life education center coordinators. The six family life education coordinators provide evaluation feedback to the Family Life Education Committee of the state Department of Human Services on program impacts. These impacts are then shared with state legislators which in turn affect budgeting.

The Rural Leadership ND Council has identified building capacity of leadership at both the rural agricultural level and business level as priorities for current Extension programs.

IV. Expenditure Summary

1. Total Actual Formula dollars Allocated (prepopulated from C-REEMS)			
Extension		Research	
Smith-Lever 3b & 3c	1890 Extension	Hatch	Evans-Allen
3213187	0	2599200	0

2. Totaled Actual dollars from Planned Programs Inputs				
	Extension		Research	
	Smith-Lever 3b & 3c	1890 Extension	Hatch	Evans-Allen
Actual Formula	2340000	0	1339200	0
Actual Matching	3510000	0	2008800	0
Actual All Other	0	0	0	0
Total Actual Expended	5850000	0	3348000	0

3. Amount of Above Actual Formula Dollars Expended which comes from Carryover funds from				
Carryover	0	0	0	0

V. Planned Program Table of Content

V(A). Planned Program (Summary)

Program # 1

1. Name of the Planned Program

Energy in Crop Agriculture

V(B). Program Knowledge Area(s)

1. Program Knowledge Areas and Percentage

KA Code	Knowledge Area	%1862 Extension	%1890 Extension	%1862 Research	%1890 Research
205	Plant Management Systems	50%		0%	
402	Engineering Systems and Equipment	35%		0%	
404	Instrumentation and Control Systems	15%		0%	
	Total	100%		0%	

V(C). Planned Program (Inputs)

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

Year: 2009	Extension		Research	
	1862	1890	1862	1890
Plan	10.0	0.0	0.0	0.0
Actual	10.0	0.0	0.0	0.0

2. Actual dollars expended in this Program (includes Carryover Funds from previous years)

Extension		Research	
Smith-Lever 3b & 3c	**1890 Extension**	**Hatch**	**Evans-Allen**
312000	0	0	0
1862 Matching	**1890 Matching**	**1862 Matching**	**1890 Matching**
468000	0	0	0
1862 All Other	**1890 All Other**	**1862 All Other**	**1890 All Other**
0	0	0	0

V(D). Planned Program (Activity)

1. Brief description of the Activity

Develop presentation materials and develop resource materials Develop and plan workshops, demonstrations and meetings Transcribe scientific research into useable resources Continuing education demonstrations - fuel use, tillage and N use Cooperate with NDSU Research Extension Centers - conduct rate N calibrations and tillage fuel use studies

2. Brief description of the target audience

Extension staff Crop consultants Agricultural industry personnel Agricultural finance people Government workers Growers

V(E). Planned Program (Outputs)

1. Standard output measures

2009	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Plan	2500	6000	0	0
Actual	5000	80000	0	0

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

Patent Applications Submitted

Year: 2009
Plan: 0
Actual: 0

Patents listed

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

2009	Extension	Research	Total
Plan	0	0	
Actual	2	0	2

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

- {No Data Entered}

V(G). State Defined Outcomes

V. State Defined Outcomes Table of Content

O. No.	OUTCOME NAME
1	Number of farmers gaining knowledge on new tillage options
2	Number of farmers gaining knowledge of energy alternatives
3	Number of farmers gaining knowledge of energy potential and availability of different crops
4	Number of farmers that changed their tillage habits to no-till
5	Number of farmers that make greater use of soil testing for fertilizer needs
6	Number of acres under reduced tillage
7	Number of farmers using reduced energy technologies
8	Growers who were educated on grain drying and handling issues through media and workshops.

Outcome #1

1. **Outcome Measures**

Number of farmers gaining knowledge on new tillage options

Not Reporting on this Outcome Measure

Outcome #2

1. **Outcome Measures**

Number of farmers gaining knowledge of energy alternatives

Not Reporting on this Outcome Measure

Outcome #3

1. **Outcome Measures**

Number of farmers gaining knowledge of energy potential and availability of different crops

Not Reporting on this Outcome Measure

Outcome #4

1. **Outcome Measures**

Number of farmers that changed their tillage habits to no-till

Not Reporting on this Outcome Measure

Outcome #5

1. **Outcome Measures**

Number of farmers that make greater use of soil testing for fertilizer needs

Not Reporting on this Outcome Measure

Outcome #6

1. **Outcome Measures**

Number of acres under reduced tillage

Not Reporting on this Outcome Measure

Outcome #7

1. Outcome Measures

Number of farmers using reduced energy technologies

Not Reporting on this Outcome Measure

Outcome #8

1. Outcome Measures

Growers who were educated on grain drying and handling issues through media and workshops.

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2009	{No Data Entered}	3000

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Corn harvest, drying and storage was extremely difficult during both 2008 and 2009, which created a very large demand for information on efficient corn drying and storage. Much of the corn needed to be dried from 25% to 28% initial moisture content to about 14% to 15% moisture content for safe storage. The typical energy demand to dry a bushel of corn 10 percentage points is about 18,000 Btu per bushel. Most of the grain is dried using propane with an energy content of 91,600 Btu per gallon. To dry the 285,200,000 bushels of corn produced in North Dakota in 2008 required about 57,000,000 gallons of propane.

What has been done
Educational material was developed and placed on the web at http://www.ag.ndsu.nodak.edu/abeng/postharvest.htm Many news releases on how to efficiently dry and store the corn were written and distributed. Numerous radio interviews and interviews for magazine articles were used to provide timely information. Educational presentations were given in numerous locations across the state on how to efficiently dry and store the corn. Individual assistance was provided annually to about 300 people through

Results
Energy audits conducted for farmers applying for USDA REAP grants show a 25 to 30% increase in energy efficiency for farmers changing to more efficient corn dryers and systems. Even farmers adopting more energy efficient practices using existing dryers experience a 10 to 20% increase in energy efficiency. For farmers drying 200,000 bushels of corn, a 20% savings is equivalent to 7,850 gallons of propane with a value of $11,775 at a propane price of $1.50 per gallon. If this is applied to all the corn grown in North Dakota, the savings would be $17,000,000.

4. Associated Knowledge Areas

KA Code	Knowledge Area
205	Plant Management Systems
402	Engineering Systems and Equipment
404	Instrumentation and Control Systems

V(H). Planned Program (External Factors)

External factors which affected outcomes

- Natural Disasters (drought, weather extremes, etc.)
- Economy

Brief Explanation

High fuel prices for propane increased the need for efficient drying systems. Extremely wet fall weather and cool summer delayed grain maturity and harvest.

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

1. Evaluation Studies Planned

- After Only (post program)

Evaluation Results

Key Items of Evaluation

V(A). Planned Program (Summary)

Program # 2

1. Name of the Planned Program

Economics of Crop Production

V(B). Program Knowledge Area(s)

1. Program Knowledge Areas and Percentage

KA Code	Knowledge Area	%1862 Extension	%1890 Extension	%1862 Research	%1890 Research
601	Economics of Agricultural Production and Farm Management	25%		0%	
602	Business Management, Finance, and Taxation	25%		0%	
603	Market Economics	25%		0%	
604	Marketing and Distribution Practices	25%		0%	
	Total	100%		0%	

V(C). Planned Program (Inputs)

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

Year: 2009	Extension		Research	
	1862	1890	1862	1890
Plan	9.0	0.0	0.0	0.0
Actual	9.0	0.0	0.0	0.0

2. Actual dollars expended in this Program (includes Carryover Funds from previous years)

Extension		Research	
Smith-Lever 3b & 3c	**1890 Extension**	**Hatch**	**Evans-Allen**
280800	0	0	0
1862 Matching	**1890 Matching**	**1862 Matching**	**1890 Matching**
421200	0	0	0
1862 All Other	**1890 All Other**	**1862 All Other**	**1890 All Other**
0	0	0	0

V(D). Planned Program (Activity)

1. Brief description of the Activity

Identify emerging issues

Provide enterprise budgets, resource use alternatives, crop insurance options, marketing strategies and other resource material reflecting best management practices.

Evaluate effectiveness of alternative management practices.

Develop presentation materials.

Offer in-service education, presentations and workshops.

2. Brief description of the target audience

Owners, managers and employees of farm operations
Marketing club members and facilitators
Agribusiness and government agency personnel

V(E). Planned Program (Outputs)

1. Standard output measures

2009	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Plan	5000	250000	0	0
Actual	7250	250000	0	0

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

Year: 2009
Plan: 0
Actual: 0

Patents listed

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

2009	Extension	Research	Total
Plan	10	1	
Actual	13	2	15

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

- {No Data Entered}

V(G). State Defined Outcomes

V. State Defined Outcomes Table of Content

O. No.	OUTCOME NAME
1	Number of producers and others attending workshops, marketing clubs and other events.
2	Number of participants demonstrating an increase in subject knowledge and skills.
3	Evidence of producers employing enterprise budgets, using computerized decision-making tools, writing marketing plans and adopting recommended management tools.
4	Number of marketing clubs in the state.
5	Evidence of producers having a more productive working relationship with agriculture service personnel.
6	Evidence of producers implementing activities indicated by the management tools.
7	Evidence of benefits from marketing club participation and best management practice implementation.
8	Estimated value of adopted best management practices to the individual and to the state.
9	Number of agricultural producers, agricultural lenders, extension agents, crop insurance agents, and county FSA directors who increased their knowledge of key provisions of the 2008 Farm Bill so that informed decisions would be made.

Outcome #1

1. **Outcome Measures**

Number of producers and others attending workshops, marketing clubs and other events.

Not Reporting on this Outcome Measure

Outcome #2

1. **Outcome Measures**

Number of participants demonstrating an increase in subject knowledge and skills.

Not Reporting on this Outcome Measure

Outcome #3

1. **Outcome Measures**

Evidence of producers employing enterprise budgets, using computerized decision-making tools, writing marketing plans and adopting recommended management tools.

Not Reporting on this Outcome Measure

Outcome #4

1. **Outcome Measures**

Number of marketing clubs in the state.

Not Reporting on this Outcome Measure

Outcome #5

1. **Outcome Measures**

Evidence of producers having a more productive working relationship with agriculture service personnel.

Not Reporting on this Outcome Measure

Outcome #6

1. **Outcome Measures**

Evidence of producers implementing activities indicated by the management tools.

Not Reporting on this Outcome Measure

Outcome #7

1. Outcome Measures

Evidence of benefits from marketing club participation and best management practice implementation.

Not Reporting on this Outcome Measure

Outcome #8

1. Outcome Measures

Estimated value of adopted best management practices to the individual and to the state.

Not Reporting on this Outcome Measure

Outcome #9

1. Outcome Measures

Number of agricultural producers, agricultural lenders, extension agents, crop insurance agents, and county FSA directors who increased their knowledge of key provisions of the 2008 Farm Bill so that informed decisions would be made.

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2009	{No Data Entered}	1535

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
In 2008, Congress passed the "Food, Conservation, and Energy Act of 2008" also known as the 2008 Farm Bill. Several new provisions were added to the bill, which has the potential to significantly impact the revenue and profitability of North Dakota farmers. One important provision was the optional Average Crop Revenue Election (ACRE) program, which is an alternative revenue-based safety net that producers could voluntarily enroll in. The Supplemental Revenue Assistance Payments (SURE) program provides benefits for losses due to natural disasters which occur on a regular basis in North Dakota.

What has been done
As a starting point, several tutorials titled ACRE Basics, ACRE Program Analyzer (an in-depth Microsoft Excel(c) spreadsheet), and Should I Enroll in ACRE were developed by Extension economists. Popular news releases were issued to alert clients of the new Farm Bill provisions, sign-up dates, and when educational meetings were to be held. Numerous meetings were held to inform clients, and to train Extension agents, USDA-FSA county staff, and farm business management instructors on the use of the tutorials.

Results

Numerous clients received valuable education about important revenue enhancing provisions in the Farm Bill. One noteworthy outcome was that the SURE program had a provision called the Livestock Indemnity Program (LIP) which covered above normal livestock losses due to adverse weather, which definitely occurred in North Dakota in the spring 2009. Losses were valued at "75 percent of the market value the day before the loss occurred." So the value of new-born calves was much less than producers would receive for calves at normal fall marketing. Extension economists worked with an important Senator who was the author of the Farm Bill to develop a provision which ultimately raised the payment for new born calves from about $80 to $319.44. This four-fold increase in value proved to be economically critical for livestock producers who received approximately $17 Million in LIP payments. The majority of livestock losses were calves in 2009.

4. Associated Knowledge Areas

KA Code	Knowledge Area
601	Economics of Agricultural Production and Farm Management
602	Business Management, Finance, and Taxation
603	Market Economics

V(H). Planned Program (External Factors)

External factors which affected outcomes

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

Brief Explanation

The passage of the 2008 Farm Bill with new provisions created a wealth of educational opportunities. Severe spring blizzards and flooding in 2009 created many educational opportunities and applications of the SURE permanent disaster program. Government regulations were enacted to address important wind energy issues.

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

1. Evaluation Studies Planned

- After Only (post program)

Evaluation Results

For the 2008 Farm Bill educational programs, the evaluation summary was completed by 238 attendees (79 percent of attendance) at four meetings that were held in October 2009.

The following questions were rated on a scale of 1 to 7, with 7 being highest and 1 being lowest.

1)	The objectives of the session were beneficial:	5.81 (238 responses)
2)	The stated objectives were met:	5.80 (238 responses)
3)	The structure/format level was:	5.81 (237 responses)
4)	The meeting facilities were:	5.55 (238 responses)
5)	The work of the presenter(s) was:	6.02 (238 responses)
6)	The materials were:	5.68 (237 responses)
7)	The ideas and activities presented were interesting:	5.83 (237 responses)
8)	My attendance at this event should prove beneficial:	5.73 (237 responses)
9)	Overall, I consider this learning experience:	5.85 (235 responses)

10) Give an example of something you gained from this session which may help you in your operation:
Update on government programs - good. Update on 2010 costs, etc. - good.
Understanding of ACRE and economic outlook
USDA programs and crop outlook
Comparison of government programs and crop insurance
USDA programs are quite complicated.
Great job of understanding USDA programs

Key Items of Evaluation

V(A). Planned Program (Summary)

Program # 3

1. Name of the Planned Program

Global Food Security and Hunger

V(B). Program Knowledge Area(s)

1. Program Knowledge Areas and Percentage

KA Code	Knowledge Area	%1862 Extension	%1890 Extension	%1862 Research	%1890 Research
202	Plant Genetic Resources	0%		25%	
203	Plant Biological Efficiency and Abiotic Stresses Affecting Plants	0%		25%	
204	Plant Product Quality and Utility (Preharvest)	0%		5%	
211	Insects, Mites, and Other Arthropods Affecting Plants	0%		5%	
212	Pathogens and Nematodes Affecting Plants	0%		40%	
	Total	0%		100%	

V(C). Planned Program (Inputs)

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

Year: 2009	Extension		Research	
	1862	1890	1862	1890
Plan	0.0	0.0	13.0	0.0
Actual	0.0	0.0	13.0	0.0

2. Actual dollars expended in this Program (includes Carryover Funds from previous years)

Extension		Research	
Smith-Lever 3b & 3c	**1890 Extension**	**Hatch**	**Evans-Allen**
0	0	483600	0
1862 Matching	**1890 Matching**	**1862 Matching**	**1890 Matching**
0	0	725400	0
1862 All Other	**1890 All Other**	**1862 All Other**	**1890 All Other**
0	0	0	0

V(D). Planned Program (Activity)

1. Brief description of the Activity

Develop improved cultivars and inbreds
Evaluate elite lines from other breeding programs
Develop resource material
Identify emerging issues
Evaluate effectiveness of activities

2. Brief description of the target audience

Producers
Processors that utilize the grain
Crop consultants
Local and regional commodity groups
Personnel in agribusiness/agrifinance
Personnel working for government agencies

V(E). Planned Program (Outputs)

1. Standard output measures

2009	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Plan	0	0	0	0
Actual	0	0	0	0

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

Year: 2009
Plan: 0
Actual: 0

Patents listed

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

2009	Extension	Research	Total
Plan	0	25	
Actual	0	25	25

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

- {No Data Entered}

V(G). State Defined Outcomes

V. State Defined Outcomes Table of Content

O. No.	OUTCOME NAME
1	Estimated dollar value new cultivars bring to North Dakota
2	Percent of acreage that our cultivar releases occupy for each of the crops we breed
3	Changes in breeding priorities that match needs
4	Addition of new breeding programs or addition of responsibilities to existing programs
5	Number of teams working together to develop genetic solutions
6	Number of individuals growing improved cultivars
7	Number of other breeding programs using NDSU developed germplasm
8	Percentage of North Dakota wheat acreage sown to hard red spring wheat cultivars that were recently developed and released by NDSU.
9	Percentage of North Dakota acreage with barley cultivars that were developed and released by NDSU.

Outcome #1

1. **Outcome Measures**

Estimated dollar value new cultivars bring to North Dakota

Not Reporting on this Outcome Measure

Outcome #2

1. **Outcome Measures**

Percent of acreage that our cultivar releases occupy for each of the crops we breed

Not Reporting on this Outcome Measure

Outcome #3

1. **Outcome Measures**

Changes in breeding priorities that match needs

Not Reporting on this Outcome Measure

Outcome #4

1. **Outcome Measures**

Addition of new breeding programs or addition of responsibilities to existing programs

Not Reporting on this Outcome Measure

Outcome #5

1. **Outcome Measures**

Number of teams working together to develop genetic solutions

Not Reporting on this Outcome Measure

Outcome #6

1. **Outcome Measures**

Number of individuals growing improved cultivars

Not Reporting on this Outcome Measure

Outcome #7

1. Outcome Measures

Number of other breeding programs using NDSU developed germplasm

Not Reporting on this Outcome Measure

Outcome #8

1. Outcome Measures

Percentage of North Dakota wheat acreage sown to hard red spring wheat cultivars that were recently developed and released by NDSU.

2. Associated Institution Types

- 1862 Research

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2009	{No Data Entered}	52

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Hard red spring wheat (HRSW) is grown on over 6 million acres annually in North Dakota, more than any other crop. Growers rely on improved HRSW cultivars with improved disease resistance and the ability to produce high quality grain under optimal and marginal growing conditions.

What has been done
The HRSW cultivars Glenn, Faller, Steele-ND, and Howard have been developed by the HRSW breeding and genetics project and released by the ND Agricultural Experiment Station. At least three of these cultivars (Glenn, Steele-ND, and Faller) have improved resistance to Fusarium head blight. The milling and baking quality of all four wheat cultivars are acceptable to processors and end users.

Results
In 2009, among the six leading hard red spring wheat (HRSW) cultivars in North Dakota and the region, four (Glenn, Faller, Steele-ND, and Howard) were released by NDSU. These cultivars were grown on 23.6, 17, 5.8, and 5.1% of North Dakota wheat acreages in 2009, respectively. Thus, over 50% of North Dakota wheat acreage was sown to these four cultivars developed at NDSU. In total in 2009, NDSU HRSW cultivars were grown on about 60% of the 6.7 million acres of wheat in North Dakota. Faller was also the leading wheat cultivar in MN with more than 24% of MN wheat acreage. Other cultivars such as Glenn were commonly grown in MN. If only 5% of yield increase is attributed to these cultivars and if the average wheat yield in 2009 is about 46 bu/ac, a total of about 15 million bu are added to ND wheat production annually. With the wheat price of more than $5/bu, a minimum of $75M in benefits would be added to the growers' income by NDSU cultivars. Similarly, millions of dollars were made by Minnesota and neighboring states growers by growing NDSU cultivars such as Faller and Glenn in Minnesota and Reeder/Steele-ND in Montana and South Dakota.

4. Associated Knowledge Areas

KA Code	Knowledge Area
203	Plant Biological Efficiency and Abiotic Stresses Affecting Plants
204	Plant Product Quality and Utility (Preharvest)

Outcome #9

1. Outcome Measures

Percentage of North Dakota acreage with barley cultivars that were developed and released by NDSU.

2. Associated Institution Types

- 1862 Research

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2009	{No Data Entered}	25

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
North Dakota is the leading barley producing state in the US and is a major supplier of malting barley for the malting and brewing industries in the US. In 2009, barley for malting received a premium of over $1.25 per bushel over feed barley. Being able to receive the premium for malting makes the difference between profitability and large losses. Thus, malting barley is important for growers wanting to obtain the premiums when selling malting barley and the users and processor of the barley.

What has been done
New malting barley cultivars are being developed and released by the barley breeding program at NDSU. The 2-rowed cultivar Pinnacle was released in July 2007 and it was distributed for production of Registered seed by the ND Crop Improvement Associations. In 2009, Pinnacle was sown 83,000 acres (0.7% of the total barley acreage) in ND. Additionally, 400,000 bu of Pinnacle was contracted for malting barley production in western ND. Pinnacle was found to be satisfactory in the 2008 AMBA Plant Scale Evaluation Program. If the 2009 Plant Scale Evaluation is also found satisfactory, Pinnacle will be added to the AMBA list of recommended malting barley varieties in late 2010. Acreage of Pinnacle is expected to increase yearly, especially if malting and brewing evaluations continue to be positive. Unique features of Pinnacle include, it may be suitable for malting as grown in ND, high grain yields, large, plump kernels and some drought tolerance, moderate resistance to net and spot, blotch, good lodging resistance, mid-early heading, low grain protein, and good malt extract values.

Results
Nearly 25% of the barley acreage sown in North Dakota uses cultivars developed by the NDSU barley breeding/genetics project. Three of the four top cultivars developed by NDSU are recommended for malting and brewing by the American Malting Barley Association. The two-rowed malting barley cultivar Conlon was grown on 18% of the North Dakota barley acreage or 265,000 acres. Since Conlon is a malting barley, it commanded on average a $1.25 premium over feed barley. In 2009, this resulted in Conlon generating an additional $23 million in revenue for North Dakota growers that grew this cultivar.

4. Associated Knowledge Areas

KA Code	Knowledge Area
202	Plant Genetic Resources
203	Plant Biological Efficiency and Abiotic Stresses Affecting Plants
204	Plant Product Quality and Utility (Preharvest)

V(H). Planned Program (External Factors)

External factors which affected outcomes

- Natural Disasters (drought, weather extremes, etc.)

Brief Explanation

Wet field delayed planting in many areas of the state and farmers shifted from planting wheat and barley to other crops.

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

1. Evaluation Studies Planned

- During (during program)

Evaluation Results

{No Data Entered}

Key Items of Evaluation

{No Data Entered}

V(A). Planned Program (Summary)

Program # 4

1. Name of the Planned Program

Weed Science

V(B). Program Knowledge Area(s)

1. Program Knowledge Areas and Percentage

KA Code	Knowledge Area	%1862 Extension	%1890 Extension	%1862 Research	%1890 Research
213	Weeds Affecting Plants	0%		50%	
215	Biological Control of Pests Affecting Plants	0%		20%	
216	Integrated Pest Management Systems	0%		30%	
	Total	0%		100%	

V(C). Planned Program (Inputs)

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

Year: 2009	Extension		Research	
	1862	1890	1862	1890
Plan	0.0	0.0	4.0	0.0
Actual	0.0	0.0	4.0	0.0

2. Actual dollars expended in this Program (includes Carryover Funds from previous years)

Extension		Research	
Smith-Lever 3b & 3c	**1890 Extension**	**Hatch**	**Evans-Allen**
0	0	148800	0
1862 Matching	**1890 Matching**	**1862 Matching**	**1890 Matching**
0	0	223200	0
1862 All Other	**1890 All Other**	**1862 All Other**	**1890 All Other**
0	0	0	0

V(D). Planned Program (Activity)

1. Brief description of the Activity

1. Evaluate new herbicides, herbicide formulations, and new adjuvants

2. Determine antagonisms between herbicides

3. Determine better methods for applying herbicides

4. Determine the prevalence of herbicide resistant weeds

2. Brief description of the target audience

1. Producers
2. Crop consultants
3. Extension state specialists and county educators
4. Commodity groups
5. Personnel in agribusiness and agrifinance
6. Personnel working for government agencies

V(E). Planned Program (Outputs)

1. Standard output measures

2009	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Plan	0	0	0	0
Actual	26110	230250	60	150

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

Year: 2009
Plan: 0
Actual: 0

Patents listed

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

2009	Extension	Research	Total
Plan	2	5	
Actual	5	12	17

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

- {No Data Entered}

V(G). State Defined Outcomes

V. State Defined Outcomes Table of Content

O. No.	OUTCOME NAME
1	Changes in weed science research priorities that match needs
2	Yearly updating of Weed Control Guide to reflect new herbicides and knowledge gained through research
3	Number of teams working together to develop solutions
4	Development of enhanced weed-management strategies that incorporate knowledge gained on the biology of weeds
5	Improved control of invasive perennial weeds using integrated methods
6	Delayed evolution of herbicide-resistant weeds
7	Estimated dollar value weed-control brings to North Dakota
8	Percent of producers that utilize our recommendations
9	Number of growers who plant glyphosate-resistant crops and agronomists with increased knowledge about glyphosate-resistant weeds through grower and allied industry meetings, seminars, workshops, and field days.

Outcome #1

1. Outcome Measures

Changes in weed science research priorities that match needs

Not Reporting on this Outcome Measure

Outcome #2

1. Outcome Measures

Yearly updating of Weed Control Guide to reflect new herbicides and knowledge gained through research

Not Reporting on this Outcome Measure

Outcome #3

1. Outcome Measures

Number of teams working together to develop solutions

Not Reporting on this Outcome Measure

Outcome #4

1. Outcome Measures

Development of enhanced weed-management strategies that incorporate knowledge gained on the biology of weeds

Not Reporting on this Outcome Measure

Outcome #5

1. Outcome Measures

Improved control of invasive perennial weeds using integrated methods

2. Associated Institution Types

- 1862 Research

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2009	1	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done

Results

4. Associated Knowledge Areas

KA Code	Knowledge Area
213	Weeds Affecting Plants
215	Biological Control of Pests Affecting Plants
216	Integrated Pest Management Systems

Outcome #6

1. Outcome Measures

Delayed evolution of herbicide-resistant weeds

Not Reporting on this Outcome Measure

Outcome #7

1. Outcome Measures

Estimated dollar value weed-control brings to North Dakota

Not Reporting on this Outcome Measure

Outcome #8

1. Outcome Measures

Percent of producers that utilize our recommendations

Not Reporting on this Outcome Measure

Outcome #9

1. Outcome Measures

Number of growers who plant glyphosate-resistant crops and agronomists with increased knowledge about glyphosate-resistant weeds through grower and allied industry meetings, seminars, workshops, and field days.

2. Associated Institution Types

- 1862 Research

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2009	{No Data Entered}	720

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Greater than 90% of corn, soybean, and sugarbeet acreage in North Dakota are planted to glyphosate-resistant varieties. Glyphosate became the most used herbicide in North Dakota in 2004. The exclusive use of glyphosate in glyphosate-resistant crops has caused the selection of glyphosate-resistant weeds. Glyphosate-resistant common ragweed has been confirmed in North Dakota and glyphosate-resistant common lambsquarters is highly suspected. As glyphosate-resistant weeds increase, grower profits will decline due to the need to use additional herbicides to effectively control the resistant weeds.

What has been done
A video was developed to teach growers and the agricultural industry how to scout for the presence of glyphosate-resistant weeds. The video was shown at 12 winter meetings to 720 growers and industry personnel as part of several different presentations about herbicide resistance or weed control. During the presentation, audience response devices were used to collect information from the meeting participants concerning herbicide resistance.

Results
Fifty-three percent of meeting participants reported that glyphosate-resistant weeds were present at some frequency on the acres they manage or provide consultation. Meeting participants reported that 11% of the acres managed or consulted on have at least a few glyphosate-resistant plants present. After viewing the video, 95% of meeting participants reported having a better understanding of how to scout for the presence of glyphosate resistance. Eighty-five percent of meeting participants reported they would spend more time scouting for glyphosate resistance. North Dakota plants approximately 6,000,000 acres of corn, soybean, and sugarbeet. If 11% of this acreage has glyphosate-resistant weeds, then at least 660,000 acres must be managed differently to control resistant weeds and the remainder of the acreage should be managed differently to reduce the risk of resistance. If the average cost of an additional herbicide to control glyphosate-resistant weeds is $15.00/A, growers may need to spend at least an additional $9,900,000 to manage glyphosate-resistant weeds in the future. Education and improved management should reduce current and potential future costs to farmers.

4. Associated Knowledge Areas

KA Code	Knowledge Area
213	Weeds Affecting Plants
215	Biological Control of Pests Affecting Plants
216	Integrated Pest Management Systems

V(H). Planned Program (External Factors)

External factors which affected outcomes
- Natural Disasters (drought, weather extremes, etc.)
- Economy

Brief Explanation

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

1. Evaluation Studies Planned

- During (during program)

Evaluation Results

Described above.

Key Items of Evaluation

V(A). Planned Program (Summary)

Program # 5

1. Name of the Planned Program

Soil Science

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	60%		60%	
205	Plant Management Systems	40%		40%	
	Total	100%		100%	

V(C). Planned Program (Inputs)

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

Year: 2009	Extension		Research	
	1862	1890	1862	1890
Plan	1.0	0.0	3.0	0.0
Actual	1.0	0.0	3.0	0.0

2. Actual dollars expended in this Program (includes Carryover Funds from previous years)

Extension		Research	
Smith-Lever 3b & 3c	**1890 Extension**	**Hatch**	**Evans-Allen**
31200	0	111600	0
1862 Matching	**1890 Matching**	**1862 Matching**	**1890 Matching**
46800	0	167400	0
1862 All Other	**1890 All Other**	**1862 All Other**	**1890 All Other**
0	0	0	0

V(D). Planned Program (Activity)

1. Brief description of the Activity

N rate calibration research projects Update producer-oriented resource materials to reflect research results of N rate studies Present research results at workshops, field days and conferences Evaluate nitrate levels in waterways

2. Brief description of the target audience

Growers Soil testing laboratories Government agencies Federal land managers Consultants, agricultural industry staff, public

V(E). Planned Program (Outputs)

1. Standard output measures

2009	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Plan	3000	100000	100	5
Actual	3200	200000	100	50

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

Year: 2009
Plan: 0
Actual: 0

Patents listed

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

2009	Extension	Research	Total
Plan	2	3	
Actual	3	4	7

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

- {No Data Entered}

V(G). State Defined Outcomes

V. State Defined Outcomes Table of Content

O. No.	OUTCOME NAME
1	Number of individuals receiving individual assistance
2	Number of individuals decreasing excessive N use
3	Number of individuals using alternative N sources
4	Number of individuals implementing recommended action or practice
5	Continued decline of N in ground and surface water (%)
6	Estimated dollar value of adopted best management practices ($)
7	Less commercial N is used (%)
8	The number of acres of ND spring wheat and durum managed by trained growers.

Outcome #1

1. **Outcome Measures**

Number of individuals receiving individual assistance

Not Reporting on this Outcome Measure

Outcome #2

1. **Outcome Measures**

Number of individuals decreasing excessive N use

Not Reporting on this Outcome Measure

Outcome #3

1. **Outcome Measures**

Number of individuals using alternative N sources

Not Reporting on this Outcome Measure

Outcome #4

1. **Outcome Measures**

Number of individuals implementing recommended action or practice

Not Reporting on this Outcome Measure

Outcome #5

1. **Outcome Measures**

Continued decline of N in ground and surface water (%)

Not Reporting on this Outcome Measure

Outcome #6

1. **Outcome Measures**

Estimated dollar value of adopted best management practices ($)

Not Reporting on this Outcome Measure

Outcome #7

1. Outcome Measures

Less commercial N is used (%)

Not Reporting on this Outcome Measure

Outcome #8

1. Outcome Measures

The number of acres of ND spring wheat and durum managed by trained growers.

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2009	{No Data Entered}	6000000

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
North Dakota spring wheat and durum nitrogen recommendations were at least 30 years old. Cultural practices have changed, as well as grain and nitrogen fertilizer prices. The new recommendations were based on over 50 site-years of archived data from 1970 to 2004, along with over 50 site-years of data generated by Extension area agronomists and researchers at Research and Experiment Stations across North Dakota in concert with the state Extension Soil Specialist in Fargo. The resulting recommendations are a combination of grain yield/protein responses to soil available nitrogen, including soil test nitrate, with economic consideration of wheat price and N costs, adjustments for tillage system, previous crop N credits, and consideration of previous year straw load, nitrogen application method, soil characteristics and grower experiences. The recommendations also divide the state into three zones based on nitrogen response uniqueness between the regions, as well as dividing the recommendations into three productivity levels (low, medium and high) within each region. The recommendations are available on both a printed/web-available circular and in an interactive web-based calculator.

What has been done
The new recommendations were unveiled Dec. 1, 2009. Since then growers around the state have had the opportunity to attend over 30 presentations by the state Extension Soil Specialist and other Extension area agronomists and county educators detailing the logic and data behind the new recommendations and showing how to access the new process.

Results
Most growers and consultants who have attended the recommendation presentations have expressed positive feedback. The new recommendations will result in greater use of soil testing, and consideration of adjustments that many have not considered before the new recommendations and especially the web-interactive site were

available. The recommendations are useful for site-specific nutrient management due to their adjustments at the state, regional and local scale, as well as consideration of within-field productivity of soils and the emphasis on local soil testing. The recommendations should assist growers as wheat prices rise and fall, and the cost of nitrogen changes over years. The major soil testing laboratory in the region will refer its clients to the spring wheat and durum web-site for their recommendations.

4. Associated Knowledge Areas

KA Code	Knowledge Area
102	Soil, Plant, Water, Nutrient Relationships
205	Plant Management Systems

V(H). Planned Program (External Factors)

External factors which affected outcomes

- Other (none)

Brief Explanation

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

1. Evaluation Studies Planned

- Retrospective (post program)
- During (during program)

Evaluation Results

{No Data Entered}

Key Items of Evaluation

{No Data Entered}

V(A). Planned Program (Summary)

Program # 6

1. Name of the Planned Program

Sustainable Energy

V(B). Program Knowledge Area(s)

1. Program Knowledge Areas and Percentage

KA Code	Knowledge Area	%1862 Extension	%1890 Extension	%1862 Research	%1890 Research
403	Waste Disposal, Recycling, and Reuse	10%		10%	
511	New and Improved Non-Food Products and Processes	80%		80%	
512	Quality Maintenance in Storing and Marketing Non-Food Products	10%		10%	
	Total	100%		100%	

V(C). Planned Program (Inputs)

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

Year: 2009	Extension		Research	
	1862	1890	1862	1890
Plan	0.6	0.0	2.0	0.0
Actual	1.5	0.0	2.0	0.0

2. Actual dollars expended in this Program (includes Carryover Funds from previous years)

Extension		Research	
Smith-Lever 3b & 3c	**1890 Extension**	**Hatch**	**Evans-Allen**
46800	0	74400	0
1862 Matching	**1890 Matching**	**1862 Matching**	**1890 Matching**
70200	0	111600	0
1862 All Other	**1890 All Other**	**1862 All Other**	**1890 All Other**
0	0	0	0

V(D). Planned Program (Activity)

1. Brief description of the Activity

Identify bioenergy and sustainable energy research needs critical to North Dakota
Identify NDSU faculty, industries and other universities for collaboration
Expand bioenergy and sustainable energy research infrastructure and faculty expertise
Present results through publications and conference presentations
Educate through teaching and extension programming.

2. Brief description of the target audience

Farmers
Policymakers
Biomass processors
Equipment manufacturers
Peer researchers
Students
Public

V(E). Planned Program (Outputs)

1. Standard output measures

2009	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Plan	125	0	0	200
Actual	1125	0	0	0

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

Year: 2009
Plan: 0
Actual: 0

Patents listed

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

2009	Extension	Research	Total
Plan	0	4	
Actual	10	4	14

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

- {No Data Entered}

V(G). State Defined Outcomes

V. State Defined Outcomes Table of Content

O. No.	OUTCOME NAME
1	Number of faculty collaborations working on biofuels projects.
2	Number of proposals submitted for biofuels projects.
3	Number of graduate students working on biofuels projects.
4	Number of biofuels-related papers published by NDSU faculty.
5	Grant money received for biofuels research.
6	Increased demand for NDSU graduate students in academia/industry.
7	Increase in quality/quantity of student applicants in biofuels-related fields.
8	Biobased industries seek out NDSU faculty for collaborations on biofuels projects.
9	State and federal policymakers seek out NDSU faculty input.
10	Number of landowners with increased knowledge to make wind turbine leasing decisions, and to provide Extension educators and community leaders with increased knowledge on the policies and economics of wind energy.

Outcome #1

1. **Outcome Measures**

Number of faculty collaborations working on biofuels projects.

Not Reporting on this Outcome Measure

Outcome #2

1. **Outcome Measures**

Number of proposals submitted for biofuels projects.

Not Reporting on this Outcome Measure

Outcome #3

1. **Outcome Measures**

Number of graduate students working on biofuels projects.

Not Reporting on this Outcome Measure

Outcome #4

1. **Outcome Measures**

Number of biofuels-related papers published by NDSU faculty.

Not Reporting on this Outcome Measure

Outcome #5

1. **Outcome Measures**

Grant money received for biofuels research.

Not Reporting on this Outcome Measure

Outcome #6

1. **Outcome Measures**

Increased demand for NDSU graduate students in academia/industry.

Not Reporting on this Outcome Measure

Outcome #7

1. Outcome Measures

Increase in quality/quantity of student applicants in biofuels-related fields.

Not Reporting on this Outcome Measure

Outcome #8

1. Outcome Measures

Biobased industries seek out NDSU faculty for collaborations on biofuels projects.

Not Reporting on this Outcome Measure

Outcome #9

1. Outcome Measures

State and federal policymakers seek out NDSU faculty input.

Not Reporting on this Outcome Measure

Outcome #10

1. Outcome Measures

Number of landowners with increased knowledge to make wind turbine leasing decisions, and to provide Extension educators and community leaders with increased knowledge on the policies and economics of wind energy.

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2009	{No Data Entered}	1125

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Wind energy was forecast to rapidly expand across North Dakota and the Plains region in 2009-10. Rural landowners were being approached by developers and asked to sign complicated multi-year leases, some even into perpetuity and with confidentiality clauses that restricted peer learning and information sharing. Very few resources were available to assist landowners with their decision making. Given the rural presence of Extension

educators and the history of developing timely, unbiased educational programs, this appeared to be an important opportunity.

What has been done
Numerous meetings with landowners, Extension agents and community leaders were held across the state and region. Six two-hour webinars were created and broadcast over Adobe Connect on various wind energy topics. A wiki space served as a repository for educational materials. A wind energy site in the Farm Energy Community of Practice was developed in eXtension, and Extension publications and popular press releases were prepared.

Results
Direct participation at meetings averaged about 50 attendees. Numerous viewers downloaded online sessions with over 1,000 participating in some of the more popular sessions. A Frequently Asked Question (FAQ) category was created in eXtension to help answer the many recurring questions that were received. A result of the popular Extension programming was that a number of bills concerning wind energy development were introduced in the 2009 North Dakota legislative session with several passed into law.

4. Associated Knowledge Areas

KA Code	Knowledge Area
403	Waste Disposal, Recycling, and Reuse
511	New and Improved Non-Food Products and Processes
512	Quality Maintenance in Storing and Marketing Non-Food Products

V(H). Planned Program (External Factors)

External factors which affected outcomes

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

Brief Explanation

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

1. Evaluation Studies Planned

- Before-After (before and after program)
- During (during program)
- Time series (multiple points before and after program)
- Comparisons between program participants (individuals, group, organizations) and non-participants
- Comparisons between different groups of individuals or program participants experiencing different levels of program intensity.

Evaluation Results

{No Data Entered}

Key Items of Evaluation

{No Data Entered}

V(A). Planned Program (Summary)

Program # 7

1. Name of the Planned Program

Insect Management

V(B). Program Knowledge Area(s)

1. Program Knowledge Areas and Percentage

KA Code	Knowledge Area	%1862 Extension	%1890 Extension	%1862 Research	%1890 Research
211	Insects, Mites, and Other Arthropods Affecting Plants	55%		55%	
216	Integrated Pest Management Systems	40%		40%	
721	Insects and Other Pests Affecting Humans	5%		5%	
	Total	100%		100%	

V(C). Planned Program (Inputs)

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

Year: 2009	Extension		Research	
	1862	1890	1862	1890
Plan	2.0	0.0	4.0	0.0
Actual	2.0	0.0	5.0	0.0

2. Actual dollars expended in this Program (includes Carryover Funds from previous years)

Extension		Research	
Smith-Lever 3b & 3c	**1890 Extension**	**Hatch**	**Evans-Allen**
62400	0	186000	0
1862 Matching	**1890 Matching**	**1862 Matching**	**1890 Matching**
93600	0	279000	0
1862 All Other	**1890 All Other**	**1862 All Other**	**1890 All Other**
0	0	0	0

V(D). Planned Program (Activity)

1. Brief description of the Activity

Assess emerging pest issues Provide insect diagnostics Provide bio-based pest management systems Meet social and regulatory needs Evaluate activity effectiveness

2. Brief description of the target audience

Crop and animal agricultural producers Home owners Agribusiness Government and NGO agency personnel Medical professionals Crop consultants General public

V(E). Planned Program (Outputs)

1. Standard output measures

2009	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Plan	5000	100000	8000	0
Actual	5000	100000	8000	0

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

Patent Applications Submitted

Year: 2009
Plan: 0
Actual: 0

Patents listed

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

2009	Extension	Research	Total
Plan	75	20	
Actual	75	12	87

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

- {No Data Entered}

V(G). State Defined Outcomes

V. State Defined Outcomes Table of Content

O. No.	OUTCOME NAME
1	Pest alerts disseminated through various channels
2	Improved pest management practices based on currently available research knowledge
3	Relevant research and extension programs in entomology initiated
4	Conduct diagnostic insect identification review session with Plant Diagnostics Lab
5	Output materials made available to users
6	Accurate insect diagnostics and reporting integrated with Plant Diagnostics Lab, National Plant Diagnostic Network and others
7	Pest management technologies that meet social and regulatory constraints
8	Estimation of adoption rate of best pest management practices
9	Insect diagnostic capacity meeting national needs

Outcome #1

1. Outcome Measures

Pest alerts disseminated through various channels

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2009	550	10000

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Targeted audience includes extension professionals, producers, agribusiness professionals, crop consultants, researchers, state or federal agency workers, etc. Timely Extension newsletters and other media served a crucial role in the education of targeted audiences.

What has been done
A weekly newsletter called "Crop and Pest Report" is published through NDSU Extension Service during the field season and available as an electronic or hard copy newsletter. It is also posted to the NDSU Extension website. It covers several disciplines: entomology, plant pathology, weed science, soils & fertility, and agronomy, horticulturists and diagnosticians. Highlights include updates on pest problems (insects, diseases or weeds), agronomy and soil & fertility issues, horticulture/tree issues, pest diagnostics, regional area reports, and weather updates.

Results
A recent post-season survey indicated that readers have been subscribing to the NDSU Crop and Pest Report for over ten years and most readers found the articles easy to read and understand. Approximately 62% of the topics covered in the NDSU Crop and Pest Report influenced production practices and actions of reader in 2009. Overall, the NDSU Crop and Pest Report was rated as 'good to excellence' when compared to other sources of information.

4. Associated Knowledge Areas

KA Code	Knowledge Area
211	Insects, Mites, and Other Arthropods Affecting Plants
216	Integrated Pest Management Systems
721	Insects and Other Pests Affecting Humans

Outcome #2

1. Outcome Measures

Improved pest management practices based on currently available research knowledge

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2009	500	5000

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Targeted audience includes extension professionals, producers, agribusiness professionals, crop consultants, researchers, state or federal agency workers, etc. Wheat stem sawfly is a major insect pest of spring wheat, winter wheat and durum in North Dakota. Sawfly larvae feed inside the stem, which impairs grain development and may reduce grain protein. Mature larvae girdle the bases of plants, which results in lodging and further yield loss because it is difficult or impossible to harvest all lodged plants. North Dakota wheat growers lose an estimated $28-$70M annually to wheat stem sawfly. Because of its long flight period, insecticides are ineffective at controlling wheat stem sawfly. Other Integrated Pest Management (IPM) tactics are needed.

What has been done
NDSU Extension Entomology, in collaboration with NDSU REC extension personnel, Montana State University researchers, USDA-ARS researchers, ND and MT wheat commodity groups, and ND and MT wheat growers, held a Focus Group meeting in January 2010 to address current problems and summarize current research on wheat stem sawfly. We used this information to identify extension and research priorities and needs. Research presentations addressed IPM strategies for management of wheat stem sawfly, including use of solid-stemmed cultivars, insecticide efficacy, crop rotation, trap crops, cultivation, and conservation of native biological control agents.

Results
The dynamic interaction between extension, research, commodity groups and growers was essential in summarizing the current knowledge and pest management practices, and in identifying needs and priorities for all concerned stakeholders. Questions regarding sawfly management practices were asked before the research presentations and group discussions, and again at the end of the meeting: 1) 95% of growers are more likely to manage for sawfly, 2) 0% of growers will use insecticides for sawfly, compare with 8% before the meeting, 3) 55% of growers will use solid-stemmed varieties, compared with 12% before the meeting, 4) Growers will continue to use crop rotation as a management strategy, 5) 5% of growers will use a trap crop, compared with 0% before the meeting, and 6) 100% of growers will scout for sawfly, compared with 56% before the meeting. Applications of research through extension will result in: 1) Better prediction and identification of sawfly problem areas, 2) Less economic loss due to wheat stem sawfly, 3) Improved wheat cultivars with sawfly resistance, 4) Increased wheat yields, 5) Savings in pesticide applications that are not effective, and 6) Implementation of the best sawfly management strategies.

4. Associated Knowledge Areas

KA Code	Knowledge Area
211	Insects, Mites, and Other Arthropods Affecting Plants
216	Integrated Pest Management Systems

Outcome #3

1. Outcome Measures

Relevant research and extension programs in entomology initiated

Not Reporting on this Outcome Measure

Outcome #4

1. Outcome Measures

Conduct diagnostic insect identification review session with Plant Diagnostics Lab

Not Reporting on this Outcome Measure

Outcome #5

1. Outcome Measures

Output materials made available to users

Not Reporting on this Outcome Measure

Outcome #6

1. Outcome Measures

Accurate insect diagnostics and reporting integrated with Plant Diagnostics Lab, National Plant Diagnostic Network and others

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2009	14000	1000

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Targeted audience includes citizens, general public, extension professionals, producers, agribusiness professionals, crop consultants, researchers, state or federal agency workers, etc. Accurate identification of insects and other arthropods is critical in agricultural, horticultural, forest, urban and medical situations. Misidentifications can have serious environmental and human health consequences, as well as negative economic impacts.

What has been done
NDSU Extension Entomology provides insect and arthropod diagnostic services to the general public free of charge. We utilize the North Dakota Insect Reference Collection (NDIRC) housed in the Department of Entomology, as well as the taxonomic expertise of NDSU Extension Entomology and Insect Systematics Laboratory personnel. We also participate in the National Plant Diagnostics Network (NPDN), which functions as a front-line defense against invasive exotic pests by providing a coherent network of pest identification laboratories at state and federal institutions, and an efficient response program in case of detection of exotic pests.

Results
Approximately 300 insect and other arthropod samples are submitted to NDSU Extension Entomology for identification each year. These range from mere curiosity to important agricultural, horticultural, urban and medical species. For the agricultural, forest and horticulture, accurate species identification is pertinent for finding the best pest management solutions, and mitigating losses from insect pests. This also has environmental and human health benefits by eliminating needless pesticide applications and applicator exposure. Many of the identifications are household pests from concerned homeowners and commercial pest control experts. Regional hospitals and clinics also routinely submit specimens, particularly ticks, for identification. Accurate identification of species of medical importance is critical to human health and well-being of affected patients. Especially in the case of ticks, accurate identification means distinguishing those species which vector human diseases (such as Lyme disease) from those species that do not. Accurate identification allows medical personnel to make informed and timely decisions regarding patient testing and treatment.

4. Associated Knowledge Areas

KA Code	Knowledge Area
211	Insects, Mites, and Other Arthropods Affecting Plants
216	Integrated Pest Management Systems
721	Insects and Other Pests Affecting Humans

Outcome #7

1. Outcome Measures

Pest management technologies that meet social and regulatory constraints

Not Reporting on this Outcome Measure

Outcome #8

1. Outcome Measures

Estimation of adoption rate of best pest management practices

Not Reporting on this Outcome Measure

Outcome #9

1. Outcome Measures

Insect diagnostic capacity meeting national needs

Not Reporting on this Outcome Measure

V(H). Planned Program (External Factors)

External factors which affected outcomes

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

Brief Explanation

Decreased funding and personnel, social and regulatory constraints to pest management practices, economic conditions, invasive species, climate and farming practice change.

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

1. Evaluation Studies Planned

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

Evaluation Results

See specific outcomes above.

Key Items of Evaluation

V(A). Planned Program (Summary)

Program # 8

1. Name of the Planned Program

Center for Nutrition and Pregnancy

V(B). Program Knowledge Area(s)

1. Program Knowledge Areas and Percentage

KA Code	Knowledge Area	%1862 Extension	%1890 Extension	%1862 Research	%1890 Research
301	Reproductive Performance of Animals	0%		40%	
302	Nutrient Utilization in Animals	0%		40%	
305	Animal Physiological Processes	0%		10%	
702	Requirements and Function of Nutrients and Other Food Components	0%		10%	
	Total	0%		100%	

V(C). Planned Program (Inputs)

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

Year: 2009	Extension		Research	
	1862	1890	1862	1890
Plan	0.0	0.0	4.0	0.0
Actual	0.0	0.0	4.0	0.0

2. Actual dollars expended in this Program (includes Carryover Funds from previous years)

Extension		Research	
Smith-Lever 3b & 3c	**1890 Extension**	**Hatch**	**Evans-Allen**
0	0	148800	0
1862 Matching	**1890 Matching**	**1862 Matching**	**1890 Matching**
0	0	223200	0
1862 All Other	**1890 All Other**	**1862 All Other**	**1890 All Other**
0	0	0	0

V(D). Planned Program (Activity)

1. Brief description of the Activity

Research projects Train students Publish research Secure funding Develop recommendations Identify emerging trends and issues Improve methodology Collaborate

2. Brief description of the target audience

Students: graduate and under-graduate Livestock producers Human health professionals Scientific peer

groups Policy and agency influences Media professionals

V(E). Planned Program (Outputs)

1. Standard output measures

2009	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Plan	0	0	0	0
Actual	500	0	0	0

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

Year: 2009
Plan: 0
Actual: 0

Patents listed

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

2009	Extension	Research	Total
Plan	0	14	
Actual	0	22	22

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

- {No Data Entered}

V(G). State Defined Outcomes

V. State Defined Outcomes Table of Content

O. No.	OUTCOME NAME
1	Numbers of producers with enhanced knowledge from livestock programming events
2	Number of grant requests for multidisciplinary educational, extension and research collaborative activities
3	Number of visiting scientists to the NDSU Department of Animal and Range Sciences
4	Monitor cases of pregnancy-based metabolic diseases
5	Monitor North Dakota agricultural statistics to measure pregnancy rates of North Dakota livestock operations
6	The number of individuals including the beef and sheep industry and other scientists receiving information on the development of sustainable agricultural practices where maternal nutrition during pregnancy increases the nutrient and reproductive efficiency of their offspring.

Outcome #1

1. **Outcome Measures**

   Numbers of producers with enhanced knowledge from livestock programming events

   Not Reporting on this Outcome Measure

Outcome #2

1. **Outcome Measures**

   Number of grant requests for multidisciplinary educational, extension and research collaborative activities

   Not Reporting on this Outcome Measure

Outcome #3

1. **Outcome Measures**

   Number of visiting scientists to the NDSU Department of Animal and Range Sciences

   Not Reporting on this Outcome Measure

Outcome #4

1. **Outcome Measures**

   Monitor cases of pregnancy-based metabolic diseases

   Not Reporting on this Outcome Measure

Outcome #5

1. **Outcome Measures**

   Monitor North Dakota agricultural statistics to measure pregnancy rates of North Dakota livestock operations

   Not Reporting on this Outcome Measure

Outcome #6

1. **Outcome Measures**

   The number of individuals including the beef and sheep industry and other scientists receiving information on the development of sustainable agricultural practices where maternal nutrition during pregnancy increases the nutrient and reproductive efficiency of their offspring.

2. **Associated Institution Types**

- 1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2009	{No Data Entered}	500

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Maternal nutrition during pregnancy has shown to influence the growth and development of the conceptus. In order to have healthy, productive livestock, proper fetal development is needed. Our long-term goal is to understand the specific nutrients and the specific time those nutrients are needed to be available to the dam to achieve healthy offspring. Specifically, we are studying how the maternal diet can influence the growth and development of nutrient transferring tissues which include the placenta, the mammary gland, and the gastrointestinal tract in ruminants.

What has been done
We have developed several models where the initiation and the duration of both nutrient restrictions (simulating drought conditions) and nutrient excess (a common management issue) can influence the development of the ovine placenta, mammary gland, and gastrointestinal tract. Moreover, we have evaluated the impacts of supranutritional selenium and nutritional intake on milk production and offspring performance. Models of twinning, age at first mating, and genotype have also been performed to determine how maternal factors can influence fetal growth.

Results
In ewe lambs, maternal nutritional intake does impact birth weight. Lambs born to restricted or overnourished ewes were lighter than to lambs born from adequately fed dams. Moreover, colostrum yield was decreased in both restricted and overnourished dams. However, milk production was similar between overnourished and adequately fed controls, but restricted dams did not catch up in milk production. Lambs born from dams that were restricted or overnourished were still lighter at weaning, even though they were raised independent of their dam. There was a higher mortality rate in lambs born from overnourished dams compared to those from restricted or control dams. Growth from weaning until market weight was similar. These research results will assist the sheep industry to improve their efficiency and profitability. Recent studies are also utilizing protein supplementation during the last trimester in pregnancy. It is known that protein levels in the diet may influence uterine and/or umbilical blood flow to the developing fetus. In a small pilot study, protein restriction increased maternal blood pressure and in vitro studies indicate a potential to have a decreased vasodilation. Future studies are underway to determine how this may influence offspring performance.

4. Associated Knowledge Areas

KA Code	Knowledge Area
301	Reproductive Performance of Animals
302	Nutrient Utilization in Animals
305	Animal Physiological Processes
702	Requirements and Function of Nutrients and Other Food Components

V(H). Planned Program (External Factors)

External factors which affected outcomes

- Economy

Brief Explanation

Low livestock prices and high input costs of productions limit the profitability of livestock ranchers. Production practices that increase production efficiency are needed so ranchers can stay in business.

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

1. Evaluation Studies Planned

- After Only (post program)

Evaluation Results

Key Items of Evaluation

V(A). Planned Program (Summary)

Program # 9

1. Name of the Planned Program

Nutrition of Grazing Livestock

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	50%		50%	
302	Nutrient Utilization in Animals	50%		50%	
	Total	100%		100%	

V(C). Planned Program (Inputs)

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

Year: 2009	Extension		Research	
	1862	1890	1862	1890
Plan	6.0	0.0	0.0	0.0
Actual	7.0	0.0	2.0	0.0

2. Actual dollars expended in this Program (includes Carryover Funds from previous years)

Extension		Research	
Smith-Lever 3b & 3c	**1890 Extension**	**Hatch**	**Evans-Allen**
218400	0	74400	0
1862 Matching	**1890 Matching**	**1862 Matching**	**1890 Matching**
327600	0	111600	0
1862 All Other	**1890 All Other**	**1862 All Other**	**1890 All Other**
0	0	0	0

V(D). Planned Program (Activity)

1. Brief description of the Activity

Develop presentation materials Develop resource material Provide presentations and workshops Translate scientific and technical materials into lay materials Identify emerging issues Evaluate effectiveness of activities

2. Brief description of the target audience

Livestock producers 4-H youth Feed and pharmaceutical industry personnel Government agency personnel Veterinarians

V(E). Planned Program (Outputs)

1. Standard output measures

2009	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Plan	400	1500	0	0
Actual	550	15000	150	1000

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

Patent Applications Submitted

Year: 2009
Plan: 0
Actual: 0

Patents listed

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

2009	Extension	Research	Total
Plan	1	0	
Actual	1	15	16

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

- {No Data Entered}

V(G). State Defined Outcomes

V. State Defined Outcomes Table of Content

O. No.	OUTCOME NAME
1	Number of individuals receiving training and education
2	Number of individuals demonstrating increase in subject knowledge and skills
3	Number of producers implementing recommended actions or practices
4	Number of producers participating in government cost-share programs for range conservation
5	Estimated cost of production for North Dakota cattle ranches
6	Number of ranches implementing range management practices
7	North Dakota beef producers receiving current information on the use of ethanol byproducts as feed in their rations.

Outcome #1

1. **Outcome Measures**

Number of individuals receiving training and education

Not Reporting on this Outcome Measure

Outcome #2

1. **Outcome Measures**

Number of individuals demonstrating increase in subject knowledge and skills

Not Reporting on this Outcome Measure

Outcome #3

1. **Outcome Measures**

Number of producers implementing recommended actions or practices

Not Reporting on this Outcome Measure

Outcome #4

1. **Outcome Measures**

Number of producers participating in government cost-share programs for range conservation

Not Reporting on this Outcome Measure

Outcome #5

1. **Outcome Measures**

Estimated cost of production for North Dakota cattle ranches

Not Reporting on this Outcome Measure

Outcome #6

1. **Outcome Measures**

Number of ranches implementing range management practices

Not Reporting on this Outcome Measure

Outcome #7

1. Outcome Measures

North Dakota beef producers receiving current information on the use of ethanol byproducts as feed in their rations.

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2009	{No Data Entered}	150

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Distiller's grains and distiller's solubles are byproducts of the fuel ethanol industry and economical feed resources for cattleman in areas where corn distilleries produce fuel ethanol. The limitation to inclusion of these products in the diets of cattle is the amount of sulfur in them. Sulfur occurs naturally in corn grain and is concentrated approximately 3-fold in the byproducts. Sulfur is also added at the plants as part of the process of converting starch to ethanol. In the rumen of cattle and sheep, dietary sulfur can be reduced chemically to sulfide by sulfate-reducing bacteria and released as hydrogen sulfide, a toxic gas. Sulfide can cause polioencephalomalacia, a central nervous system disorder, in cattle and sheep. This leads to both loss of production and increased death loss.

What has been done
NDSU research has characterized the effects of dietary incorporation of distiller's grains plus solubles on production outcomes in cattle, such as intake, gain, and gain efficiency. NDSU research has also assessed the production and timing of sulfide release in the rumen after distiller's grains plus solubles have been added to diets of both cattle and sheep. Finally, NDSU research has measured the impact of distiller's grains plus solubles on the quality attributes of meat from cattle fed distiller's grains.

Results
The incorporation of distiller's grains plus solubles into diet of cattle improves the ruminal environment from the standpoint of organic matter fermented in the rumen. This in turn generally improves intake, gain, and gain efficiency of the cattle. NDSU research has demonstrated that ruminal sulfur reduction is slow when cattle are fed primarily forage-based diets. As the diet includes more grain or distiller's grains, sulfide production rate increases. Incidence of polioencephalomalacia has been reported to peak about 4 weeks after introduction of dietary distiller's grains. Our research has not measured a change in ruminal gas cap sulfide concentrations to correlate to this change, although sulfide production rates in vivo are approaching maximum at this time. Although thiamine has been included in rations as a possible treatment for reducing the incidence of polioencephalomalicia, we have not found a response to feeding thiamine. Finally, quality attributes of meat from cattle fed distiller's grains has not been different from those that were not fed distiller's grains. Because distiller's grains are sold at a discount of approximately 5% to corn, cattle producers that feed corn will realize decreased feed costs and cost of gain by feeding more distiller's grains if biological upper limits can be increased. This research information is currently being transferred to beef producers in North Dakota.

4. Associated Knowledge Areas

KA Code	Knowledge Area
302	Nutrient Utilization in Animals

V(H). Planned Program (External Factors)

External factors which affected outcomes

- Economy

Brief Explanation

The increasing availability of byproducts from the ethanol industry has increased interest in using these materials as livestock feed because of their lower cost.

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

1. Evaluation Studies Planned

- After Only (post program)

Evaluation Results

Key Items of Evaluation

V(A). Planned Program (Summary)

Program # 10

1. Name of the Planned Program

Food Safety

V(B). Program Knowledge Area(s)

1. Program Knowledge Areas and Percentage

KA Code	Knowledge Area	%1862 Extension	%1890 Extension	%1862 Research	%1890 Research
504	Home and Commercial Food Service	75%		0%	
712	Protect Food from Contamination by Pathogenic Microorganisms, Parasites, and Naturally Occurring Toxins	25%		0%	
	Total	100%		0%	

V(C). Planned Program (Inputs)

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

Year: 2009	Extension		Research	
	1862	1890	1862	1890
Plan	7.0	0.0	0.0	0.0
Actual	7.0	0.0	0.0	0.0

2. Actual dollars expended in this Program (includes Carryover Funds from previous years)

Extension		Research	
Smith-Lever 3b & 3c	**1890 Extension**	**Hatch**	**Evans-Allen**
218400	0	0	0
1862 Matching	**1890 Matching**	**1862 Matching**	**1890 Matching**
327600	0	0	0
1862 All Other	**1890 All Other**	**1862 All Other**	**1890 All Other**
0	0	0	0

V(D). Planned Program (Activity)

1. Brief description of the Activity

Implement programs for children and adults based on Fight BAC, Thermy, Produce Safety and BAC Down campaigns; USDA food preservation rules; and implement food safety programs for foodservice and processors (ServSafe, TAPS, HACCP).

2. Brief description of the target audience

Children in school and youth program settings

Teen food handlers in high school and community

Adults in home settings

Volunteer food handlers in community settings

Professionals in foodservice and food processing environments

V(E). Planned Program (Outputs)

1. Standard output measures

2009	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Plan	26000	410000	3600	24000
Actual	5500	400000	4000	50000

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

Year: 2009
Plan: 0
Actual: 0

Patents listed

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

2009	Extension	Research	Total
Plan	0	0	
Actual	7	1	8

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

- {No Data Entered}

V(G). State Defined Outcomes

V. State Defined Outcomes Table of Content

O. No.	OUTCOME NAME
1	Based on post-surveys, 75 percent of children participating in handwashing classes will report intentions to wash hands properly
2	Based on post-surveys, 50 percent of teens will report changes in food handling practices to reduce risk of foodborne illness outbreaks
3	Seventy-five percent of foodservice and food industry participants in ServSafe, HACCP or other food sanitation courses will pass the examination.
4	Based on post-surveys, 50 percent of adult participants in consumer food safety classes will report intent to change one or more food handling behaviors.

Outcome #1

1. Outcome Measures

Based on post-surveys, 75 percent of children participating in handwashing classes will report intentions to wash hands properly

Not Reporting on this Outcome Measure

Outcome #2

1. Outcome Measures

Based on post-surveys, 50 percent of teens will report changes in food handling practices to reduce risk of foodborne illness outbreaks

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2009	1200	1500

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
"Teens Serving Food Safely" is a statewide NDSU Extension Service food safety education effort designed to improve young food handlers' food safety knowledge and skills and decrease risk of foodborne illness outbreaks associated with food service establishments. According to a 2002 U.S. Department of Labor report, 22% of employed 15- to 17- year olds work in eating and drinking establishments. According to the National Restaurant Association pocket fact book, "32 percent of adults got their first job experience in a restaurant." The average cost is $1,850 per person each time a person is sickened by foodborne illness.

What has been done
The "Teens" curriculum consists of five lessons based on the Fight BAC(tm) and Thermy(tm) national food safety campaign concepts, with pre/post and follow-up evaluation procedures. Youth benefit from the curriculum's experiential learning model, obtaining information and tools to share with their families. Since 2003 more than 5,600 North Dakota teens have been trained and received completion certificates.

Results
Since 2003, on average, knowledge scores increased from 53% on the pre-test to 84% on the post-test. About 58% of participants had been involved in the preparation of food for the public, and 90% prepare food for themselves or others every week. On the one-month follow up survey 66% were more careful about cleaning and sanitizing, 50% had shared their knowledge about food safety with others, 81% reported washing their hands more often when preparing food and 37% have applied their knowledge when serving food for the public.

4. Associated Knowledge Areas

KA Code	Knowledge Area

504	Home and Commercial Food Service
712	Protect Food from Contamination by Pathogenic Microorganisms, Parasites, and Naturally Occurring Toxins

Outcome #3

1. Outcome Measures

Seventy-five percent of foodservice and food industry participants in ServSafe, HACCP or other food sanitation courses will pass the examination.

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2009	50	75

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
In North Dakota the food service industry accounts for $700 million in sales, according to www.ndhospitality.com, which also reports there were 34,800 restaurant and food service workers in North Dakota. For every $1 spent in North Dakota's restaurants an additional 86 cents in sales is generated for North Dakota's economy. Quantity food preparation presents unique challenges for safe food handling and preparation. In this environment, more attention has been placed on the development and implementation of safe food handling guidelines. As a result, there is high demand for training and educational materials in food safety.

What has been done
ServSafe Food Safety Certification and HACCP certification programs have been conducted for foodservice managers and for members of the food industry. ServSafe is a nationally recognized food safety training program of the National Restaurant Association, with a standardized examination. HACCP Alliance certification programs have been conducted for the food processing industry, in partnership with the North Dakota Department of Animal and Range Sciences and the North Dakota Department of Agriculture meat inspection program.

Results
From 2004 to present, 241 restaurant managers and kitchen staff have attended and passed the certification examination. These same managers reported training 2,348 restaurant workers and serving thousands of people in their facility every day. About 85 percent of participants passed the national exam. On post-surveys, about 97 percent will train others about the importance of handwashing, and 93 percent plan to wash their hands more often when preparing food. Among those in direct foodservice management positions, 90 percent indicated they would store chemicals separate from food. About 91 percent will check the sanitizer concentration, 93 percent will take additional steps to avoid cross-contamination, 88 percent will teach others how to avoid cross-contamination, 90 percent will teach others to cool foods more quickly using ice baths, shallow pans and other techniques, 88 percent will teach others how to use a thermometer, 91 percent will use a food thermometer more often, and 95 percent will explain the importance of understanding food allergies to their foodservice workers. Nearly 98 percent will apply what they learned at home.

4. Associated Knowledge Areas

KA Code	Knowledge Area
504	Home and Commercial Food Service
712	Protect Food from Contamination by Pathogenic Microorganisms, Parasites, and Naturally Occurring Toxins

Outcome #4

1. Outcome Measures

Based on post-surveys, 50 percent of adult participants in consumer food safety classes will report intent to change one or more food handling behaviors.

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2009	20000	807

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Grilling is a popular cooking method, especially in the summer months, although some people grill year-round. Grilling is one of the healthier methods of preparing food, however food safety issues, including quality issues and lack of use of thermometers, have been cited as issues.

What has been done
Grilling is a popular cooking method, especially in the summer months, although some people grill year-round. Grilling is one of the healthier methods of preparing food, however food safety issues, including quality issues and lack of use of thermometers, have been cited as issues.

Results
Participants in the Barbeque Boot Camps increased their knowledge and indicated they will change their behavior. The average score of meat preparation knowledge on the pre-survey was 74%. After attending the Boot Camp event, the average score on the post-survey was 91%. When asked "Do you plan to use a meat thermometer when grilling?", 29% responded "Never" prior to Boot Camp as opposed to only 6% reporting they will "never" use a thermometer when grilling after attending BBQ Boot Camp. In a six-month follow-up survey, preliminary results for the final post test show that consumers retained 90% of the information from BBQ Boot Camps in 2009. Participants have reported that that they use meat thermometers and know what temperatures are safe to cook different products to, such as ground beef and pork.

4. Associated Knowledge Areas

KA Code	Knowledge Area
504	Home and Commercial Food Service
712	Protect Food from Contamination by Pathogenic Microorganisms, Parasites, and Naturally Occurring Toxins

V(H). Planned Program (External Factors)

External factors which affected outcomes

- Competing Public priorities

Brief Explanation

External factors, including flooding, did not affect the outcomes significantly.

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

1. Evaluation Studies Planned

- Case Study

Evaluation Results

Foodborne illness and food safety risks pose health threats to everyone, including international college students who migrate to the United States and encounter new or unfamiliar foods. A survey assessed the prevalence of self-reported foodborne illness among international college students by cultural region and length of time they have lived in the United States. Eight land grant institutions were contacted for participation. Directors of international students and scholars (ISS) programs at participating institutions agreed to forward a link containing an online survey to international students enrolled at their respective universities. Cross-tabulations were used to determine percentages of self-reported foodborne illness and other food safety risks among respondents by cultural regions and length of time lived in the U.S.

Results indicated that 29% respondents self-reported they have been sick due to foodborne illness within the past year in the U.S.; 10% have sought medical attention, and 3.2% have reported a suspected foodborne illness; and 31% and 30%, respectively, have avoided particular restaurants or foods for fear of foodborne illness. Foodborne illness may be a concern among international college students in the U.S. Educators could focus efforts on reaching international college students with appropriate food safety messages during their early stages of acculturation to mitigate risks of foodborne illness. As a result, a "global food safety" Web site and series of fact sheets were created and are being evaluated and disseminated through international student offices.

Key Items of Evaluation

V(A). Planned Program (Summary)

Program # 11

1. Name of the Planned Program

Childhood Obesity

V(B). Program Knowledge Area(s)

1. Program Knowledge Areas and Percentage

KA Code	Knowledge Area	%1862 Extension	%1890 Extension	%1862 Research	%1890 Research
703	Nutrition Education and Behavior	70%		0%	
724	Healthy Lifestyle	10%		0%	
806	Youth Development	20%		0%	
	Total	100%		0%	

V(C). Planned Program (Inputs)

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

Year: 2009	Extension		Research	
	1862	1890	1862	1890
Plan	8.0	0.0	0.0	0.0
Actual	8.0	0.0	0.0	0.0

2. Actual dollars expended in this Program (includes Carryover Funds from previous years)

Extension		Research	
Smith-Lever 3b & 3c	**1890 Extension**	**Hatch**	**Evans-Allen**
249600	0	0	0
1862 Matching	**1890 Matching**	**1862 Matching**	**1890 Matching**
374400	0	0	0
1862 All Other	**1890 All Other**	**1862 All Other**	**1890 All Other**
0	0	0	0

V(D). Planned Program (Activity)

1. Brief description of the Activity

Identify emerging issues
Translate scientific data
Develop lessons and curricula
Develop public campaigns
Promote changes in public policy
Train extension agents
Develop evaluation methodology
Analyze/report impacts

2. Brief description of the target audience

Youth - schools, afterschool, 4-H
Adults - homes, worksites, communities, people with chronic disease

V(E). Planned Program (Outputs)

1. Standard output measures

2009	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Plan	25000	420000	6000	24000
Actual	7500	450000	7500	50000

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

Year: 2009
Plan: 0
Actual: 0

Patents listed

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

2009	Extension	Research	Total
Plan	3	1	
Actual	4	1	5

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

- {No Data Entered}

V(G). State Defined Outcomes

V. State Defined Outcomes Table of Content

O. No.	OUTCOME NAME
1	Based on follow-up surveys of adult participants in walking programs, 50 percent will report increased number of steps or minutes of walking
2	Based on follow-up surveys of adult participants in nutrition education programs, 25 percent will report a change in behavior to be more consistent with current nutrition recommendations based on MyPyramid
3	Based on follow-up surveys of parents of children participating in nutrition education programs, 25 percent of parents will report a family behavior change to be consistent with current recommendations
4	Based on post-surveys of children involved in multi-session nutrition/fitness classes, 25 percent of participants will report a change in nutrition or fitness behavior to be consistent with current MyPyramid recommendations
5	Based on program evaluations, 25 percent of adult participants will demonstrate an increased knowledge and an intent to change nutrition behavior, which may prevent disease or improve disease management.

Outcome #1

1. Outcome Measures

Based on follow-up surveys of adult participants in walking programs, 50 percent will report increased number of steps or minutes of walking

Not Reporting on this Outcome Measure

Outcome #2

1. Outcome Measures

Based on follow-up surveys of adult participants in nutrition education programs, 25 percent will report a change in behavior to be more consistent with current nutrition recommendations based on MyPyramid

Not Reporting on this Outcome Measure

Outcome #3

1. Outcome Measures

Based on follow-up surveys of parents of children participating in nutrition education programs, 25 percent of parents will report a family behavior change to be consistent with current recommendations

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2009	2200	3000

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
The home environment plays a role in the weight and overall health of a child. Eating meals as a family is associated with reducing risky behavior as well as improving communication and nutritional quality among children.

What has been done
Two curricula for youth ("Banking on Strong Bones" and "On the Move to Better Health") as well as a statewide "Eat Smart. Play Hard. Together" program have been implemented with parent nutrition education and evaluation. In addition a Web site, www.ndsu.edu/eatsmart, family mealtimes newsletters, magazine and a cookbook reaches families with MyPyramid information.

Results
Parent pre/post surveys were used in both of the curricula from 2007-09. On the parent post-survey, with 2,832 participants, for the "Banking on Strong Bones" curriculum, about 53% of parents reported positive changes in their child's eating habits as a result of this program. About 20% of parents reported that the family eats breakfast together the majority of the time, 97% reported the family eats the evening meal together the majority of the time,

and 73% reported eating meals together as a family five or more times per week. In the "On the Move" program, with 884 participants, 90% of the parents reported reading the newsletters and 74% used the information. About 69% of families set a goal each week; of those, 52% met their nutrition or fitness goal as a family. About 51% of parents reported an increase in their families' consumption of fruits and vegetables, and 28% reported an increase in consumption of dairy products. About 73% of parents reported eating family meals five or more times per week.

4. Associated Knowledge Areas

KA Code	Knowledge Area
703	Nutrition Education and Behavior
724	Healthy Lifestyle
806	Youth Development

Outcome #4

1. Outcome Measures

Based on post-surveys of children involved in multi-session nutrition/fitness classes, 25 percent of participants will report a change in nutrition or fitness behavior to be consistent with current MyPyramid recommendations

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2009	3600	3600

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Childhood obesity remains an issue of concern in the U.S., with some researchers considering children to be "overfed" but "undernourished." Diseases formerly associated with adults, including heart disease, are becoming more common among children.

What has been done
The overall goal of the "Eat Smart. Play Hard. Together." program is to increase knowledge and change behavior among children and their parents through the use of two curricula in elementary schools and in 4-H clubs. "Banking on Strong Bones" is a five-week, school-based educational intervention for fourth graders. The purpose is to increase knowledge and change behavior regarding calcium-rich foods and weight-bearing activities. "On the Move to Better Health" is a five-week school-based curriculum for fifth graders, which aims to increase fruits, vegetables and calcium-rich foods in the diets of children, as well as increase physical activity.

Results
From 2005-09, the "Banking on Strong Bones" five-lesson program has reached 4,334 children and their families. Students improved their knowledge scores and reported positive attitude and behavior changes toward consumption of dairy products. On the pre-survey, 48% reported drinking three or more glasses of milk the previous day, compared to 66% on the post-survey. On the pre-survey, 15% reported drinking soda pop every day, compared to 11% on the post-survey. About 92% reported planned to drink more milk. According to the

2007-10 surveys of 3,294 children in the five-week "On the Move to Better Health" program, about 54% reported increasing the amount of fruits and vegetables they consumed, 53% reported drinking more milk, 58% reported drinking less soda pop, 57% drank more water, 54% chose healthier snacks, and 63% increased the amount of physical activity. In 4-H youth programming, 22 4-H Clubs from six counties were recognized for participating in at least six "healthy activities" based on MyPyramid guidelines during regular meetings.

4. Associated Knowledge Areas

KA Code	Knowledge Area
703	Nutrition Education and Behavior
724	Healthy Lifestyle
806	Youth Development

Outcome #5

1. Outcome Measures

Based on program evaluations, 25 percent of adult participants will demonstrate an increased knowledge and an intent to change nutrition behavior, which may prevent disease or improve disease management.

Not Reporting on this Outcome Measure

V(H). Planned Program (External Factors)

External factors which affected outcomes

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

Brief Explanation

{No Data Entered}

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

1. Evaluation Studies Planned

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

Evaluation Results

{No Data Entered}

Key Items of Evaluation

{No Data Entered}

V(A). Planned Program (Summary)

Program # 12

1. Name of the Planned Program

Livestock Waste Management

V(B). Program Knowledge Area(s)

1. Program Knowledge Areas and Percentage

KA Code	Knowledge Area	%1862 Extension	%1890 Extension	%1862 Research	%1890 Research
112	Watershed Protection and Management	25%		0%	
133	Pollution Prevention and Mitigation	25%		0%	
403	Waste Disposal, Recycling, and Reuse	50%		0%	
	Total	100%		0%	

V(C). Planned Program (Inputs)

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

Year: 2009	Extension		Research	
	1862	1890	1862	1890
Plan	5.0	0.0	0.0	0.0
Actual	5.0	0.0	0.0	0.0

2. Actual dollars expended in this Program (includes Carryover Funds from previous years)

Extension		Research	
Smith-Lever 3b & 3c	**1890 Extension**	**Hatch**	**Evans-Allen**
156000	0	0	0
1862 Matching	**1890 Matching**	**1862 Matching**	**1890 Matching**
234000	0	0	0
1862 All Other	**1890 All Other**	**1862 All Other**	**1890 All Other**
0	0	0	0

V(D). Planned Program (Activity)

1. Brief description of the Activity

Develop presentation materials Develop resource material Provide presentations and workshops Translate scientific materials into lay materials Identify emerging issues Evaluate effectiveness of activities

2. Brief description of the target audience

Owners, managers and employees of animal operations Agribusiness and agrifinance personnel Government agency personnel

V(E). Planned Program (Outputs)

1. Standard output measures

2009	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Plan	400	400	0	0
Actual	800	2000	15	0

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

Patent Applications Submitted

Year: 2009
Plan: 0
Actual: 0

Patents listed

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

2009	Extension	Research	Total
Plan	2	0	
Actual	3	1	4

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

- {No Data Entered}

V(G). State Defined Outcomes

V. State Defined Outcomes Table of Content

O. No.	OUTCOME NAME
1	Number of individuals requesting information
2	Number of individuals demonstrating increase in subject knowledge and skills
3	Number of individuals implementing recommended action or practice
4	Number of individuals requesting assistance
5	Number of people trained to assist producers with nutrient management training
6	Estimated dollar value of adopted best management practices
7	Number of nutrient management plans implemented
8	Surface water quality monitoring data collected in watersheds before and after bmp implementation
9	Number of farmers and individuals who provide technical assistance to farmers with increased knowledge of manure best management practices to increase farm profitability and protect the environment.

Outcome #1

1. **Outcome Measures**

Number of individuals requesting information

Not Reporting on this Outcome Measure

Outcome #2

1. **Outcome Measures**

Number of individuals demonstrating increase in subject knowledge and skills

Not Reporting on this Outcome Measure

Outcome #3

1. **Outcome Measures**

Number of individuals implementing recommended action or practice

Not Reporting on this Outcome Measure

Outcome #4

1. **Outcome Measures**

Number of individuals requesting assistance

Not Reporting on this Outcome Measure

Outcome #5

1. **Outcome Measures**

Number of people trained to assist producers with nutrient management training

Not Reporting on this Outcome Measure

Outcome #6

1. **Outcome Measures**

Estimated dollar value of adopted best management practices

Not Reporting on this Outcome Measure

Outcome #7

1. Outcome Measures

Number of nutrient management plans implemented

Not Reporting on this Outcome Measure

Outcome #8

1. Outcome Measures

Surface water quality monitoring data collected in watersheds before and after bmp implementation

Not Reporting on this Outcome Measure

Outcome #9

1. Outcome Measures

Number of farmers and individuals who provide technical assistance to farmers with increased knowledge of manure best management practices to increase farm profitability and protect the environment.

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2009	{No Data Entered}	275

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
With the increased emphasis on handling manure in an environmentally friendly manner and the increase in cost of commercial fertilizer, producers are greatly interested in using livestock manure as a replacement for commercial fertilizer in crop production while protecting the environment. Manure can be a viable substitute for commercial fertilizer but management considerations must be taken into account such as nitrogen mineralization rate of the manure, timing of manure application and conservation management practices on fields targeted for manure use.

What has been done
A comprehensive educational program has been developed that integrates outcomes of manure utilization research with manure management best management practices (bmp's). Statewide educational programs were delivered in the classroom, on-farm at field days and in one-on-one consultation. Providers of technical information to farmers were also targeted in the educational programs as well as fellow extension educators. Using the feedback from these groups, complimentary manure management research was initiated to address concerns and issues.

Results

Farmers in three regions of the state have been engaged directly in an on-farm runoff monitoring project where their input is used to develop any needed manure management bmp's. This project has led to a strong partnership between the farmers who are involved, NDSU, the United States Geological Survey and the ND Dept. of Health and will not only lead to farmer derived manure bmp development but will have policy implications as well. Extension publications on manure spreader calibration, animal carcass disposal and feedlot management have been developed. Results of manure nitrogen mineralization research leading to changes in manure use recommendations were published in a refereed journal. In the past year, manure best management practices education was delivered at over 30 group meetings across the state. Impacts of these educational programs triggered television and radio interviews that enhanced statewide coverage of the educational goals. A website devoted solely to nutrient management education and research was developed and marketed to constituents. A case study on farmer adoption of manure composting was conducted and is in the process of being published. The livestock manure management of these targeted North Dakota farmers will be improved and will affect the manure from approximately 140,000 head of cattle annually. This manure will be spread on about 27,500 acres and has a fertilizer value of $1.5M of nitrogen, $1.2M of phosphorus, and $1.95M of potassium based on credits relative to commercial fertilizer sources. The net result of this project is improved utilization of this resource by crops, reduced environmental risks, and increased profits for North Dakota farmers.

4. Associated Knowledge Areas

KA Code	Knowledge Area
112	Watershed Protection and Management
133	Pollution Prevention and Mitigation
403	Waste Disposal, Recycling, and Reuse

V(H). Planned Program (External Factors)

External factors which affected outcomes

- Natural Disasters (drought, weather extremes, etc.)
- Competing Programmatic Challenges

Brief Explanation

North Dakota suffered extensive overland flooding in the spring of 2009. The flooding events forced alternative educational programming which took time away from the planned nutrient management programming.

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

1. Evaluation Studies Planned

- After Only (post program)
- Retrospective (post program)
- During (during program)
- Case Study

Evaluation Results

{No Data Entered}

Key Items of Evaluation

{No Data Entered}

V(A). Planned Program (Summary)

Program # 13

1. Name of the Planned Program

Citizenship and Leadership Development

V(B). Program Knowledge Area(s)

1. Program Knowledge Areas and Percentage

KA Code	Knowledge Area	%1862 Extension	%1890 Extension	%1862 Research	%1890 Research
806	Youth Development	100%		0%	
	Total	100%		0%	

V(C). Planned Program (Inputs)

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

Year: 2009	Extension		Research	
	1862	1890	1862	1890
Plan	2.0	0.0	0.0	0.0
Actual	2.0	0.0	0.0	0.0

2. Actual dollars expended in this Program (includes Carryover Funds from previous years)

Extension		Research	
Smith-Lever 3b & 3c	**1890 Extension**	**Hatch**	**Evans-Allen**
62400	0	0	0
1862 Matching	**1890 Matching**	**1862 Matching**	**1890 Matching**
93600	0	0	0
1862 All Other	**1890 All Other**	**1862 All Other**	**1890 All Other**
0	0	0	0

V(D). Planned Program (Activity)

1. Brief description of the Activity

Develop Leadership Training module

Contribution module to include how community service leads to belonging, independence, mastery and generosity

Future modules on youth involvement, diversity, civic engagement and teamwork

2. Brief description of the target audience

4-H youth

4-H youth leaders

4-H adult leaders

County extension staff

Other community organizations, councils and boards

V(E). Planned Program (Outputs)

1. Standard output measures

2009	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Plan	450	1500	300	1500
Actual	448	1600	450	1500

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

Year: 2009
Plan: 0
Actual: 0

Patents listed

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

2009	Extension	Research	Total
Plan	0	0	
Actual	0	0	0

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

- {No Data Entered}

V(G). State Defined Outcomes

V. State Defined Outcomes Table of Content

O. No.	OUTCOME NAME
1	Fifty percent of organized clubs will have someone complete contribution education/training.
2	Forty percent of clubs will do one or more community service projects.
3	Twenty-five percent of county 4-H leadership will participate in leadership education/training.
4	One hundred community service projects will be reported.
5	Fifty percent of county 4-H leadership will participate in leadership education/training.
6	Five percent of county 4-H leadership participating in leadership education/training will report more civic activism.
7	Fifty percent of clubs will report contributions to their community.
8	Seventy-five percent of county 4-H leadership will participate in leadership education/training.
9	Twenty-five percent of county 4-H leadership participating in leadership education/training will report more civic activism.
10	Number of leaders of 4-H clubs, youth and adults, who will lead service to community activities and participate in leadership development opportunities.

Outcome #1

1. **Outcome Measures**

Fifty percent of organized clubs will have someone complete contribution education/training.

Not Reporting on this Outcome Measure

Outcome #2

1. **Outcome Measures**

Forty percent of clubs will do one or more community service projects.

Not Reporting on this Outcome Measure

Outcome #3

1. **Outcome Measures**

Twenty-five percent of county 4-H leadership will participate in leadership education/training.

Not Reporting on this Outcome Measure

Outcome #4

1. **Outcome Measures**

One hundred community service projects will be reported.

Not Reporting on this Outcome Measure

Outcome #5

1. **Outcome Measures**

Fifty percent of county 4-H leadership will participate in leadership education/training.

Not Reporting on this Outcome Measure

Outcome #6

1. **Outcome Measures**

Five percent of county 4-H leadership participating in leadership education/training will report more civic activism.

Not Reporting on this Outcome Measure

Outcome #7

1. Outcome Measures

Fifty percent of clubs will report contributions to their community.

Not Reporting on this Outcome Measure

Outcome #8

1. Outcome Measures

Seventy-five percent of county 4-H leadership will participate in leadership education/training.

Not Reporting on this Outcome Measure

Outcome #9

1. Outcome Measures

Twenty-five percent of county 4-H leadership participating in leadership education/training will report more civic activism.

Not Reporting on this Outcome Measure

Outcome #10

1. Outcome Measures

Number of leaders of 4-H clubs, youth and adults, who will lead service to community activities and participate in leadership development opportunities.

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2009	{No Data Entered}	149

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Youth need opportunities to develop leadership and community skills and communities often have unmet service needs at food pantries, elder care facilities, parks, etc. 4-H programs have the reputation of developing leadership through service to communities. Depending on age of 4H members, needs in the community, and other leadership efforts, service projects can be developed to meet both needs. They can vary from simple cleanup efforts to supporting our military troops, elderly or other projects with more involved planning.

What has been done

Service projects by 4-H groups (clubs, teen leader groups, etc.) were focused on local needs, sometimes identified by the groups and sometimes by others in the community. Examples of projects this past year include food drives, assisting the elderly, community beautification, charities and local missions, support for the armed services, safety projects, recycling, donations for victims of natural disasters (tornado, flood), and cultural preservation/gifts.

Results

A total of 149 4-H clubs from 26 counties reported doing 326 service to community projects. Service to community efforts develop skills, concern for others, and community pride. These are traits which will serve the state and local communities well into the future. A previous survey of North Dakota 4-H club leaders regarding the perceptions and attitudes of youth participating in service to community generated statements like these. 1) Think of others. All people need help from others. Help where help is needed. 2) The value of community service in small communities. We learned how to work together to accomplish a task. 3) It can be fun and rewarding to help others. 4) Community pride. 5) Respect for the environment.

One club in Rolette County has taken an annual effort of highway cleanup and inspired greater community action. Comments from community members show their appreciation. "The youth...have become more conscious of taking care of their own litter and encouraging their friends to put their trash in the garbage receptacles. In recent years, other community groups have taken effort to organize the cleaning of roadways in other directions from town." Overall, participants in service to community projects grow in their ability to understand their community, recognize need, plan and carry out projects that benefit others. These attitudes and skills benefit youth in many other aspects of their lives.

4. Associated Knowledge Areas

KA Code	Knowledge Area
806	Youth Development

V(H). Planned Program (External Factors)

External factors which affected outcomes

- Natural Disasters (drought, weather extremes, etc.)
- Economy
- Other (recognized needs in the community)

Brief Explanation

Some of the projects became a need because of weather related events. Floods in the spring over many areas of the state created needs that may not have been evident otherwise. People struggling in a difficult economy created more need for food pantries and missions.

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

1. Evaluation Studies Planned

- Retrospective (post program)

Evaluation Results

Comments from adult volunteers observing the efforts of the young people doing service to community projects demonstrate the impact of involving youth in service activities. It will likely have a lifetime effect on their attitudes and behaviors. Comments on the value of the service projects indicate long term impacts: "Our children (become) aware that hunger exists essentially right in our backyard." "Kids gain an appreciation for what they have and understand that not everyone has everything they need."

Key Items of Evaluation

V(A). Planned Program (Summary)

Program # 14

1. Name of the Planned Program

Developing Leadership Systems

V(B). Program Knowledge Area(s)

1. Program Knowledge Areas and Percentage

KA Code	Knowledge Area	%1862 Extension	%1890 Extension	%1862 Research	%1890 Research
803	Sociological and Technological Change Affecting Individuals, Families, and Communities	50%		0%	
805	Community Institutions, Health, and Social Services	50%		0%	
	Total	100%		0%	

V(C). Planned Program (Inputs)

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

Year: 2009	Extension		Research	
	1862	1890	1862	1890
Plan	5.0	0.0	0.0	0.0
Actual	5.0	0.0	0.0	0.0

2. Actual dollars expended in this Program (includes Carryover Funds from previous years)

Extension		Research	
Smith-Lever 3b & 3c	**1890 Extension**	**Hatch**	**Evans-Allen**
156000	0	0	0
1862 Matching	**1890 Matching**	**1862 Matching**	**1890 Matching**
234000	0	0	0
1862 All Other	**1890 All Other**	**1862 All Other**	**1890 All Other**
0	0	0	0

V(D). Planned Program (Activity)

1. Brief description of the Activity

Rural Leadership North Dakota program
Horizons project
Leadership Plenty
Study Circles
Ethical Leadership
Generational Leadership

2. Brief description of the target audience

Youth, Schools, Elected officials, Community asset builders, Community collaborators, Association of Counties, Service groups, Governor's office, Chamber, Economic developers, Higher Education, SBARE, RLND, Soil Conservation Districts

V(E). Planned Program (Outputs)

1. Standard output measures

2009	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Plan	700	0	200	0
Actual	3222	5405	170	100

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

Patent Applications Submitted

Year: 2009
Plan: 0
Actual: 0

Patents listed

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

2009	Extension	Research	Total
Plan	2	0	
Actual	1	0	1

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

- {No Data Entered}

V(G). State Defined Outcomes

V. State Defined Outcomes Table of Content

O. No.	OUTCOME NAME
1	Number of community members who display leadership skills sets
2	Number of community members who understand how they can be involved in leadership roles
3	Number of people from ethnically diverse backgrounds involved
4	Number of community projects being accomplished and reported on
5	Number of individuals (including youth) involved in leadership programs that had no previous leadership experience
6	Number of youth involved as active partners with adults to complete a community project or address a community issue
7	The number of community plans developed and projects being accomplished within those plans in rural North Dakota communities.

Outcome #1

1. **Outcome Measures**

Number of community members who display leadership skills sets

Not Reporting on this Outcome Measure

Outcome #2

1. **Outcome Measures**

Number of community members who understand how they can be involved in leadership roles

Not Reporting on this Outcome Measure

Outcome #3

1. **Outcome Measures**

Number of people from ethnically diverse backgrounds involved

Not Reporting on this Outcome Measure

Outcome #4

1. **Outcome Measures**

Number of community projects being accomplished and reported on

Not Reporting on this Outcome Measure

Outcome #5

1. **Outcome Measures**

Number of individuals (including youth) involved in leadership programs that had no previous leadership experience

Not Reporting on this Outcome Measure

Outcome #6

1. **Outcome Measures**

Number of youth involved as active partners with adults to complete a community project or address a community issue

Not Reporting on this Outcome Measure

Outcome #7

1. Outcome Measures

The number of community plans developed and projects being accomplished within those plans in rural North Dakota communities.

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2009	{No Data Entered}	27

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
The foundation of community and economic development in North Dakota is local leadership, including the identification and development of current and emerging leaders, programs to strengthen leadership, and local capacity to enhance community self-sufficiency. These leaders work to sustain and grow rural North Dakota communities in a variety of ways but specific community projects help get many on board to impact public policy and potentially change the environment or the economy of their town.

What has been done
Three major programs have helped rural North Dakota communities have impact through project development and completion to sustain and grow these towns. These programs include Horizons, Rural Leadership North Dakota, and Beginning Again North Dakota. Horizons works to develop leaders in rural communities to address difficult community issues over an 18 month period. The Rural Leadership North Dakota (RLND) Program prepares and develops effective leaders to strengthen rural communities during an 18-month leadership development experience. RLND participants complete community projects during their experience. RLND Short-course participants complete a 20-hour leadership program. Short course participants work on community projects as part of their experience. Beginning Again North Dakota helps communities identify their assets and utilize them for project development in their town.

Results
Multiple projects are in progress or completed in rural North Dakota towns. Impactful examples include:
* A new Lakota Youth Council formed made up of students from grades 7-12. These individuals provide feedback to the city council on concerns of youth in Lakota and will have an impact on the city policies of the rural community of Lakota.
* The RLND participants from our third class increased the value of their North Dakota communities through their projects. Projects included raising $25,000 for new playground equipment in Ray; partnering with the city of Northwood to build a new $900,000 building that will house a business center; and securing an $8,000 grant to rehabilitate a home in New Town.
* Jamestown RLND Short Course participants improved the quality of life through their local projects including revitalizing the Jamestown Civic Center through partnerships with Jamestown College students conducting an economic impact study of the civic center, partnership with Jamestown High School Art students to paint sports murals on the civic center walls and partnership with the James Valley Career and Technology Center to make display cases for the Sports Hall of Fame located in the civic center.
* Involvement in Horizons, RLND, and other community development programs resulted in over 17,000 volunteers

involved with a total economic value of $259,445.
* The Beginning Again community of Tower City will re-open their gas station and restaurant in 2010 affecting the economic development of that town by adding another business.

4. Associated Knowledge Areas

KA Code	Knowledge Area
803	Sociological and Technological Change Affecting Individuals, Families, and Communities
805	Community Institutions, Health, and Social Services

V(H). Planned Program (External Factors)

External factors which affected outcomes

- Economy
- Public Policy changes
- Competing Public priorities
- Populations changes (immigration, new cultural groupings, etc.)
- Other (People not knowing where to go for help.)

Brief Explanation

Economy - individuals in North Dakota are often living with fewer resources and must get creative with resource procurement.

Public policy changes - a concern for more youth involvement across the state prompted Lakota especially to get youth involved in decision-making. North Dakota Governor John Hoeven started a youth council in the past year and this has prompted others to think about the retention of young people in the state.

Competing public priorities - there are more limitations on what the public system can provide as limited resources are available for programs and activities in the state due to challenging economic times. Community projects were developed to tackle many of these issues on their own.

Population change - population outmigration, especially youth.

People not knowing where to go for help - NDSU Extension can provide help to rural communities so they know what resources might be available for these community projects. Building a network across the state.

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

1. Evaluation Studies Planned

- Before-After (before and after program)
- During (during program)
- Other (blogging)

Evaluation Results

See results above.

Key Items of Evaluation

V(A). Planned Program (Summary)

Program # 15

1. Name of the Planned Program

Financial Security for All

V(B). Program Knowledge Area(s)

1. Program Knowledge Areas and Percentage

KA Code	Knowledge Area	%1862 Extension	%1890 Extension	%1862 Research	%1890 Research
801	Individual and Family Resource Management	100%		0%	
	Total	100%		0%	

V(C). Planned Program (Inputs)

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

Year: 2009	Extension		Research	
	1862	1890	1862	1890
Plan	3.0	0.0	0.0	0.0
Actual	3.0	0.0	0.0	0.0

2. Actual dollars expended in this Program (includes Carryover Funds from previous years)

Extension		Research	
Smith-Lever 3b & 3c	**1890 Extension**	**Hatch**	**Evans-Allen**
93600	0	0	0
1862 Matching	**1890 Matching**	**1862 Matching**	**1890 Matching**
140400	0	0	0
1862 All Other	**1890 All Other**	**1862 All Other**	**1890 All Other**
0	0	0	0

V(D). Planned Program (Activity)

1. Brief description of the Activity

Promote Interactive learning modules Packaged programs NDSU Extension Service Family Economics Web site Media work Collaborative projects

2. Brief description of the target audience

Extension educators Specialists General public Targeted audiences - Baby Boomers, women, couples, farm/ranch Families - older adults Collaborators Youth Financially vulnerable

V(E). Planned Program (Outputs)

1. Standard output measures

2009	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Plan	2600	140000	2000	9000
Actual	4400	180000	4500	9900

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

Year: 2009
Plan: 0
Actual: 0

Patents listed

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

2009	Extension	Research	Total
Plan	2	1	
Actual	4	1	5

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

- {No Data Entered}

V(G). State Defined Outcomes

V. State Defined Outcomes Table of Content

O. No.	OUTCOME NAME
1	Number of educational programs and activities conducted
2	Number of people completing educational programs
3	Number of people reporting increased knowledge from the number completing educational programs
4	Number of people who plan to adopt practices from the number of people who increased knowledge
5	Number of people adopting practices from the number of people who increased knowledge
6	Number of people receiving information through non-program contacts such as telephone, office and farm visits
7	Number of people who participate in programs to cope with financial impacts of reduced income
8	Decreased numbers of personal bankruptcy filings in state of North Dakota
9	Number of Extension agents taking advanced coursework and test for the AFCPE Certified Financial counselor designation, thereby increasing the capability of the NDSU Extension Service to deliver financial education.

Outcome #1

1. **Outcome Measures**

Number of educational programs and activities conducted

Not Reporting on this Outcome Measure

Outcome #2

1. **Outcome Measures**

Number of people completing educational programs

Not Reporting on this Outcome Measure

Outcome #3

1. **Outcome Measures**

Number of people reporting increased knowledge from the number completing educational programs

Not Reporting on this Outcome Measure

Outcome #4

1. **Outcome Measures**

Number of people who plan to adopt practices from the number of people who increased knowledge

Not Reporting on this Outcome Measure

Outcome #5

1. **Outcome Measures**

Number of people adopting practices from the number of people who increased knowledge

Not Reporting on this Outcome Measure

Outcome #6

1. **Outcome Measures**

Number of people receiving information through non-program contacts such as telephone, office and farm visits

Not Reporting on this Outcome Measure

Outcome #7

1. Outcome Measures

Number of people who participate in programs to cope with financial impacts of reduced income

Not Reporting on this Outcome Measure

Outcome #8

1. Outcome Measures

Decreased numbers of personal bankruptcy filings in state of North Dakota

Not Reporting on this Outcome Measure

Outcome #9

1. Outcome Measures

Number of Extension agents taking advanced coursework and test for the AFCPE Certified Financial counselor designation, thereby increasing the capability of the NDSU Extension Service to deliver financial education.

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2009	{No Data Entered}	8

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Personal finance education is an area of Extension programming that needs addtional FTEs, along with training and resources to better servie the citizens of North Dakota. Agents with confidence and competence in personal finance can better address current and emerging issues in the state, sucha as disaster preparation and recovery, managing limited resources, and dealing with fluctuating income.

What has been done
Seven NDSU Extension agents have chosen the emphasis area of Family Economics. Four of these agents and four additional agents have been chosen to participate in the Certified Financial Counselor training program. They participate in regular study sessions and the first two agents will test for the certification in the spring of 2010. Remaining agents plan to complete the course and become certified by the fall of 2010. This group of 10 agents are being trained in DollarWorks, the HSFPP, and other relevant curriculum as well. Marketing materials are being developed to promote Family Economics issues in local communities.

Results

An increased number of NDSU Extension agents are more confident and competent in the area of personal finance. The number and quality of personal finance educational programs will increase in future years, enabling state wide collection of outcome data from participants.

4. Associated Knowledge Areas

KA Code	Knowledge Area
801	Individual and Family Resource Management

V(H). Planned Program (External Factors)

External factors which affected outcomes

- Natural Disasters (drought, weather extremes, etc.)
- Economy
- Public Policy changes
- Competing Programmatic Challenges

Brief Explanation

North Dakotans are financially recovering from the flood of 2009. The North Dakota legislature enacted a requirement for high school students graduation in 2011 and beyond to have completed personal finance training.

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

1. Evaluation Studies Planned

Evaluation Results

Key Items of Evaluation

V(A). Planned Program (Summary)

Program # 16

1. Name of the Planned Program

Noxious and Invasive Weed Management

V(B). Program Knowledge Area(s)

1. Program Knowledge Areas and Percentage

KA Code	Knowledge Area	%1862 Extension	%1890 Extension	%1862 Research	%1890 Research
213	Weeds Affecting Plants	20%		0%	
215	Biological Control of Pests Affecting Plants	40%		0%	
216	Integrated Pest Management Systems	40%		0%	
	Total	100%		0%	

V(C). Planned Program (Inputs)

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

Year: 2009	Extension		Research	
	1862	1890	1862	1890
Plan	4.0	0.0	0.0	0.0
Actual	4.0	0.0	0.0	0.0

2. Actual dollars expended in this Program (includes Carryover Funds from previous years)

Extension		Research	
Smith-Lever 3b & 3c	**1890 Extension**	**Hatch**	**Evans-Allen**
124800	0	0	0
1862 Matching	**1890 Matching**	**1862 Matching**	**1890 Matching**
187200	0	0	0
1862 All Other	**1890 All Other**	**1862 All Other**	**1890 All Other**
0	0	0	0

V(D). Planned Program (Activity)

1. Brief description of the Activity

Develop presentation materials Develop resource material Provide workshops and field tours Translate scientific materials into lay materials Develop demonstration and research trials Evaluate effectiveness of activities

2. Brief description of the target audience

Private land managers, including livestock producers Public land managers 4-H youth Government agency personnel Conservation groups

V(E). Planned Program (Outputs)

1. Standard output measures

2009	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Plan	300	3500	125	600
Actual	249	5000	101	575

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

Patent Applications Submitted

Year: 2009
Plan: 0
Actual: 0

Patents listed

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

2009	Extension	Research	Total
Plan	1	0	
Actual	1	1	2

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

- {No Data Entered}

V(G). State Defined Outcomes

V. State Defined Outcomes Table of Content

O. No.	OUTCOME NAME
1	Number of individuals receiving training and education
2	Number of individuals demonstrating increase in subject knowledge and skills
3	Number of producers implementing recommended actions or practices
4	Number of producers participating in government cost share programs for range conservation
5	Estimated cost savings and return for North Dakota landowners implementing an integrated pest management program ($/acre)
6	Reduce number of noxious weed acres by two to five percent annually in North Dakota
7	Number of hay growers and inspectors certified on weed seed free standards.

Outcome #1

1. **Outcome Measures**

Number of individuals receiving training and education

Not Reporting on this Outcome Measure

Outcome #2

1. **Outcome Measures**

Number of individuals demonstrating increase in subject knowledge and skills

Not Reporting on this Outcome Measure

Outcome #3

1. **Outcome Measures**

Number of producers implementing recommended actions or practices

Not Reporting on this Outcome Measure

Outcome #4

1. **Outcome Measures**

Number of producers participating in government cost share programs for range conservation

Not Reporting on this Outcome Measure

Outcome #5

1. **Outcome Measures**

Estimated cost savings and return for North Dakota landowners implementing an integrated pest management program ($/acre)

Not Reporting on this Outcome Measure

Outcome #6

1. **Outcome Measures**

Reduce number of noxious weed acres by two to five percent annually in North Dakota

Not Reporting on this Outcome Measure

Outcome #7

1. Outcome Measures

Number of hay growers and inspectors certified on weed seed free standards.

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2009	{No Data Entered}	71

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Private and public land managers and operators were the target audience because noxious weeds infest over 2.5 million acres of range, pasture, CRP, and wild lands in North Dakota, accounting over 8% of the land. Invasive species not listed as noxious infest over 50% of these same lands. Noxious and invasive plants have a direct economic impact on the livestock industry of North Dakota, costing over $30 million, and $129.5 million in the Northern Plains. Invasive grasses and noxious weeds reduce wildlife habitat and the hydrologic function of our rangelands.

What has been done
Educational materials have been developed to educate land managers on weed identification and proper control techniques. A web based site was developed through the North Dakota Department of Agriculture for visual aid in identifying noxious and invasive weeds for weed board members, land managers and general public. Finally, a new law was passed to attempt to eliminate transportation of hay infested with weed seed. This law created guidelines for training weed seed free certifiers and will help hay growers properly produce and certify weed seed free hay.

Results
Three planning meetings were conducted in 2008 and 2009 that included all agencies that work with private and public grazing and wild land. Through these meetings, policy was developed and a bill created and passed by the North Dakota House and Senate. This new law should reduce the transportation of noxious weed infested hay by 80% in state and 95% out-of-state. Four training sessions were developed to train and certify weed seed free inspectors and land managers at key locations through North Dakota, with 71 people certified. The new color pictorial book showing the top 37 noxious and invasive weeds of North Dakota was developed and published by Lym and Travnicek (2009). Over 5,000 copies were distributed through the Northern Plains for educational training. Hay growers that develop weed seed free hay are estimated to increase the economic value of their hay by 20%. Job creation in producing certified weed seed free agents is estimated at 5 new positions in 2010 and 10 new positions by 2012.

4. Associated Knowledge Areas

KA Code	Knowledge Area
213	Weeds Affecting Plants
215	Biological Control of Pests Affecting Plants

216 Integrated Pest Management Systems

V(H). Planned Program (External Factors)

External factors which affected outcomes

- Natural Disasters (drought, weather extremes, etc.)
- Economy
- Public Policy changes

Brief Explanation

1) North Dakota has been in a wet cycle since 1993, creating conditions conducive to increased populations of Canada thistle (# 1 noxious weed on range and pastureland in ND) and Kentucky bluegrass (# 1 invasive grass on ND grazing lands). Until this climate change reverses, control and management strategies have cost more money for control and reduced the ecological integrity of rangelands, 2) Noxious weeds impact North Dakota's livestock economy by over $30 million/year and invasive grasses reduce livestock carrying capacity by approximately 25%, and 3) Public policy for growing and transporting weed seed free hay was changed in 2009, thus improving our efforts to reduced noxious weed invasive on lands in North Dakota.

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

1. Evaluation Studies Planned

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

Evaluation Results

Changing weed seed free hay development and transportation policy reduced transportation of weed seed infested hay by 80-95%. In a case study, certified weed seed free hay was valued at 28.5% greater than traditional hay.

Key Items of Evaluation

V(A). Planned Program (Summary)

Program # 17

1. Name of the Planned Program

Fusarium head blight of wheat

V(B). Program Knowledge Area(s)

1. Program Knowledge Areas and Percentage

KA Code	Knowledge Area	%1862 Extension	%1890 Extension	%1862 Research	%1890 Research
212	Pathogens and Nematodes Affecting Plants	100%		100%	
	Total	100%		100%	

V(C). Planned Program (Inputs)

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

Year: 2009	Extension		Research	
	1862	1890	1862	1890
Plan	1.5	0.0	2.0	0.0
Actual	1.5	0.0	2.0	0.0

2. Actual dollars expended in this Program (includes Carryover Funds from previous years)

Extension		Research	
Smith-Lever 3b & 3c	**1890 Extension**	**Hatch**	**Evans-Allen**
46800	0	74400	0
1862 Matching	**1890 Matching**	**1862 Matching**	**1890 Matching**
70200	0	111600	0
1862 All Other	**1890 All Other**	**1862 All Other**	**1890 All Other**
0	0	0	0

V(D). Planned Program (Activity)

1. Brief description of the Activity

Research on fungicidal- and bio-control and application technology Field surveys on disease severity and losses to disease Develop resource material Provide presentations and workshops Translate scientific materials into lay materials

2. Brief description of the target audience

Wheat and barley producers Crop consultants and ag advisors Research Extension Centers Extension personnel Agribusiness and agrifinance personnel Government agency personnel

V(E). Planned Program (Outputs)

1. Standard output measures

2009	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Plan	6000	15000	0	0
Actual	6500	20000	0	0

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

Patent Applications Submitted

Year: 2009
Plan: 0
Actual: 0

Patents listed

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

2009	Extension	Research	Total
Plan	1	2	
Actual	1	2	3

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

- {No Data Entered}

V(G). State Defined Outcomes

V. State Defined Outcomes Table of Content

O. No.	OUTCOME NAME
1	Percent of acres planted to resistant varieties
2	Percent of acres treated with fungicides
3	Economic losses to disease ($)
4	Number of individuals demonstrating increased knowledge and skills
5	Number of individuals implementing recommended action or practice
6	Estimated dollar value of adopted best management practices ($)
7	Stable export market unaffected by quality issues ($)
8	Percentage of North Dakota producers who used a practice or combination of practices to reduce the potential threat of Fusarium head blight (FHB) disease and increase yield.

Outcome #1

1. **Outcome Measures**

Percent of acres planted to resistant varieties

Not Reporting on this Outcome Measure

Outcome #2

1. **Outcome Measures**

Percent of acres treated with fungicides

Not Reporting on this Outcome Measure

Outcome #3

1. **Outcome Measures**

Economic losses to disease ($)

Not Reporting on this Outcome Measure

Outcome #4

1. **Outcome Measures**

Number of individuals demonstrating increased knowledge and skills

Not Reporting on this Outcome Measure

Outcome #5

1. **Outcome Measures**

Number of individuals implementing recommended action or practice

Not Reporting on this Outcome Measure

Outcome #6

1. **Outcome Measures**

Estimated dollar value of adopted best management practices ($)

Not Reporting on this Outcome Measure

Outcome #7

1. Outcome Measures

Stable export market unaffected by quality issues ($)

Not Reporting on this Outcome Measure

Outcome #8

1. Outcome Measures

Percentage of North Dakota producers who used a practice or combination of practices to reduce the potential threat of Fusarium head blight (FHB) disease and increase yield.

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2009	{No Data Entered}	73

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Fusarium head blight is a crop disease that has the potential to causes severe yield and quality losses in ND wheat. Over past decade, over $2 billion was lost to this disease because of reduced wheat production, quality (fungus can produce a myctoxin), and farm and small town business failures. Approximately 2/3 or 20,000 of ND's 30,000 farmers are at risk to this disease any given year, depending on if favorable weather for infection occurs. NDSU Research and Extension efforts are designed to test strategies, and then provide information and demonstration on the strategies that reduce this disease and how an integration of strategies is more beneficial than a single strategy.

What has been done
Applied research has shown the effects of cultivar resistance, crop rotation and appropriate fungicide use on the disease and subsequent crop yield and quality. Good FHB management strategies are available and when combined, provide the optimum in economic and grain quality returns. Based on this knowledge, NDSU extension IPM programs have held series of workshops across the state (including ones called "Best of the Best"), field days, provided news releases and extension newsletters, and updated management information on the internet.

Results
A survey of wheat producers attending the two annual Best of the Best Wheat Production workshops indicated that 80% of them use resistant varieties and fungicides for FHB management and 72% use crop rotation. Seventy percent of these same wheat producers indicated that extension meetings were the top source of their FHB management information. Another 34% of respondents indicated that Extension publications were among their most important source of FHB management information. An applied research trial indicated that a combination of three management strategies, rotation, use of resistant varieties and application of a fungicide,

gave an economic return of $120/acre over no management strategy and $68 to $30 better economic return that a single or two strategies. Thus, NDSU IPM research has shown value of integrated strategies, and adoption of key FHB management practices is high among well informed wheat producers. As a consequence, the adoption of these practices has created in excess of $150M in additional annual returns to North Dakota wheat growers.

4. Associated Knowledge Areas

KA Code	Knowledge Area
212	Pathogens and Nematodes Affecting Plants

V(H). Planned Program (External Factors)

External factors which affected outcomes

- Natural Disasters (drought, weather extremes, etc.)
- Economy
- Other (Farm Program)

Brief Explanation

Brief explanation of external factors which affected the outcomes. The weather plays a big factor in development of FHB disease; a late summer drought in 2008 and cold temperatures in 2009 limited disease and some adoption of practices; In 2008, high commodity prices resulted in high interest in management strategies because wheat producers wanted a healthy, high yielding crop to realize the gains from having high prices. In more marginally profitable years, producers will more likely adopt crop rotation and variety resistance than use of fungicides. And finally, changes in the farm program and price supports for oilseed crops such as soybean, often make wheat less of a profitable crop than soybean, so producers may choose not to grow wheat, regardless of disease threat and the good management strategies available.

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

1. Evaluation Studies Planned

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

Evaluation Results

Current evaluation results are described in the outcomes section. Participant's use of FHB management practices was determined by surveying participants in two large wheat production workshops. In 2010, a new, much broader survey will be conducted with the help of the ND Ag. Statistical Reporting Service (ND NASS). The questionnaire will be mailed to approximately 5000 wheat producers who have 100 acres or more across 22 counties in ND, and make comparisons among participants based on their farm size, use of consultants and their use of the extension service, and determine their primary sources of FHB management information, and which practices they consider most important.

Key Items of Evaluation

V(A). Planned Program (Summary)

Program # 18

1. Name of the Planned Program

Family Meals

V(B). Program Knowledge Area(s)

1. Program Knowledge Areas and Percentage

KA Code	Knowledge Area	%1862 Extension	%1890 Extension	%1862 Research	%1890 Research
802	Human Development and Family Well-Being	100%		0%	
	Total	100%		0%	

V(C). Planned Program (Inputs)

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

Year: 2009	Extension		Research	
	1862	1890	1862	1890
Plan	3.0	0.0	0.0	0.0
Actual	3.0	0.0	0.0	0.0

2. Actual dollars expended in this Program (includes Carryover Funds from previous years)

Extension		Research	
Smith-Lever 3b & 3c	**1890 Extension**	**Hatch**	**Evans-Allen**
93600	0	0	0
1862 Matching	**1890 Matching**	**1862 Matching**	**1890 Matching**
140400	0	0	0
1862 All Other	**1890 All Other**	**1862 All Other**	**1890 All Other**
0	0	0	0

V(D). Planned Program (Activity)

1. Brief description of the Activity

The activities of this program have been reported under 'Childhood Obesity', program #11.

2. Brief description of the target audience

Parents and family caregivers

4-H youth and other youth

Child care programs, caregivers

School system personnel

Government agency personnel

V(E). Planned Program (Outputs)

1. Standard output measures

2009	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Plan	1600	5000	1000	2000
Actual	0	0	0	0

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

Year: 2009
Plan: 0
Actual: {No Data Entered}

Patents listed
{No Data Entered}

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

2009	Extension	Research	Total
Plan	0	0	
Actual	0	0	0

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

- {No Data Entered}

V(G). State Defined Outcomes

V. State Defined Outcomes Table of Content

O. No.	OUTCOME NAME
1	Percent of participating individuals demonstrating increase in subject knowledge and skills
2	Percent of individuals implementing recommended actions or practices
3	Percent of individuals indicating a change in frequency of family meals
4	Percent of individuals indicating a change in other quality indicators of the family meal experience
5	Percent of individuals showing an improvement in measures of family connection and well-being
6	Percent of individuals showing an improvement in family nutritional wellness
7	Number of individuals receiving information through materials or training

Outcome #1

1. **Outcome Measures**

Percent of participating individuals demonstrating increase in subject knowledge and skills

Not Reporting on this Outcome Measure

Outcome #2

1. **Outcome Measures**

Percent of individuals implementing recommended actions or practices

Not Reporting on this Outcome Measure

Outcome #3

1. **Outcome Measures**

Percent of individuals indicating a change in frequency of family meals

Not Reporting on this Outcome Measure

Outcome #4

1. **Outcome Measures**

Percent of individuals indicating a change in other quality indicators of the family meal experience

Not Reporting on this Outcome Measure

Outcome #5

1. **Outcome Measures**

Percent of individuals showing an improvement in measures of family connection and well-being

Not Reporting on this Outcome Measure

Outcome #6

1. **Outcome Measures**

Percent of individuals showing an improvement in family nutritional wellness

Not Reporting on this Outcome Measure

Outcome #7

1. Outcome Measures

Number of individuals receiving information through materials or training

Not Reporting on this Outcome Measure

V(H). Planned Program (External Factors)

External factors which affected outcomes

- Economy
- Populations changes (immigration, new cultural groupings, etc.)

Brief Explanation

{No Data Entered}

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

1. Evaluation Studies Planned

- Retrospective (post program)
- Before-After (before and after program)
- During (during program)
- Comparisons between program participants (individuals, group, organizations) and non-participants

Evaluation Results

{No Data Entered}

Key Items of Evaluation

{No Data Entered}

V(A). Planned Program (Summary)

Program # 19

1. Name of the Planned Program

Parent Education - Parents Forever

V(B). Program Knowledge Area(s)

1. Program Knowledge Areas and Percentage

KA Code	Knowledge Area	%1862 Extension	%1890 Extension	%1862 Research	%1890 Research
802	Human Development and Family Well-Being	100%		100%	
	Total	100%		100%	

V(C). Planned Program (Inputs)

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

Year: 2009	Extension		Research	
	1862	1890	1862	1890
Plan	6.0	0.0	1.0	0.0
Actual	6.0	0.0	1.0	0.0

2. Actual dollars expended in this Program (includes Carryover Funds from previous years)

Extension		Research	
Smith-Lever 3b & 3c	**1890 Extension**	**Hatch**	**Evans-Allen**
187200	0	37200	0
1862 Matching	**1890 Matching**	**1862 Matching**	**1890 Matching**
280800	0	55800	0
1862 All Other	**1890 All Other**	**1862 All Other**	**1890 All Other**
0	0	0	0

V(D). Planned Program (Activity)

1. Brief description of the Activity

- Develop educational resources on healthy parenting and child development.

- Develop presentation and resource materials for staff members and community professionals.

- Provide training and education through seminars and workshops.

- Identify key and emerging issues to address.

- Evaluate the effectiveness of activities.

2. Brief description of the target audience

Parents and family caregivers;

Child care programs;

School system personnel;

Government agency;

Personnel community workers and professionals

V(E). Planned Program (Outputs)

1. Standard output measures

2009	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Plan	300	3000	0	0
Actual	342	10600	0	0

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

Year: 2009
Plan: 0
Actual: 0

Patents listed

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

2009	Extension	Research	Total
Plan	4	1	
Actual	1	1	2

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

- {No Data Entered}

V(G). State Defined Outcomes

V. State Defined Outcomes Table of Content

O. No.	OUTCOME NAME
1	Percent of individuals demonstrating increase in subject knowledge and skills
2	Percent of individuals implementing recommended actions or practices
3	Percent of individuals indicating a change in frequency of specified parenting practices
4	Percent of individuals indicating a change in other quality indicators of parent-child relationships
5	Number of individuals receiving information through materials or training
6	Percent of parents participating in the program who demonstrate an increase in knowledge and skills to improve their life experiences during family transitions.

Outcome #1

1. **Outcome Measures**

   Percent of individuals demonstrating increase in subject knowledge and skills

   Not Reporting on this Outcome Measure

Outcome #2

1. **Outcome Measures**

   Percent of individuals implementing recommended actions or practices

   Not Reporting on this Outcome Measure

Outcome #3

1. **Outcome Measures**

   Percent of individuals indicating a change in frequency of specified parenting practices

   Not Reporting on this Outcome Measure

Outcome #4

1. **Outcome Measures**

   Percent of individuals indicating a change in other quality indicators of parent-child relationships

   Not Reporting on this Outcome Measure

Outcome #5

1. **Outcome Measures**

   Number of individuals receiving information through materials or training

   Not Reporting on this Outcome Measure

Outcome #6

1. **Outcome Measures**

   Percent of parents participating in the program who demonstrate an increase in knowledge and skills to improve their life experiences during family transitions.

2. **Associated Institution Types**

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2009	{No Data Entered}	85

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
In programs for adults experiencing separation or divorce, parents can learn to cope with their feelings, communicate with their former spouse and children, and learn about specific things to help children through the transition. Effective parent and family education is intended to benefit families who may be facing distress or difficulty and enable them to activate those capacities that will aid them in the coping and adjustment process. Parents experiencing the pain of separation and divorce need knowledge, support and resources to provide them with guidance on healthy parenting in the midst of divorce. Parent education interventions can provide assistance to parents undergoing family transitions.

What has been done
In 2007, the North Dakota State University (NDSU) Extension Service adopted the Parents Forever divorce education program. Statewide training sessions were held to train program facilitators, community partners and extension educators in delivering a 4-hour portion of Parents Forever, focusing on the impact of divorce on children. In North Dakota, the program is administered regionally through the NDSU Extension Service and is regularly delivered in 4-hour educational sessions to divorcing or never-married parents. An evaluation process was developed to assess program value, gather feedback from participants and community stakeholders, and enable program refinement as needed. Participants in the single-session Parents Forever class offered in North Dakota receive instruction and discuss grief and loss issues for children, child responses to divorce based on developmental levels, parental communication concerns, helpful parental responses to child concerns, and strategies for managing conflict and improving communication between parents. Ten sites with a total of 342 participants were involved in the program in the past year.

Results
The Parents Forever program was highly effective in providing parents who are facing divorce with greater levels of awareness and understanding about the effects of their divorce on the stress and well being of their children. The parents learned new communication and parenting strategies to reduce the likelihood that their children will feel like they are caught in the middle when parents are in the process of divorcing. Specifically, parents learned how to make a parallel parenting plan, how to help themselves and their children adjust in following a new pathway in life, and effective communication strategies to use with their former partner during the divorce process and in co-parenting. The adoption of these skills will provide indirect benefits to their children and subsequently to their community.

4. Associated Knowledge Areas

KA Code	Knowledge Area
802	Human Development and Family Well-Being

V(H). Planned Program (External Factors)

External factors which affected outcomes

- Economy

Brief Explanation

The economic recession has placed additional financial stress on many families.

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

1. Evaluation Studies Planned

- Retrospective (post program)

Evaluation Results

Participants in the evaluation included 342 adults who participated in the 4-hour Parents Forever program in North Dakota. At the time of class participation, current relationship status of participants included considering separation or divorce (2%), separated from partner (6%), in the divorce process (47%), and completed the divorce process (26%). Additionally, 19% of respondents were never married to the child's other parent at the time of class participation. Participants in the single-session program of Parents Forever indicated high levels of satisfaction and strong perceptions of the program's value to them. Asked whether they felt the class was worthwhile for them, 91% of attendees strongly agreed or agreed that they did perceive it as worthwhile. In addition, 92% of participants strongly agreed or agreed that the class would be beneficial for all divorcing parents. When asked if they would recommend participation in the program to someone else, 98% of participants noted that they would recommend the course to another person. Study findings indicated statistically significant increases between retrospective pre-program and post-program knowledge levels (mean scores) for participants in all knowledge areas assessed. The largest knowledge gains were reported in understanding how to make a parallel parenting plan (M = 2.80 before program versus M = 4.32 after program), how to help themselves and their children adjust in following a new pathway in life (M = 3.07 before program versus M = 4.44 after program), and effective communication strategies to use with their former partner during the divorce process and in co-parenting (M = 3.05 before program versus M = 4.39 after program).

Key Items of Evaluation