2015 North Dakota State University Combined Research and Extension Annual Report of Accomplishments and Results

Status: Accepted

Date Accepted: 06/07/2016

I. Report Overview

1. Executive Summary

Agriculture continues to be the dominant force in North Dakota's economy even though North Dakota has become the second largest oil producing state in the nation. The North Dakota Agricultural Experiment Station (ND AES) and North Dakota State University Extension Service (NDSU ES) serve as major sources of innovation, new tools and knowledge, and educational support to agriculture's continued success. The following examples illustrate recent contributions in the areas of cropping systems, natural resources, livestock systems, economic and community vitality, 4-H youth development, and human development and education.

Cropping Systems

Extension Works to Control Waterhemp

One weed- waterhemp, a member of the pigweed family- is adding to North Dakota producers' list of concerns. A number of factors- reduced tillage systems, herbicide resistance and simplified weed management systems- have contributed to the spread of waterhemp across eastern North Dakota. How is waterhemp moving so rapidly? Scientists know its seed moves readily in water. They also believe that geese and ducks feeding on waterhemp distribute seed along flyways. Finally, humans unintentionally move seed, especially with harvesting equipment. Plus, waterhemp biotypes are especially resistant to herbicides, including glyphosate, and have the ability to produce massive quantities of seed that potentially germinate and emerge after a farmer has completed postemergent herbicide applications. The first step in waterhemp control is awareness and identification. County based NDSU ES agents, farmers, crop consultants and industry retailers are learning to understand the difference between pigweed and waterhemp in order to begin the process of controlling it. In the fall of 2014, a team of NDSU ES specialists in the Plant Sciences Department developed a program to help Extension agents educate producers about managing weeds, including waterhemp. That education paid off in Walsh County. One day, a producer walked into the county Extension office with a 6-foot-tall weed. After having attended an Extension training, the producer suspected the weed was waterhemp or Palmer amaranth. The agent confirmed it was waterhemp, and about a half-dozen plants were pulled and destroyed before they could go to seed.

Producers Learn How to Combat Soybean Cyst Nematode

Soybean cyst nematode (SCN), a microscopic plant-parasitic worm, is emerging as a major threat to soybean production in North Dakota. SCN was identified in the U.S. in 1954 and quickly spread through all major soybean production areas. It first was detected in North Dakota's Richland County in 2003, and within a decade, SCN was confirmed in a dozen counties. Once a farmer sees above-ground symptoms, a soybean yield loss of up to 30 percent likely has already occurred. Early detection and aggressive management before a significant yield loss occurs will not only protect farmers' yields, it will also keep egg levels low so yield reductions are limited in the future. A team of NDSU ES specialists, agents, ND AES scientists and others in the Plant Pathology Department, have developed a multipronged approach to prepare farmers for SCN. With support from the North Dakota Soybean Council, Extension distributed

SCN sample bags to soybean growers through county Extension offices and at Research Extension Center field days throughout the state. Growers could sample for SCN, mail the bag to the NDSU Plant Pathology Lab and receive their data in the mail. At the field days, growers were taught how to identify potentially infested areas, dig and clean roots for sampling and differentiate cysts from soil particles. Producers also learned about management topics including SCN-resistant soybean varieties, crop rotation and seed treatment products. Our goal is that every farmer who first identified SCN as a result of this awareness programs will be able to manage this pest that would have caused potentially devastating levels of yield loss.

Langdon Research Extension Center Tests Industrial Hemp

More than 30 nations grow industrial hemp as an agricultural commodity, but until last year, it was not allowed in the U.S. As a result of the 2014 farm bill, universities and state agriculture departments can begin cultivating industrial hemp for limited purposes. North Dakota is one of 15 states to establish a commercial industrial hemp program. The NDSU Langdon Research Extension Center (REC) started variety trials of industrial hemp in the summer of 2015 and harvested the crop in the fall. Center scientists planted five Canadian varieties, five French varieties, and one each from Australia and Finland. The goal is to gain practical insights that help North Dakota producers raise this little-known crop efficiently and profitably. Initial testing of different varieties has started, but much more research in crop production practices is needed, such as seeding dates and rates. Varietal differences in seed and fiber yields were noticed during the 2015 harvest. Because information is limited about the production of industrial hemp, research will continue in the 2016 growing season.

Some facts about industrial hemp:

- Marijuana and hemp come from the same plant species but from different varieties or cultivars. They have a similar leaf shape, so the two often are confused; however, hemp is genetically different and has extremely low levels, 0.3 percent, of THC, the chemical responsible for most of marijuana's psychological effects.
- Hemp use includes food, cosmetics, nutritional supplements, fabric, paper, construction and insulation materials. The global hemp market is estimated at more than 25,000 products.
- Hemp grows in a wide variety of climates and soil types. The biggest advantage for farmers could be that it grows rapidly and chokes out competing weeds

Natural Resources

The United Nations' Food and Agriculture Organization (FAO) declared 2015 the International Year of Soils. The FAO's purpose was to generate awareness about the importance of soils for food security, nutrition and essential ecosystem functions. Soils are a limited natural resource and nonrenewable on a human time scale. Soils are the foundation for food, animal feed, fuel and natural fiber production, and are essential for the supply of clean water, nutrient cycling and a range of ecosystems. While the U.N. was promoting the health of soil on an international level, ND AES scientists and NDSU ES soil health specialists were doing their part to ensure the vitality of North Dakota soil. The ND AES and NDSU ES are based at North Dakota State University (NDSU) which has the motto "For the land and its people." It is fitting that the Natural Resources section focused on "soils" this year.

Scientists Seek Oil Spill Remediation Options for Soil

ND AES scientists and NDSU ES specialists are conducting research and educational programming that could impact the way soils are restored after an oil spill. Part of their task is to help the state by providing reclamation options for the region. With funding from Tesoro Logistics LP, the scientists and specialists along with two graduate students are determining whether the soil impacted by an oil spill near Tioga can

be used for agricultural production again once reclamation is complete. A lightning strike apparently weakened a Tesoro Logistics-managed underground pipeline, causing it to develop a ¼-inch hole that leaked more than 20,600 barrels of Bakken crude in a field. The oil percolated more than 55 feet deep and covered about eight acres. The impacted area has grown to 60 acres because of reclamation activities. Remediation involves passing impacted soil through a thermal desorption unit, which heats the soil to drive the oil out. Then the vaporized oil is combusted. The remediated soil eventually will be returned to the field. Restoring the soil to its prior condition for agricultural productivity is a concern because of the size of the disturbed area and because heating soil affects its characteristics, such as biological and chemical properties, microbial activity and water-holding capacity. The task is to determine the most optimal methods for bringing the soil back to agricultural productivity. Planting cover crops or adding manure are some possible options. The team has collected samples of different mixes of treated and untreated material to see how these will affect plant growth and seed quality. A crop, likely edible peas, will be planted in test plots in the spring of 2016.

A Cup of Coffee Soil Health Conversations

With settings like the local grain elevator, the seed store or the small-town coffee shop, a group of NDSU Extension soil health specialists and local agents are changing the way they disseminate information to North Dakota's farmers. Started in 2014, the Soil Health Café Talk sessions have become a way for farmers and NDSU Extension agents to share information and learn from each other. For some producers, a laid-back, informal meeting where they can ask questions about their specific soil concerns has been very popular. They prefer that there is no set agenda for Café Talks, and the direction of the meetings are entirely driven by their questions. Small-group session time also is included to discuss such issues as soil salinity, sodicity, cropping systems, cover crops and compaction. The café talks are a nice, small-group setting where producers feel comfortable asking questions that they normally wouldn't ask at a large meeting. They can bounce ideas off of each other easily and get our questions answered. Café talks create an environment for farmers to talk through management approaches with other farmers and specialists. It also helps NDSU ES better understand some of the management challenges farmers are facing and the innovative approaches farmers are taking to overcome those challenges. We can then use this information to guide our research efforts and develop meaningful programs.

Multiyear Research Focuses on Relationship Between Soil Salinity and Crop Pests

Soil salinity management has become increasingly important to North Dakota crop producers. Nearly 90 percent are seeing some sort of reduced productivity as a result of soil salinity issues. An ongoing research project started in 2013 seeks to understand not only how salinity directly affects crop productivity, but also how salinity may influence insect pest infestation. It answers these questions: "What kind of yield drag can we expect at low salinity levels?" "Do salt-stressed crops become hot spots for pest pressures?" "What are the economic losses associated with yield loss and increased pest pressures?" The initial research focuses on corn and soybean response to salinity because both are important crops for North Dakota producers, and yields start to decline at very low levels of salinity. Funded by the North Dakota Corn Council and North Dakota Soybean Council, the experiment started with greenhouse projects to measure the crop and pest response to salinity in a controlled environment. During the last two years, the project was conducted on six quarters of land in Richland County to collect real-world, in-field data. Preliminary results indicate that both leaf size and root mass decrease with increasing salinity. Smaller leaves mean less surface shading and smaller roots mean less water uptake by the plant. Surface shading to reduce evaporation and water use by roots to lower the water table are both important ways to manage salinity. While the plants do worse as salinity increases, the introduced spider mites do better. The more the salinity, the more eggs the spider mites lay. While using a whole-systems approach, linking soils, crops and pest research, is exciting. Getting new information to our North Dakota producers through research and education is our goal.

Livestock Systems

Research Shedding Light on Cow Pregnancy

ND AES scientists and others are a step closer to solving the mystery of why 90-plus percent of beef cows become pregnant after insemination, but only 50 to 60 percent still have a viable embryo 30 days later. The scientists have developed a procedure that allows them to evaluate factors affecting embryo development in the early part of pregnancy, from days 16 to 50. Up until about day seven after fertilization it is relatively easy to look at what's going on with the embryo, but for the rest of the loss period, it's like a big black box. Learning why so many embryos are lost is important because beef production needs to be as efficient as possible if the U.S. is going to help meet the challenge of feeding 9.2 billion people by 2050. Nine scientists from campus and the NDSU Central Grasslands Research Extension Center are working on the problem using center cattle. New Mexico State University researchers also are involved, and scientists from other universities are interested. There's no one else in the world who is doing this type of work and this puts NDSU squarely in the forefront of this research. Preliminary indications are that the issue is nutrient transfer to the embryo and when it occurs. The scientists found that the transfer changes dramatically during the first 50 days of pregnancy. This research eventually will translate into ways producers can improve production efficiency and lead to a new reference book on the subject. Current publications are decades old.

Discovering Value in North Dakota Calves

North Dakota produces calves that grow extremely well. This outstanding growth results from years of planning and selective breeding. This planning continually evolves since understanding beef cattle genetics is a continual process. Selection for bulls and heifers is mostly accomplished through visual appraisals and on-ranch production records. In addition to this information, learning about cattle performance as they progress through the feed yard or finishing phase can further help identify animals with superior performance genetics. To help ranchers make better informed genetic selection decisions, Extension education programs using a cattle feedout project was developed to give ranchers performance data and experience having their calves fed at a central location in North Dakota. The Dakota Feeder Calf Show feedout project involves local county based Extension staff recruiting ranchers and their calves to participate in the project, and analyzing feed performance and carcass data. This annual program begins in October when the ranchers deliver their calves to the Dakota Feeder Calf Show at Turtle Lake, ND. After the locally hosted show and Extension educational program, the consigned calves are then shipped to the NDSU Carrington Research Extension Center Livestock Feedlot for backgrounding and feeding to finish (final weight). During the feeding period, ranchers are sent monthly updates of individual cattle health and weight gain. In February, the feedout participating ranchers and other cattle producers from across the state go on a feedlot tour to assess the cattle and discuss marketing options. When the cattle are harvested (slaughtered) in May, carcass data is collected. Carcass data combined with with feeding profitability data are shared during the follow-up Extension educational meeting in July. The difference in economic profitability between the highest performing feedout cattle and the lowest performing cattle was $382.83 per head. Participants in the Extension educational portion of the feedout project reported an 86% increased their knowledge by being involved in the cattle feedout program. Of all ranchers participating in the project, they self reported an increased profitability in their own herd of $112 per head on average.

Economic and Community Vitality

Farmers, Ranchers Learn Value of Succession Planning

Many farmers and ranchers are nearing retirement, and they need to make some decisions on what will happen to their farm, especially if their children have nonfarm careers. They could find help from the NDSU ES Design Your Succession Plan program, which was held at several locations throughout the

state in 2015. It shows farm and ranch families how to:

- Get started in developing a plan
- Talk with family members about this subject
- Choose and work with professionals such as attorneys, financial planners, trust officers, accountants, agricultural lenders, insurance agents and tax experts

It gives you a great tool to start the discussion with your family, and it gives you great advice about what questions to be asking. Having a succession plan is vital because the farm or ranch often is more than a business; it is a legacy that has been in the family for generations. Participants receive a resource binder and workbook to help them get started on a succession plan during the program and continue to work on it afterward. The program also includes case studies of farm families who could benefit from a succession plan. These generate discussion on what can happen if families don't have a plan. The program was a revelation for a Harvey-area farm couple. The husband, who is 45, said he realized he and his wife were the youngest people in the room. "We said we were starting early," he recalls telling the facilitator. The facilitator responded with, "You're the only ones starting at the right time. You've got to start early."

Outside Impressions Can Lead to Community Improvements

If you've lived in your community awhile, you probably don't need a sign to direct you to the hospital, and you no longer pay attention to that empty lot filled with tall weeds and trash. But if you're a new in town, those may be the first things you notice. That's the premise behind NDSU ES's Community Impressions, a new program to help communities learn about their strengths and weaknesses through the eyes of first-time visitors. A group of volunteers from two similar communities make unannounced visits to each other's town, then report their findings to residents and leaders. This is valuable information communities can use in planning efforts to improve themselves. Community Impressions is based on the University of Wisconsin's First Impressions program. Bowman and Carrington piloted the North Dakota program. The volunteers drove through the community to gather their first impressions, then ate at restaurants, chatted with residents, and checked out businesses, housing, and tourism and recreational opportunities. The visit showed that Bowman needs to educate its frontline workers about the community so they can be more helpful to visitors. Many of those workers are new to the area. One of the things Carrington residents learned is the community lacked signage for the hospital, tourist attractions and some businesses. Both groups found community pride was among the communities' major strengths.

4-H Youth Development

4-H Competitions, Judging Events Help Build Valuable Skills

Young people often are nervous about giving presentations or have trouble setting goals and sticking to them. But not one Walsh County 4-H'er. She is one of more than 1,000 North Dakota youth who participate in 4-H judging contests and other competitions such as shooting sports. Attending national and local 4-H judging contests has helped her become a more confident and well-rounded person. From judging land to making consumer decisions, she has learned many valuable life skills that will stick with her forever. Those skills include public speaking, setting goals and priorities, listening, communicating effectively, making decisions and teaching others. Judging events help develop youth in ways that can't be taught in a classroom. The teams that have the opportunity to travel really mature from these opportunities. To become proficient at shooting sports, youth need to be dedicated to practicing, planning, setting goals and maintaining self-discipline, all skills they will need to be successful in life. Traveling to other states for competitions is another long-term benefit. It allows youth to meet others from all over the state and then all over the nation. Youth can meet new people and make new friends while learning about things that can help them on their future career path.

4-H Native Beautification Project

Children at Grand Forks Air Force Base (GFAFB) participating in 4-H learned the importance of plants to their everyday lives. After a series of science classes, the 35 children selected and planted trees and flowers on the base grounds. The children cared for the plants throughout the summer. Children learned plants are important for our environment and for our food. The children were excited to show their parents the progress we were making throughout the summer. They learned a sense of responsibility and ownership to the world around them. We were able to clean up a neglected portion of our Youth Center on the base and fill it with beautiful flowers and trees that were native to the North Dakota and able to survive the climate just below the Canadian border. The parents commented continually over on how nice it was to be greeted by such a welcoming landscape as they walked up to the building. They loved that it was done by their children. Partners in the project included the NDSU ES - Grand Forks County, GFAFB Youth Center Open Recreation Program, GFAFB Airmen Leadership School Personnel, GFAFB School Age Program and GFAFB workers.

Human Development and Education

NDSU ES family and consumer science (FCS) programming addresses some of the most pressing social challenges for North Dakota communities and families, including obesity, chronic health conditions and poverty. A recent study conducted by nonprofit research organization Battelle to evaluate the impact of FCS programs in the U.S.'s north-central region found Extension FCS programs offer several economic benefits. For example, every $1 spent on the Expanded Food and Nutrition Education Program results in a $2.48 savings on food expenditures because participants are savvier shoppers and better at meal planning and using low-cost recipes, and make more home-cooked meals.

Parenting

Programs such as Love and Logic Early Childhood Parenting Made Fun and Parenting the Love and Logic Way teach parents, grandparents, foster and adoptive parents, and others working with children and youth to use positive tools for raising happy and well-balanced children. Parents learn strategies to balance love, mutual respect, limits and accountability to help youth become happy, self-controlled adults. By helping parents find positive strategies that will work for them, we can really make a difference for families. Parent Resource Centers offer the programs across the state. Nearly 90 percent of those attending these programs say they've improved their parenting skills. Sessions are provided free to families because of grants from the North Dakota Department of Human Services' Children and Family Services division and through collaborative partnerships with NDSU Extension county offices, area schools and community agencies serving families.

Empowering Older Adults

North Dakota has a population of approximately 670,000 people. Of these, approximately 14.5% (97,150) are aged 65 years and older. One of three people 65 and older (32,380) fall each year. Nearly half (16,190) of all seniors who fall do not resume independent living. Stepping On is a national, evidence-based falls prevention program that NDSU Extension, in partnership with the North Dakota Department of Health, offers across the state. Participants learn about improving their balance and strength, home modifications, community safety, vision issues, safe footwear and sleep. Surveys three months later show only 24 percent of the participants had fallen since the workshop.

Total Actual Amount of professional FTEs/SYs for this State

Year: 2015	Extension		Research	
	1862	1890	1862	1890
Plan	64.0	0.0	95.0	0.0
Actual	160.0	0.0	99.0	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

Research programs were subjected to four different types of scientific peer review. These reviews occur prior to, during and at the conclusion of each research project. First, research faculty who participate in multistate research projects receive a critical review of their contributing project from fellow committee members, the administrative adviser and the North Central Multi-State Research Committee. Second, most faculty augment their multistate research funding with competitive grants. These grants are awarded on the basis of scientific merit and afford an opportunity for external peer review. Third, each research faculty member with the ND AES is required to have a station project that is reviewed for scientific merit by a Project Review Committee that is comprised of one faculty member from each discipline. Finally, all research is peer reviewed, either internally or externally, prior to publication.

Extension program leaders in agriculture and natural resources, family and consumer science, 4-H and youth development, and community resource development from the North Central Region meet twice a year to evaluate program needs and develop plans of work for the whole region. Ongoing efforts are made to update North Central regional logic models and develop and collect multistate impact indicators. State Extension specialists frequently submit grant proposals to regional and federal agencies and commodity groups to fund applied-research and Extension program activities. These proposals are externally reviewed prior to selection for funding. Extension bulletins are internally peer reviewed 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
- Other (Input from State Board of Agricultural Research and Education)

Brief explanation.

Building linkages with the public enables us to discover information about community/county/district/state assets and needs. Various methods for stakeholder input are utilized on an on-going basis. Advisory and commodity boards are used annually to identify issues and refine research and Extension programs. Examples include county extension advisory boards, Sustainable Agriculture Research and Education (SARE) advisory board, nutrient management advisory board, soil health advisory board, sugar beet research and Extension board, research extension center (REC) advisory boards, and the State Board of Agricultural Research and Education (SBARE). Input from stakeholders, the general public and from targeted audiences is used to develop our five-year plan of work and to make adjustments to the plan based on crisis situations that may develop in the state, e.g. drought, flood, insect infestations, plant diseases, high-risk issues of youth, bioenergy economics, animal welfare issues. Using several methods and several venues to collect data ensure that high priority issues are identified, people that have self-interest in the issue are brought to the planning meetings, and the appropriate research project or educational program and design is developed to address the issue using a variety of delivery methods.

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 of Agricultural Research and Education (SBARE) is charged by the state legislature to determine the causes of any adverse economic impacts on crops and livestock produced in this state; develop ongoing strategies for the provision of research solutions to negate adverse economic impacts on crops and livestock produced in this state; develop ongoing strategies for the dissemination of research information through the NDSU ES; annually evaluating the results of research and extension activities and expenditures; and report the findings to the North Dakota Legislative Council and the State Board of Higher Education. SBARE actively solicits input from all sectors of agricultural interests (i.e. different commodity and livestock groups) and meets throughout the state to gather input.

County commissioners actively participate in county extension program reviews with extension district directors. The county extension budgeting process also results in strong engagement from county government. Local needs are also identified through input from crop and livestock improvement boards, soil conservation districts, 4-H councils, and area focus groups. End of program surveys are used at most county and state extension programs to identify emerging clientele needs.

In 1992, the North Dakota Department of Human Services and NDSU ES were legislated by

the North Dakota state legislature to form 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 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.

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.

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 process of collecting stakeholder input was described above in III, 2(A),1 along with the process in identifying stakeholder groups and individuals.

3. A statement of how the input will be considered

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

Brief explanation.

The State Board for Agricultural Research and Education (SBARE) is charged with developing ongoing strategies for the dissemination of research information through the ES; annually evaluating the results of research and Extension activities, recommending faculty and support positions and areas for program expenditures; and reporting the findings to the North Dakota Legislative Council and the State Board of Higher Education. Their findings directly affect the research and Extension budgeting process. The SBARE priority research and Extension needs can be found at: http://www.ag.ndsu.edu/sbare/. Commodity councils and research-education boards guide research and Extension program priorities and activities through their call for

proposals, proposal review sessions, and grant funding. The staff from the seven Research Extension Centers (RECs) use the input from winter meetings with their advisory boards to set program direction for research projects and Extension programs at their centers.

During county staff evaluations each year, program 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. County commissioner input is also critical in determining the staffing level and emphasis within county Extension offices as 50 percent of the Extension agent's salary is paid by the county.

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.

Stakeholders are frequently important contributors on the search committees of Extension state specialists and county commissioners are partners in the search committees and interview process of county staff. A SBARE member or another stakeholder is often a representative on faculty position searches.

Brief Explanation of what you learned from your Stakeholders

Our stakeholders are very supportive of the ND AES, NDSU ES and their activities and efforts. It is very important that Federal capacity be maintained to ensure NDSU's continued success. The ND AES and NDSU ES enhance the lives of the citizens of ND.

IV. Expenditure Summary

1. Total Actual Formula dollars Allocated (prepopulated from C-REEMS)			
Extension		Research	
Smith-Lever 3b & 3c	1890 Extension	Hatch	Evans-Allen
3427609	0	2992945	0

2. Totaled Actual dollars from Planned Programs Inputs				
	Extension		Research	
	Smith-Lever 3b & 3c	1890 Extension	Hatch	Evans-Allen
Actual Formula	2846473	0	2344221	0
Actual Matching	2846473	0	2344221	0
Actual All Other	7951420	0	8525030	0
Total Actual Expended	13644366	0	13213472	0

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

V. Planned Program Table of Content

V(A). Planned Program (Summary)

Program # 1

1. Name of the Planned Program

Cropping Systems

☑ Reporting on this Program

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	15%		5%	
103	Management of Saline and Sodic Soils and Salinity	5%		15%	
202	Plant Genetic Resources	5%		5%	
203	Plant Biological Efficiency and Abiotic Stresses Affecting Plants	5%		10%	
205	Plant Management Systems	20%		10%	
211	Insects, Mites, and Other Arthropods Affecting Plants	15%		10%	
212	Pathogens and Nematodes Affecting Plants	15%		15%	
213	Weeds Affecting Plants	5%		10%	
216	Integrated Pest Management Systems	5%		10%	
405	Drainage and Irrigation Systems and Facilities	10%		10%	
	Total	100%		100%	

V(C). Planned Program (Inputs)

1. Actual amount of FTE/SYs expended this Program

Year: 2015	Extension		Research	
	1862	1890	1862	1890
Plan	18.5	0.0	37.8	0.0
Actual Paid	45.5	0.0	51.5	0.0
Actual Volunteer	3.2	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**
1156495	0	1391610	0
1862 Matching	**1890 Matching**	**1862 Matching**	**1890 Matching**
1156495	0	1391610	0
1862 All Other	**1890 All Other**	**1862 All Other**	**1890 All Other**
1820148	0	4225707	0

V(D). Planned Program (Activity)

1. Brief description of the Activity

- Meet with stakeholder groups to gather input and refine program directions.
- Develop improved crop cultivars acceptable to growers and those who use and process the grain.
- Present crop research results at field days and grower meetings, popular press, radio and TV spots, web sites, and educational classes and workshops to foster producer adoption.
- Evaluate the effectiveness and impact of the Extension programming.

2. Brief description of the target audience

The targeted audience will include but not be limited to:

1. Crop producers in North Dakota and surrounding states
2. Crop consultants and agricultural advisors
3. Commodity groups
4. Crop improvement associations
5. Extension personnel
6. Agribusiness and agricultural finance personnel
7. Government agencies

3. How was eXtension used?

eXtension was not used in this program

V(E). Planned Program (Outputs)

1. Standard output measures

2015	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Actual	330098	6305671	9709	64344

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

Patent Applications Submitted

Year:	2015
Actual:	4

Patents listed
Rosie Dry Beans
Talon Dry Beans
ND Gold Flax
Joppa Durum Wheat

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

2015	Extension	Research	Total
Actual	38	60	98

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 acres of hard red spring wheat and number of acres of durum wheat grown in North Dakota are seeded with NDSU derived cultivars.
2	Number of farmers adopting new practices to achieve highly productive crops in a changing environment.
3	Number of farmers adopting new practices to improve pest management in a changing environment.

Outcome #1

1. Outcome Measures

Number of acres of hard red spring wheat and number of acres of durum wheat grown in North Dakota are seeded with NDSU derived cultivars.

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2015	2730000

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Wheat is a crop that has been climate adapted over the centuries. Developing cultivars suited to the northern great plains helps increase production in an area frequented with climate extremes. These cultivars in turn are propagated, multiplied and grown through the efforts of crop producers, crop consultants, nutritionists, crop consultants, commodity groups, Extension personnel, Crop Improvement Associations, and ultimately the consumer.

What has been done
The ND AES has led the way in the development of new and improved germplasm in 14 crops, including some with multiple market classes. Improved germplasm has improved resistance to abiotic and biotic stresses. The improved germplasm also has improved end use quality that is desired by those who use and process the harvested seed.

Results
In 2015 NDSU AES released one two-rowed barley cultivar and one conventional soybean cultivar.

4. Associated Knowledge Areas

KA Code	Knowledge Area
202	Plant Genetic Resources
203	Plant Biological Efficiency and Abiotic Stresses Affecting Plants
211	Insects, Mites, and Other Arthropods Affecting Plants
212	Pathogens and Nematodes Affecting Plants

216 Integrated Pest Management Systems

Outcome #2

1. Outcome Measures

Number of farmers adopting new practices to achieve highly productive crops in a changing environment.

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2015	250

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
The US consumer has become concerned about where their food comes from and the stewardship of the natural resources used to produce their food. Producers are concerned that the practices they use today ensure that their farms and production units are sustainable in the future. Citizens are learning how to grow their own produce and add aesthetic value to their homes and lives, as well as serving others.

What has been done
NDSU AES has conducted research to improve production and efficiency of small grains, corn, soybeans, sunflowers, canola, dry beans, flax, horticulture, cropping systems, weed control, potatoes, and sugarbeets. NDSU ES provided educational programs on production practices for these crops to farmers and agri-professionals.

Results
The percentage of sugarbeet growers using a cover crop to protect sugarbeet seedlings increased 5-percentage units in 2015.

In total, 151 Master Gardeners in 32 counties volunteered 6,752 hours (3.24 FTE). Using a commonly used formula for valuing volunteer hours, Master Gardeners contributed $169,684 in horticultural services to North Dakota. The number of volunteer hours is up 151% from 2013.

4. Associated Knowledge Areas

KA Code	Knowledge Area

102	Soil, Plant, Water, Nutrient Relationships
103	Management of Saline and Sodic Soils and Salinity
205	Plant Management Systems
211	Insects, Mites, and Other Arthropods Affecting Plants
212	Pathogens and Nematodes Affecting Plants
213	Weeds Affecting Plants
216	Integrated Pest Management Systems
405	Drainage and Irrigation Systems and Facilities

Outcome #3

1. Outcome Measures

Number of farmers adopting new practices to improve pest management in a changing environment.

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2015	150

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Fusarium head blight (scab) of small grains has incurred over $3 billion in economic losses to growers in the United States since 1990. Although this disease can cause substantial yield loss, quality losses also occur when the causal organism releases mycotoxins (vomitoxin, deoxynivalenal) in the infection process. This imposes price dockage for growers at the point of sale and additional expenses may occur for end users. Subsequently, the disease can affect growers, the industry and consumers alike.

What has been done
The ND AES and NDSU ES have established a strong research and Extension program to deal with Fusarium head blight. Using this framework, several scab integrated management trials funded by the US Wheat and Barely Scab Initiative were conducted across the state. Extension presentations on scab management were given in scab-stricken locations through Extension programs, county Ag days, crop improvement meetings and REC field days. Results of research trials and the implementation of scab management tools were presented to the audience.

Results

The integrated management research trials showcased the importance of using less susceptible varieties, well-timed fungicide applications and crop rotation in managing Fusarium head blight and vomitoxin. This type of information was well-received by growers and was included in their crop management plan in 2015. Also, several of the attendees at the meetings indicated they learned something new that will be used in the upcoming growing season. As an example of documenting grower and industry awareness in a scab-stricken area, one agronomy center in Divide County in 2015 hired additional aircraft to deliver timely fungicide applications for growers. This was a drastic increase in Fusarium related activities from the previous 2014 season.

4. Associated Knowledge Areas

KA Code	Knowledge Area
102	Soil, Plant, Water, Nutrient Relationships
103	Management of Saline and Sodic Soils and Salinity
205	Plant Management Systems
211	Insects, Mites, and Other Arthropods Affecting Plants
212	Pathogens and Nematodes Affecting Plants
213	Weeds Affecting Plants
216	Integrated Pest Management Systems
405	Drainage and Irrigation Systems and Facilities

V(H). Planned Program (External Factors)

External factors which affected outcomes

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

Brief Explanation

V(I). Planned Program (Evaluation Studies)

Evaluation Results

Using a 1 to 5 rating system with 1 indicating no knowledge and 5 indicating very knowledgeable, attendees of potato extension education programs indicated that their general knowledge of potato production (3.2 to 3.6), ability to identify potato insects (2.8 to 3.2), ability to identify common potato weeds (3.4 to 3.9) and common potato diseases (2.7 to 3.1) increased as a result of the Scout School. Surveys were taken prior to the Scout

School and 10 months later.

Soybean producers were asked the question: If you were to place a dollar value on the information you received (when you apply the knowledge you learned in your business), what would it be per acre? The average of those who answered (27% of attendees) was $9.10 per acre. The growers reported they, on average, managed 1,872, 926, 1,870, and 1,790 soybean acres in Streeter, Underwood, Minot and Newburg, respectively. The total estimated perceived value across the four ND locations was about 2.8 million dollars.

At venues where formal surveys were conducted, at least 50% of the audience indicated they learned something new or gained important insight that will be applied to their farming operation.

Based on the national survey results from the US Wheat and Barley Scab Initiative, 85% of the wheat growers in ND have faced scab problems within the last year and over 60% of those growers use wheat varieties that are moderately resistant to scab.

Key Items of Evaluation

V(A). Planned Program (Summary)

Program # 2

1. Name of the Planned Program

Natural Resources

☑ Reporting on this Program

V(B). Program Knowledge Area(s)

1. Program Knowledge Areas and Percentage

KA Code	Knowledge Area	%1862 Extension	%1890 Extension	%1862 Research	%1890 Research
102	Soil, Plant, Water, Nutrient Relationships	25%		25%	
103	Management of Saline and Sodic Soils and Salinity	25%		25%	
205	Plant Management Systems	25%		25%	
405	Drainage and Irrigation Systems and Facilities	25%		25%	
	Total	100%		100%	

V(C). Planned Program (Inputs)

1. Actual amount of FTE/SYs expended this Program

Year: 2015	Extension		Research	
	1862	1890	1862	1890
Plan	15.2	0.0	22.7	0.0
Actual Paid	16.0	0.0	14.0	0.0
Actual Volunteer	0.0	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**
269729	0	273085	0
1862 Matching	**1890 Matching**	**1862 Matching**	**1890 Matching**
269729	0	273085	0
1862 All Other	**1890 All Other**	**1862 All Other**	**1890 All Other**
937243	0	1116326	0

V(D). Planned Program (Activity)

1. Brief description of the Activity

1. Determine thresholds for salinity and sodicity to serve as management goals on affected soils
2. Produce systems to reclaim saline and sodic areas within farm fields
3. Determine the strengths and weaknesses of saline and sodic soil reclamation methods
4. Determine the interaction of salinity, sodicity and soil microorganisms
5. Survey and improve management recommendations for insect pests on the major crops
6. Devise improved range management methods to allow increased soil health in saline or sodic threatened soils
7. Provide improved guidelines to growers on best choice of crops for lands affected by salts or sodium
8. Translate scientific findings into practical producer applications and provide transformational education through workshops, field days and conferences, and resource materials
9. Conduct research on controlled drainage and subsurface irrigation to improve crop yield
10. Translate scientific findings into practical producer applications and provide transformational education through workshops, field days and conferences, and resource materials

2. Brief description of the target audience

The targeted audience will include but not be limited to:

1. Crop producers in North Dakota and surrounding states
2. Crop consultants and agricultural advisors
3. Commodity groups
4. Crop improvement associations
5. Extension personnel
6. Agribusiness and agricultural finance personnel
7. Government agencies

3. How was eXtension used?

Extension personnel answered questions submitted to extension in their areas of specialty.

V(E). Planned Program (Outputs)

1. Standard output measures

2015	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Actual	28948	358579	742	3659

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

Patent Applications Submitted

Year:	2015
Actual:	0

Patents listed

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

2015	Extension	Research	Total
Actual	10	10	20

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

Outcome #1

1. Outcome Measures

Number of farmers and landowners who understand the source of salinity and sodicity, and take steps to prevent their spread.

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2015	300

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Soil salinity and sodicity negatively impacts soil health and the ability of farmers and landowners to produce food and support their families economically, and in a larger scope feed the people of the world.

What has been done
Extension efforts have been coordinated by state and regional Extension specialists utilizing field demonstration plots throughout ND, large grower meetings, and small Café meetings to reach growers with methods that could be used to reduce soil salinity.

Results
A growing number of growers are adopting the use of cover crops, proper crop selection, improved drainage and modified no-till systems as a result of intensive educational efforts in salt and sodium reduction techniques.

4. Associated Knowledge Areas

KA Code	Knowledge Area
102	Soil, Plant, Water, Nutrient Relationships
103	Management of Saline and Sodic Soils and Salinity
205	Plant Management Systems
405	Drainage and Irrigation Systems and Facilities

Outcome #2

1. Outcome Measures

Number of farmers and ranchers who better understand the relationship between range plants, crop plants, ground water management, and salinity and sodicity management.

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2015	200

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Soil salinity and sodicity decreases the overall productivity of the soil and ultimately the feed value of pasture and range, and soil health in general.

What has been done
Extension specialists have included programming in larger and smaller grower meetings to explain the source of salinity and sodicity and recommend proper forage crop selection and salinity reduction techniques to ranchers.

Results
Ranchers are better informed regarding the source of salinity and sodicity on their land and some are making progress through better forage crop/species selection to stop the further spread of salinity on their land.

4. Associated Knowledge Areas

KA Code	Knowledge Area
102	Soil, Plant, Water, Nutrient Relationships
103	Management of Saline and Sodic Soils and Salinity
205	Plant Management Systems
405	Drainage and Irrigation Systems and Facilities

Outcome #3

1. Outcome Measures

Number of farmers and landowners who better understand surface and sub-surface moisture management and how it impacts soil health and crop production management.

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2015	50

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
A little over one percent of the cultivated land in North Dakota is irrigated yet it uses over 50% of the permitted fresh water allocated by the ND State Water Commission. Economic analysis indicates that generally, one irrigated acre is equal to over 4 dryland acres in economic return to the farmer before government payments. Over the past 15 years, excess precipitation has meant that interest in irrigation water management has been low and therefore it has been a low priority work area for the Natural Resources Conservation Service (NRCS). Many irrigation practices are cost shared by the NRCS through the EQIP program and recently, they have received many requests for cost share assistance to install variable rate irrigation (VRI) systems on existing center pivots.

What has been done
A collaborative effort was initiated between the NRCS and Extension specialists to conduct Drainage Water Management Level II training for NRCS personnel in the 12 Midwest states. Led by South Dakota Extension, a multi-state training grant was initiated between Extension specialists in 8 states and the NRCS. To reduce travel costs and accommodate a large number of people, the training consisted of two phases. Phase I was the development of 8 online training modules, each about 1 hour in length, to present the various aspects of DWM. NDSU Extension developed module 5, Water Control Structures. These modules can be found online at: http://www.conservationwebinars.net/webinars/dwm-module-2-1. Phase II consisted of onsite training sessions held in locations where the NRCS employees could drive to in a few hours. Prior to attending the onsite training, the NRCS employees were expected to view the 8 online training modules.

Results

Over 100 NRCS employees were trained at the 4 training sessions held in North Dakota, Another 53 were trained at the two Minnesota sessions, half of them were from ND. Over 600 NRCS personnel were trained in the 12 midwestern states.

4. Associated Knowledge Areas

KA Code	Knowledge Area
102	Soil, Plant, Water, Nutrient Relationships
103	Management of Saline and Sodic Soils and Salinity
405	Drainage and Irrigation Systems and Facilities

V(H). Planned Program (External Factors)

External factors which affected outcomes

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

Brief Explanation

V(I). Planned Program (Evaluation Studies)

Evaluation Results

Evaluations of field demonstration days and winter grower/rancher meetings large and small showed increased learning of concepts and a desire to implement some of the strategies covered or demonstrated by a smaller proportion of attendees on their land.

On-line training was also utilized. Evaluations were generally positive, but on-line participants did think the modules used with the irrigation training were too long.

Key Items of Evaluation

Demonstrations in the field were highly effective. Educational program delivery by multiple layers of educators (specialist and county agent; or even better utilizing a specialist, county agent, and independent ag consultant or early grower/rancher adopter) was also highly effective in increasing grower/rancher desire to consider and change soil health practices.

V(A). Planned Program (Summary)

Program # 3

1. Name of the Planned Program

Livestock Systems

☑ Reporting on this Program

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	25%		15%	
301	Reproductive Performance of Animals	30%		35%	
302	Nutrient Utilization in Animals	30%		35%	
305	Animal Physiological Processes	15%		15%	
	Total	100%		100%	

V(C). Planned Program (Inputs)

1. Actual amount of FTE/SYs expended this Program

Year: 2015	Extension		Research	
	1862	1890	1862	1890
Plan	6.5	0.0	23.3	0.0
Actual Paid	21.0	0.0	21.0	0.0
Actual Volunteer	0.0	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**
436566	0	473709	0
1862 Matching	**1890 Matching**	**1862 Matching**	**1890 Matching**
436566	0	473709	0
1862 All Other	**1890 All Other**	**1862 All Other**	**1890 All Other**
929815	0	1833606	0

V(D). Planned Program (Activity)

1. Brief description of the Activity

Educational programming will be conducted using a variety of methods including: face to face meetings, webinars, news releases, media interviews, in-service training programs, needs assessments, advisory boards, and social media. Research activities include livestock and forage research, laboratory activities, and pursuit of grant funds.

2. Brief description of the target audience

The targeted audience will include but not be limited to:

1. Livestock producers in North Dakota and surrounding states
2. Livestock consultants and agricultural advisors
3. Veterinarians
4. Commodity groups
5. Livestock improvement associations
6. Extension personnel
7. Agribusiness and agricultural finance personnel
8. Government agencies

3. How was eXtension used?

The NDSU Extension equine specialist is a member of extension and participates in the Horse Quest team.

V(E). Planned Program (Outputs)

1. Standard output measures

2015	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Actual	57990	1998603	2000	20394

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

Patent Applications Submitted

Year: 2015

Actual: 0

Patents listed

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

2015	Extension	Research	Total
Actual	14	10	24

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 ND livestock producers with increased knowledge of practices to improve the efficiency of livestock production systems, including use of improved livestock genetics and use of practices to improve reproductive efficiency.
2	Number of ND livestock producers with increased knowledge of practices to improve livestock stewardship practices and use of improved nutrition.

Outcome #1

1. Outcome Measures

Number of ND livestock producers with increased knowledge of practices to improve the efficiency of livestock production systems, including use of improved livestock genetics and use of practices to improve reproductive efficiency.

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2015	350

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Improved efficiency of livestock production is an increasingly important issue for livestock producers, consumers, and the general public. As world population grows to nearly 9 to 9.5 billion over the next several decades, livestock producers must improve the efficiency at which nutrients and other inputs are converted to muscle protein. This issue also directly impacts resource use efficiency and the impact of livestock production on the environment.

What has been done
Educational programs were conducted which directly and indirectly addressed these topics. Specialists had face to face educational meetings, webinars, developed written bulletins, and used a variety of forms of media to deliver these messages and programs. In addition, direct contact on the farm or ranch was also used in the educational effort.

Results
350 livestock producers have gained knowledge about these topics areas following face to face meetings with Extension specialists involved in the programs. Ranchers participating in the Dakota Feeder Calf Show feedout project self reported an increased profitability in their own cattle herds of $112 per head on average.

4. Associated Knowledge Areas

KA Code	Knowledge Area
121	Management of Range Resources
301	Reproductive Performance of Animals

302	Nutrient Utilization in Animals
305	Animal Physiological Processes

Outcome #2

1. Outcome Measures

Number of ND livestock producers with increased knowledge of practices to improve livestock stewardship practices and use of improved nutrition.

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2015	501

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Livestock stewardship is an increasingly important issue with consumers, livestock producers and food companies. Consumers are demanding more transparency with food production including the means by which animals are produced, how they are handled, what they have been fed, and certifications that they have been cared for in a humane manner. Livestock producers need to be aware of these trends and understand that, in some cases, the marketplace is demanding these attributes.

What has been done
Meetings were held to educate dairy producers about good livestock stewardship practices. Hands on demonstration meetings for dairy producers were held in North Dakota, South Dakota, and Minnesota. In addition, educational programs were developed to educate livestock producers, veterinarians, and county agents about new regulations related to the use of antimicrobials in feeds. An advisory board provided input into stewardship programming efforts. This advisory board consists of livestock producers, allied industry personnel, veterinarians, restaurant owners, and consumers.

Results
Producers gained a better understanding of low stress livestock handling techniques. Audiences had increased awareness of regulations related to antimicrobial use. The advisory board provides a mechanism by which programming can be prioritized and feedback provided for Extension specialists.

4. Associated Knowledge Areas

KA Code	Knowledge Area
121	Management of Range Resources
302	Nutrient Utilization in Animals
305	Animal Physiological Processes

V(H). Planned Program (External Factors)

External factors which affected outcomes

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

Brief Explanation

V(I). Planned Program (Evaluation Studies)

Evaluation Results

Our evaluations indicated that the programming efforts were successful at increasing knowledge regarding livestock production, good stewardship practices, and methods to improve production efficiency.

Key Items of Evaluation

A broader effort is needed to improve awareness regarding antimicrobial resistance (AMR) and stewardship.

V(A). Planned Program (Summary)

Program # 4

1. Name of the Planned Program

Economic and Community Vitality

☑ Reporting on this Program

V(B). Program Knowledge Area(s)

1. Program Knowledge Areas and Percentage

KA Code	Knowledge Area	%1862 Extension	%1890 Extension	%1862 Research	%1890 Research
602	Business Management, Finance, and Taxation	35%		100%	
608	Community Resource Planning and Development	15%		0%	
803	Sociological and Technological Change Affecting Individuals, Families, and Communities	50%		0%	
	Total	100%		100%	

V(C). Planned Program (Inputs)

1. Actual amount of FTE/SYs expended this Program

Year: 2015	Extension		Research	
	1862	1890	1862	1890
Plan	7.6	0.0	9.4	0.0
Actual Paid	22.5	0.0	13.5	0.0
Actual Volunteer	0.0	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**
361755	0	205817	0
1862 Matching	**1890 Matching**	**1862 Matching**	**1890 Matching**
361755	0	205817	0
1862 All Other	**1890 All Other**	**1862 All Other**	**1890 All Other**
1369171	0	1349391	0

V(D). Planned Program (Activity)

1. Brief description of the Activity

Educational programming will be conducted using a variety of methods including: face to face meetings, webinars, new releases, media interviews, in-service training programs, needs assessments, advisory boards, and social media. Research activities include develop new risk management tools for underserved commodities. Educational activities include use of the real-time commodity training room, and training through the Rural Leadership North Dakota (RLND) program.

2. Brief description of the target audience

- crop producers
- livestock producers
- small business entrepreneurs
- civic leaders
- commodity groups
- government agencies
- eXtension communities of practice

3. How was eXtension used?

Business leaders were targeted using eXtension with the Power of Business effort. Friday chats, weekly blogs, as well as some title testing, video testing and Facebook ad testing were completed.

V(E). Planned Program (Outputs)

1. Standard output measures

2015	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Actual	87789	1474025	2251	15041

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

Patent Applications Submitted

Year:	2015
Actual:	0

Patents listed

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

2015	Extension	Research	Total
Actual	5	3	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	Number of growers and industry personnel who increase their knowledge of price risk management strategies, production risk management strategies, and financial risk management strategies.
2	Number of individuals involved in new leadership roles as a result of leadership programs.

Outcome #1

1. Outcome Measures

Number of growers and industry personnel who increase their knowledge of price risk management strategies, production risk management strategies, and financial risk management strategies.

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2015	3500

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Risk management training is needed for lenders to make informed lending decisions, producers to mitigate declining commodity prices, and industry stakeholders to minimize risks and increase revenues.

What has been done
Actions taken include:
- Hosting Ag Lenders Conferences - 310 participants from ND, MN, SD, and MT
- Hosting Crop Insurance Conferences - 230 participants
- Provided ongoing Farm Bill implementation assistance to more than 1,500 growers
- Provided multiday training in Commodity Trading Room for the Soybean Council, Corn Council, Canola Growers, and Wheat Commission - more than 100 industry participants
- Hosted a Bioenergy Summit for about 75 participants
- Developed and maintained crop budgets for the 12 crops in which ND consistently ranks #1 in production for more than 1,500 ag producers

Results

Risk management activities focused on three core programs:

Ag. Lenders Conference

- Agriculture lenders indicated they increased their knowledge of risk management tools through feedback via a formal survey evaluation
- Ninety agriculture lenders estimated their multiplier activities utilizing Extension information affects 7,500 producers within ND.

Crop Insurance

- More than 230 participants received continuous education credits
Farm Bill Education and Implementation
- Of those producers who attended Farm Bill educational seminars, 95% indicated they would be more likely to use the NDSU Extension Service in the future.

4. Associated Knowledge Areas

KA Code	Knowledge Area
602	Business Management, Finance, and Taxation
803	Sociological and Technological Change Affecting Individuals, Families, and Communities

Outcome #2

1. Outcome Measures

Number of individuals involved in new leadership roles as a result of leadership programs.

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2015	109

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
North Dakotans have been concerned with the shortage of leaders in communities and organizations across North Dakota, especially in rural areas.

What has been done
Since 2003, the 18- month Rural Leadership North Dakota program has been offered to increase leadership skills. In 2009, a Rural Leadership Short Course was added to provide North Dakotans that were unable to participate in the longer event due to time constraints, the chance to learn about themselves, their communities, and the state. These programs are offered annually by NDSU Extension.

In 2015, Lead Local, a one-day boardsmanship training was added to the course offerings. This

program helps build the confidence of participants serving on boards, councils and committees by helping them understand meeting basics, parliamentary procedure, and handling conflict in groups.

Also in 2015, the "Stronger Economies Together" (SET) program was implemented in one region of the state to help build a regional economic development plan. In addition to building this plan, the program encourages current and aspiring leaders to be engaged in the process for community betterment. This program is still in progress but evidence supports five individuals in the region stepping up in leadership roles in 2015.

A leadership in local foods program was provided to help support community leaders in expanding the local foods efforts in their region.

Results

As of the end of 2015, 140 individuals have completed the 18-month RLND program. Over $4 million has been invested in the 100+ RLND projects, five businesses have been started, and nine individuals have run for public office. Over 80% of alumni have taken leadership of various community projects and 20 of them have been asked to serve on boards and councils they had not served on before.

Seven RLND Short Course programs have been offered in 15 communities with 140 participants since inception. Two of the participants have run for public office and several local projects have been accomplished.

Participants in Lead Local indicated:
- 75% feeling confident in running a meeting using parliamentary procedure
- 86% understanding how to use the components of an effective meeting
- 92% feeling prepared to serve on a local board, council or committee

While the SET program continues into 2016, there is evidence of five individuals moving into leadership roles at this early stage in the program. They are serving as committee chairs and one serves on the statewide SET support committee.

Local foods leadership initiative resulted in over 1,000 volunteers providing over 4,500 hours of support for local Foods projects.

4. Associated Knowledge Areas

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

V(H). Planned Program (External Factors)

External factors which affected outcomes

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

Brief Explanation

V(I). Planned Program (Evaluation Studies)

Evaluation Results

Risk management activities focused on three core programs:
Ag. Lenders Conference

- Agriculture lenders indicated they increased their knowledge of risk management tools through feedback via a formal survey evaluation
- Ninety agriculture lenders estimated their multiplier activities utilizing Extension information affects 7,500 producers within ND.

Crop Insurance

- More than 230 participants received continuing education credits

Farm Bill Education and Implementation

- Of those producers who attended Farm Bill educational seminars, 95% indicated they would be more likely to use the NDSU Extension Service in the future.

Each leadership program is evaluated using various methods such as quantitative surveys, qualitative focus groups, case studies and observation. A longitudinal study is ongoing with the Rural Leadership North Dakota course to evaluate:

- Effectiveness of creating a network of people across the state and beyond that leadership program graduates will utilize
- Participants' leadership, critical thinking and communication skills
- Improvement of the quality of life for the participant, organization and community
- Participants' preparedness to work with an issue they are passionate about in their community/organization

Key Items of Evaluation

Of farmers and ranchers who participated in Farm Bill educational seminars and training sessions, 95% reported they would likely use Extension in the future. Many of these producers had never had any interaction with Extension before this training. It is imperative that Extension's abilities and capacities be communicated to other Agencies within and outside of USDA in order to leverage Extension's value to the public.

V(A). Planned Program (Summary)

Program # 5

1. Name of the Planned Program

4-H Youth Development

☑ Reporting on this Program

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%	
806	Youth Development	50%		0%	
	Total	100%		0%	

V(C). Planned Program (Inputs)

1. Actual amount of FTE/SYs expended this Program

Year: 2015	Extension		Research	
	1862	1890	1862	1890
Plan	9.1	0.0	0.0	0.0
Actual Paid	22.5	0.0	0.0	0.0
Actual Volunteer	54.0	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**
436401	0	0	0
1862 Matching	**1890 Matching**	**1862 Matching**	**1890 Matching**
436401	0	0	0
1862 All Other	**1890 All Other**	**1862 All Other**	**1890 All Other**
857236	0	0	0

V(D). Planned Program (Activity)

1. Brief description of the Activity

A variety of different programs and methods are used to reach North Dakota youth, including afterschool programming, 4-H military partners, club learning experiences and science related events such as the 4-H Aerospace Event, Geospatial and Robotics Technologies for the 21st Century (GEAR-Tech-21) Camp, 4-H Camps, Kids Power, Children, Youth and Families at Risk (CYFAR) Project, 4-H Robotics Event, 4-H Film Festival and National 4-H Youth Science Day.

In an effort to increase the science related knowledge and confidence level of county staff and volunteer leaders several trainings are offered. These trainings have used the inquiry based and experiential learning methods for youth.

2. Brief description of the target audience

North Dakota 4-H Science programs reach more than 12,000 youth with hands-on learning experiences to prepare the next generation of science, engineering, and technology leaders. A special effort is made where Native American youth on four reservations are targeted as an underserved audience.

3. How was eXtension used?

eXtension was not used in this program

V(E). Planned Program (Outputs)

1. Standard output measures

2015	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Actual	12353	93337	172937	1306712

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

Patent Applications Submitted

Year:	2015
Actual:	0

Patents listed

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

2015	Extension	Research	Total
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

Outcome #1

1. Outcome Measures

Number of 4-H youth indicating they would like to have a job related to science.

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2015	320

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
North Dakota's situation parallels that of the United States, there are opportunities to hold a job in a field related to science. There is a shortage of people to fill these positions so the job sector is turning to education to assist them in generating a pool of people who might be interested in holding these positions. To interest youth in science we must engage them in science. Consistent with our role and purpose, this engagement should be done through hands on, active learning methods. This is a niche that 4-H youth development, as a non-formal, experiential learning based program can provide.

What has been done
Educational opportunities provided include 4-H National Science Day experiment, Agriculture in the Classroom type programs, North Dakota 4-H Film Festival, Robotics Challenges, Aerospace Camp, Geospatial Projects, science-based 4-H project work and a hands on science training for educators.

Results
A total of 42,187 science, engineering and technology contacts were made, these include possible duplicates.

4. Associated Knowledge Areas

KA Code	Knowledge Area
803	Sociological and Technological Change Affecting Individuals, Families, and Communities
806	Youth Development

Outcome #2

1. Outcome Measures

Number of 4-H youth indicating that they think science will be important in their future.

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2015	16030

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
North Dakota's situation parallels that of the United States, there are opportunities to hold a job in a field related to science. There is a shortage of people to fill these positions so the job sector is turning to education to assist them in generating a pool of people who might be interested in holding these positions. To interest youth in science we must engage them in science. Consistent with our role and purpose, this engagement should be done through hands on, active learning methods. This is a niche that 4-H youth development, as a non-formal, experiential learning based program can provide.

What has been done
Educational opportunities provided include 4-H National Science Day experiment, Agriculture in the Classroom type programs, North Dakota 4-H Film Festival, Robotics Challenges, Aerospace Camp, Geospatial Projects, science-based 4-H project work and a hands on science training for educators.

Results
Adult volunteers report from program evaluations that they plan to use more science activities at 4-H club meetings, Afterschool program staff reported youth were more motivated because they were being involved in hands-on, active learning activities as part of the program. Youth learned science principles and also how to work as a team. Science includes the utilization of technology. After attending the Gear-tech camp, participants shared that they felt like they could teach, or help teach, creating a digital map.

4. Associated Knowledge Areas

KA Code	Knowledge Area
803	Sociological and Technological Change Affecting Individuals, Families, and

	Communities
806	Youth Development

V(H). Planned Program (External Factors)

External factors which affected outcomes

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

Brief Explanation

The retirement of a lead specialist resulted in incomplete data collection and evaluation at the end of this program year. The resignation of a key extension agent working in this area during the year also resulted in some program incompletion. The program will also move through a phase of reevaluation once new staffing is in place.

V(I). Planned Program (Evaluation Studies)

Evaluation Results

Adults who were trained and youth who were taught showed an increase in participating in science related educational activities across all types of programs offered. This increase in interest is expected to translate into more interest in science and also having a career related to the science disciplines. Long term and consistent data collection will be necessary to substantiate this.

Key Items of Evaluation

V(A). Planned Program (Summary)

Program # 6

1. Name of the Planned Program

Human Development and Education

☑ Reporting on this Program

V(B). Program Knowledge Area(s)

1. Program Knowledge Areas and Percentage

KA Code	Knowledge Area	%1862 Extension	%1890 Extension	%1862 Research	%1890 Research
607	Consumer Economics	20%		0%	
703	Nutrition Education and Behavior	30%		0%	
724	Healthy Lifestyle	30%		0%	
806	Youth Development	20%		0%	
	Total	100%		0%	

V(C). Planned Program (Inputs)

1. Actual amount of FTE/SYs expended this Program

Year: 2015	Extension		Research	
	1862	1890	1862	1890
Plan	6.9	0.0	0.8	0.0
Actual Paid	33.0	0.0	0.0	0.0
Actual Volunteer	0.0	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**
185527	0	0	0
1862 Matching	**1890 Matching**	**1862 Matching**	**1890 Matching**
185527	0	0	0
1862 All Other	**1890 All Other**	**1862 All Other**	**1890 All Other**
2037807	0	0	0

V(D). Planned Program (Activity)

1. Brief description of the Activity

Educational programming will be conducted using a variety of methods including: face to face meetings, webinars, news releases, media interviews, in-service training programs, needs assessments, advisory boards, and social media.

School-based curricula, including "On the Move to Better Health", "Banking on Strong Bones", and "Go Wild for Fruits and Vegetables" will continue to be used with children. Community-based programs, including the "Nourish Your Body" series of lessons will be implemented for adults. A "Designing Your Succession Plan" curriculum will be developed and used at multiple sites across ND, eventually culminating in a succession planner "certification" program.

2. Brief description of the target audience

The targeted audience will include but not be limited to:

1. Children, teens and adults targeted in educational programming related to nutrition, food safety and health.
2. Crop and livestock producers in North Dakota and surrounding states
3. Agricultural, agribusiness and financial advisors
4. Accountants and attorneys
5. Commodity groups
6. Extension personnel
7. Government agencies

3. How was eXtension used?

eXtension is used as a source of professional development and training, resource review, and program planning support. The majority of our programs are not delivered to target audiences directly using eXtension.

V(E). Planned Program (Outputs)

1. Standard output measures

2015	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Actual	54652	2810860	109304	181346

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

Patent Applications Submitted

Year:	2015
Actual:	0

Patents listed

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

2015	Extension	Research	Total
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

Outcome #1

1. Outcome Measures

Number of adults and children participating in education curricula conducted in formal and informal situations reporting improvements in one or more healthy lifestyle behaviors.

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2015	10041

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
In order to improve overall health and well-being, behavior changes must be made and the two most critical things to change are diet and exercise. These programs target increased fruit and vegetable consumption and calcium intake for youth, as well as increased physical activity. Increasing intake of healthy foods and physical activity will yield best possible health outcomes.

What has been done
Several programs have been implemented throughout North Dakota for students and adults:
On the Move to Better Health (Sr) [grade 4]
On the Move to Better Health (Jr) [grade 2]
Go Wild with Fruits and Veggies [grade 3]
Teens serving Food Safely (teens)
Nourishing Boomers and Beyond (adults)

Results
On The Move program:
Number and/or percentage who made a positive change
o89% reported eating more fruits (Jr)
o77% reported eating more vegetables (Jr)
o78% reported eating more whole grains (Jr)
o88% reported eating more dairy (Jr)
o91% reported participating in more physical activity (Jr)
o50% reported noticing their child ate more dairy (Jr)
o56% reported noticing their child ate more fruit (Jr)
o42% reported noticing their child ate more vegetables (Jr)

o25% reported noticing their child ate more whole Grains (Jr)
o52% reported their child asked for more healthful snacks (Jr)

During the program participants reported:
o48% increased fruits (Sr)
o53% drank more milk (Sr)
o60% drank less pop (Sr)
o64% drank more water (Sr)
o56% chose healthier snacks (Sr)
o55% increased exercise (Sr)
o67% said they met the goals they had set during the program (Sr)

Families indicated they
o37% increased fruits (Sr)
o30% increased vegetables (Sr)
o17% increased dairy (Sr)
o14% increased whole grains (Sr)

Go Wild With Fruits and Veggies
Number of youth participants for 2014-15 = 749
Percentage who made a positive change after participating in this program:
o Do you eat more fruit? 89% yes
o Do you eat more vegetables? 69% yes

Teens Serving Food Safely
o80 percent reported washing their hands more often during food preparation.
o67 percent reported being more careful about cleaning and sanitizing utensils to prevent cross-contamination.
o48 percent had shared their knowledge about food safety with others.
o38 percent already had applied what they learned when preparing food for the public.
o22 percent had used a food thermometer more often.
o22 percent had checked refrigerator and freezer temperatures more often.

Nourishing Boomers and Beyond
o99 to 100% report they plan to make changes in their diet

Website visitors have come from 37 states and 12 countries. In the preceding year, the site has had a total reach of 281,242 visitors from 37 states and 12 countries. The e-newsletter is delivered monthly to 757 people via email and has an average open rate of 40%, compared to the national average of 18% for educational newsletters. According to a survey of e-newsletter readers (n=437), 86% reading most or all of it every month, 43% have shared the content, 45% have prepared a recipe, 38% have used the information to modify what they eat, and 47% have explored the links.

4. Associated Knowledge Areas

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

806 Youth Development

Outcome #2

1. Outcome Measures

Number of participants in the "Succession Planning" program indicating they intend to develop a succession plan for their business.

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2015	62

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
A record number of farmers are retiring and the financial consequences to the state and local economy are huge. Families can find literature on types of succession planning tools, but the key factor to success is quality communication among partners and family members. Design Your Succession Plan (DYSP) targets families that need support in initiating conversation, communicating effectively and fairly, and preparing materials needed before meeting with professionals.

What has been done
In 2014 a new curriculum was developed and piloted. In 2015, the first workshops were held and 88 adults participated. In 2015 the next phase was piloted and 30 professionals were invited to a succession planner training session to become certified in the ND. Being certified allowed the (DYSP) program to promote those who are certified to help families complete their succession plans after they leave the program.

Results
A total of 88 adults participated in the 2015 DYSP program. Of those responding to a follow up survey, 70% reported they had visited with family members about the succession plan for their economic enterprise following the DYSP workshop. Of the survey respondents, 44% reported they had chosen and met with a professional about their succession plan following the workshop.

4. Associated Knowledge Areas

KA Code	Knowledge Area
607	Consumer Economics

V(H). Planned Program (External Factors)

External factors which affected outcomes

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

Brief Explanation

V(I). Planned Program (Evaluation Studies)

Evaluation Results

A total of 88 adults participated in the 2015 DYSP program. Of those responding to a follow up survey, 70% reported they had visited with family members about the succession plan for their economic enterprise following the DYSP workshop. Of the survey respondents, 44% reported they had chosen and met with a professional about their succession plan following the workshop.

Key Items of Evaluation

VI. National Outcomes and Indicators

1. NIFA Selected Outcomes and Indicators

Childhood Obesity (Outcome 1, Indicator 1.c)	
0	Number of children and youth who reported eating more of healthy foods.
Climate Change (Outcome 1, Indicator 4)	
0	Number of new crop varieties, animal breeds, and genotypes whit climate adaptive traits.
Global Food Security and Hunger (Outcome 1, Indicator 4.a)	
0	Number of participants adopting best practices and technologies resulting in increased yield, reduced inputs, increased efficiency, increased economic return, and/or conservation of resources.
Global Food Security and Hunger (Outcome 2, Indicator 1)	
0	Number of new or improved innovations developed for food enterprises.
Food Safety (Outcome 1, Indicator 1)	
0	Number of viable technologies developed or modified for the detection and
Sustainable Energy (Outcome 3, Indicator 2)	
0	Number of farmers who adopted a dedicated bioenergy crop
Sustainable Energy (Outcome 3, Indicator 4)	
0	Tons of feedstocks delivered.