2014 North Dakota State University Combined Research and Extension Plan of Work

Status: Accepted

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I. Plan Overview

1. Brief Summary about Plan Of Work

The NDSU Extension Service (NDSU ES) and the North Dakota Agricultural Experiment Station (ND AES) are integral units of North Dakota State University. The main campus is located at Fargo, North Dakota. The extension service and experiment station serve the citizens of the state through the main campus as well as 53 extension offices located in 52 counties and one American Indian reservation, seven research extension centers located across the state, and one area extension office.

Agriculture is a critical component of North Dakota's economy and accounts for approximately 30% of total business activity. Total cash receipts from crops are projected to be $5.0 billion more in 2012 than 2011 because excellent growing conditions and record high commodity prices. Crop production accounted for nearly $11.0 billion in cash receipts and about 85 percent of total farm marketing with the remainder livestock, primarily beef cattle. The total business activity attributed to agriculture in North Dakota is $32 billion. North Dakota leads the national in the production of fourteen crop categories, plus the production of honey.

The mission of the ND AES is to develop and disseminate technology important to the production and utilization of food, feed, fiber and fuel from crop and livestock enterprises. The research must provide for an enhancement of the quality of life, sustainability of production, and protection of the environment. ND AES programs also address each of NIFA's priority areas. In particular, plant breeding efforts continue developing high yielding cultivars and animal science research will improve the nutritional and reproductive efficiencies for increased global food security. Expanded research is planned on soil salinity and other water and soil management issues in a response to recent increased precipitation associated with climate variability. Research will continue on the economics of alternative bio and sustainable energy sources and research on feedstock processing will contribute to developing sustainable energy technologies. Applied research on the adoption of nutritional practices will benefit national goals of reducing obesity. Basic research will continue on the functional traits of food and microbial resistance in the area of food safety.

The purpose of the NDSU ES is to create learning partnerships that help adults and youth enhance their lives and communities. NDSU ES programs will contribute to each of NIFA's five priority areas. Educational programs will contribute by improving crop productivity and adapting new crops within the area of global food security; adapting cropping systems, responding to evolving pest issues, and improving soil management in the area of climate change; assisting with the development of biofuels as sustainable energy sources; training families on nutrition and wellness to address childhood obesity; and training food handlers to minimize the risk of food borne disease. Extension programs will also continue to focus on state identified needs in the areas of agricultural and natural resources; 4H youth development; family and consumer sciences; and community, leadership and economic development. Within these program areas, emerging areas of concern include animal welfare, response to natural disasters, transitional plans for farms and rural businesses, and rural business development and entrepreneurship.

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

Year	Extension		Research	
	1862	1890	1862	1890
2014	53.0	0.0	71.0	0.0
2015	53.0	0.0	71.0	0.0
2016	53.0	0.0	71.0	0.0
2017	53.0	0.0	71.0	0.0
2018	53.0	0.0	71.0	0.0

II. Merit Review Process

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

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

2. Brief Explanation

Research programs are subject 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. Extension program leaders from North Dakota, South Dakota, Nebraska and Kansas typically meet annually to develop joint program opportunities for these four states. They exchange ideas on plans of work in an effort to increase the effectiveness of programs in their states; and programs impacting all four states have been developed as a result of these regular planning meetings. 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. Evaluation of Multis & Joint Activities

1. How will the planned programs address the critical issues of strategic importance, including those identified by the stakeholders?

The National Institute of Food and Agriculture has identified five national priorities in which the ND AES and NDSU ES will use to guide state programming needs. Within these priorities, ND AES and NDSU ES will gather input from the State Board of Agricultural Research and Education (SBARE), Research Extension Center advisory boards, county advisory councils, focus groups and our own extension staff to further refine the issues and details to be addressed within most planned program activities. These stakeholder groups will also identify state needs not defined within the NIFA priorities. Recent examples of SBARE identified priorities include enhancing crop development and protection, improving livestock productivity, and sustaining water, air and land quality. These priorities were developed through direct testimony from stakeholders to SBARE. The targeted audiences for these programs were inclusive of all people with a vested interest in the issue. Many programs are on-going or multiple years in length and are conducted by either integrated teams or are conducted by faculty with split research and extension appointments. This ensures that the research is delivered through extension to the stakeholders.

2. How will the planned programs address the needs of under-served and under-represented populations of the State(s)?

The major under-served and under-represented audience in North Dakota is Native Americans, and a continued emphasis is given to work more closely with this group, especially those living on the four American Indian reservations in the state and those attending one of the five tribal colleges.

The NDSU ES has and plans to continue supporting a Tribal College Liaison program. The liaison works directly with the tribal colleges. The liaison's responsibilities include: communicating with the tribal colleges on the transfer of their students to NDSU to further the student's college education; explore opportunities for collaboration on grants, initiatives and research projects; coordinate exchange programs of students and faculty; facilitate communication between tribal colleges and 4-H; facilitate the communication and facilitation of Extension programming; and participate in the annual pow-wow.

Our Fort Berthold office is budgeted to be staffed with three full-time extension agents [one in agriculture, one in 4-H youth development, and one in Family Nutrition Program (FNP)] and Expanded Food and Nutrition Education Program (EFNEP). Our Sioux County office is staffed with a full-time agent in family and consumer sciences, shares an agricultural agent with an adjoining county, and a search for a full-time FNP position is in process. Sioux County also has an EFNEP agent. The other two reservations are served by the extension agents in the county in which the reservation lies. Both of these extension offices have specific programs directed towards Native American audiences. Extension programs include expanded educational efforts with Native American farmers both in crop and livestock production as well as targeted youth programming, and family and nutrition programming. The Standing Rock Sioux Reservation is the partner of a research and extension AFRI integrated grant to improve beef production and natural resources. The NDSU ES supports these partnerships through the tribal college liaison and participates in an annual meeting with the reservations to discuss how USDA services can better meet the needs of the American Indian audiences living on the

reservations. Special emphasis has been placed on sustainability in the Native Nations through current SARE programming efforts. Many nutrition programs focus on both Native American and low-income families. These programs provide education on selecting and preparing nutritious meals on a limited budget. Diabetes is a major problem with the state's Native Americans, so a planned program focuses on the reduction of the incidence of diabetes through diet and exercise.

A major youth program on the Standing Rock Sioux Reservation focuses on community gardening and a community orchard to improve food resources, increase knowledge about food choices, and promote healthy eating by including more fruits and vegetables in the diet. This program is supported by resources from other community agencies. Another program on the same reservation is helping youth through a popular outdoors skills project. The Operation Military Kids program also provides support to youth of military families who live on reservations.

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

The planned programs that are submitted have specific outcomes that will occur over a period of five years. In some programs, outcomes and impacts will occur in the first year, but many impacts will occur throughout the five-year period and beyond. Under each planned program, specific progress toward the outcomes and impacts will be documented through research publications, research extension center annual reports, a joint AES/ES annual highlights report, and ES impact reports.

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

At North Dakota State University, research and extension programs have a historic and strong connection that increases the effectiveness of both entities. All Extension specialists on campus are integrated into departments to foster communication and nearly all campus Extension specialists hold joint Extension-research appointments to ensure integration of programs. In addition, research scientists and extension specialists are employed at seven Research and Extension Centers (REC) located across the state. These REC personnel are able to greatly increase the efficiency of collaborative research and extension projects. They also provide important local contacts with stakeholders (each REC has its own state mandated advisory board) and serve as originating and receiving locations of extension programs delivered through our interactive video system. In most programs areas, extension education and demonstration activities serve a dual purpose of education, but also gather input from stakeholders, which is then communicated to the research community.

IV. Stakeholder Input

1. Actions taken to seek stakeholder input that encourages 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, sugar beet research and Extension board, research extension center (REC) advisory boards, the Soil Health Advisory Board, 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 will be used by the recipient institution to identify individuals and groups stakeholders and to collect input from them

1. Method to identify individuals and groups

- Use Advisory Committees
- Use 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 with determining the causes of any adverse economic impacts on crops and livestock produced in this state; developing ongoing strategies for the provision of research solutions to negate adverse economic impacts on crops and livestock produced in this state; developing ongoing strategies for the dissemination of research information through the Extension Service; annually evaluating the results of research and extension activities and expenditures; and reporting the findings to the North Dakota Legislative Council and the State Board of Higher Education. 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 Extension Service 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 will be used by the recipient institution to identify individuals and groups who are stakeholders and to collect input from them

1. Methods for collecting Stakeholder Input

- Meeting with traditional Stakeholder groups
- 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 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.

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) uses 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.

V. Planned Program Table of Content

V(A). Planned Program (Summary)

Program # 1

1. Name of the Planned Program

Global Food Security and Hunger

2. Brief summary about Planned Program

One objective of the project is to develop and release improved crop cultivars for producers in North Dakota and adjacent areas in the United States, and to those who use or process the crops that are produced. This objective is being accomplished using traditional breeding methodologies. Traits receiving top priorities are improved grain quality, resistance to Fusarium plant diseases, and improved agronomic performance. Breeding programs exist for wheat, durum, canola, corn, soybean, barley, oat, flax, dry bean, edible legumes, and potato. A sub-objective is to provide educational training to growers to increase the adoption of new cultivars and new crops to increase productivity. A second objective is to conduct nutritional, reproductive and genetic research to increase the efficiency and production of livestock enterprises. Livestock species include beef, dairy, sheep, and swine. A sub-objective is to provide educational training to producers to adopt new management technologies to increase their production or efficiency and profitability.

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

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

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

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

V(B). Program Knowledge Area(s)

1. Program Knowledge Areas and Percentage

KA Code	Knowledge Area	%1862 Extension	%1890 Extension	%1862 Research	%1890 Research
121	Management of Range Resources	25%		0%	
202	Plant Genetic Resources	0%		15%	
203	Plant Biological Efficiency and Abiotic Stresses Affecting Plants	0%		15%	
204	Plant Product Quality and Utility (Preharvest)	0%		5%	
205	Plant Management Systems	50%		0%	
211	Insects, Mites, and Other Arthropods Affecting Plants	0%		5%	
212	Pathogens and Nematodes Affecting Plants	0%		30%	
301	Reproductive Performance of Animals	5%		10%	
302	Nutrient Utilization in Animals	20%		10%	
305	Animal Physiological Processes	0%		5%	
702	Requirements and Function of Nutrients and Other Food Components	0%		5%	
	Total	100%		100%	

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

1. Situation and priorities

North Dakota has natural resources that allow for highly productive crop and livestock sectors. However, the combination of environmental factors such as alkaline soils, typically lower rainfall, cold winters, and pests can limit the productivity of both crops and livestock. The large number of crops grown in North Dakota creates a demand for improved new cultivars that are adapted to the environmental conditions, have tolerance to diseases and other evolving pests, and retain high quality grain characteristics. Genetic resistance in the host plant is the most cost-effective and environmentally safe means of reducing crop losses. Consequently, basic and applied plant breeding is conducted to provide information that will facilitate achievement of our breeding goals and enhance our understanding of the crops that we breed. Information on these new cultivars needs to be communicated to growers by extension so appropriate adoption decisions can be made by growers. Research on livestock systems is needed in the areas of reproductive physiology, especially for maternal health and fetal and neonatal growth, to increase efficiencies of cow-calf, sheep, and pork production. Research is also needed on cost effective grazing systems and the nutritional attributes of the abundant alternative feedstocks that are available in North Dakota and their effects on animal growth and carcass quality. The overall goal of this multi-disciplinary and multi-faceted program is to increase the agricultural productivity of North Dakota.

2. Scope of the Program

- In-State Extension

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

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

1. Assumptions made for the Program

Funding will remain available to conduct the research. Insect and disease pests will continue to evolve resistance and attack current crops. Growers will accept new cultivars with improved disease resistance and agronomic performance under favorable and marginal growing conditions. End users accept new cultivars developed by researchers at NDSU. Cow-calf operations will continue to exist in North Dakota and rangeland will remain available. Ethanol plants and other industries will continue to produce alternative feed stuffs.

2. Ultimate goal(s) of this Program

Development and adoption of improved crop cultivars that require fewer grower inputs, have improved disease resistance, and have higher yields under favorable and marginal growing conditions. Development of new livestock feeding systems that will increase the efficiency of gain and adoption of management practices that will increase livestock reproductive rates and productivity of offspring.

V(E). Planned Program (Inputs)

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

Year	Extension		Research	
	1862	1890	1862	1890
2014	12.0	0.0	37.0	0.0
2015	12.0	0.0	37.0	0.0
2016	12.0	0.0	37.0	0.0
2017	12.0	0.0	37.0	0.0
2018	12.0	0.0	37.0	0.0

V(F). Planned Program (Activity)

1. Activity for the Program

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.
Conduct research on alternative grazing and feeding systems.
Conduct research on the effect of maternal treatments on the productivity of offspring.
Present crop and livestock 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. Type(s) of methods to be used to reach direct and indirect contacts

Extension

Direct Methods	Indirect Methods
● Workshop ● Group Discussion ● Demonstrations ● Other 1 (Field days)	● Newsletters ● eXtension web sites ● Web sites other than eXtension ● Other 1 (Radio/TV/YouTube) ● Other 2 (Circulars)

3. Description of targeted audience

Grain and livestock producers, crop consultants, nutritionists and feed personnel, veterinarians, extension personnel, commodity groups, crop improvement associations, and grain processors.

V(G). Planned Program (Outputs)

NIFA no longer requires you to report target numbers for standard output measures in the Plan of Work. However, all institutions will report actual numbers for standard output measures in the Annual Report of Accomplishments and Results. The standard outputs for which you must continue to collect data are:

- Number of contacts
  - Direct Adult Contacts
  - Indirect Adult Contacts
  - Direct Youth Contacts
  - Indirect Youth Contact
- Number of patents submitted
- Number of peer reviewed publications

☑ Clicking this box affirms you will continue to collect data on these items and report the data in the Annual Report of Accomplishments and Results.

V(H). State Defined Outputs

1. Output Measure

☐ Clicking this box affirms you will continue to collect data on these items and report the data in the Annual Report of Accomplishments and Results.

V(I). State Defined Outcome

O. No	Outcome Name
1	Percentage of seeded acres in ND that are grown with new NDSU developed crop varieties with improved disease resistance and the ability to produce a high quality crop under both favorable and marginal growing conditions.
2	Increased percentage of livestock producers that utilized NDSU developed cover crop mixtures as forage to improve livestock production per land area, reduce costs to feed an animal, and ability to produce a high quality forage crop for livestock grazing under both favorable and marginal growing conditions.

Outcome # 1

1. Outcome Target

Percentage of seeded acres in ND that are grown with new NDSU developed crop varieties with improved disease resistance and the ability to produce a high quality crop under both favorable and marginal growing conditions.

2. Outcome Type : Change in Action Outcome Measure

3. Associated Knowledge Area(s)

- 202 - Plant Genetic Resources
- 203 - Plant Biological Efficiency and Abiotic Stresses Affecting Plants
- 204 - Plant Product Quality and Utility (Preharvest)
- 205 - Plant Management Systems
- 211 - Insects, Mites, and Other Arthropods Affecting Plants
- 212 - Pathogens and Nematodes Affecting Plants
- 702 - Requirements and Function of Nutrients and Other Food Components

4. Associated Institute Type(s)

- 1862 Extension
- 1862 Research

Outcome # 2

1. Outcome Target

Increased percentage of livestock producers that utilized NDSU developed cover crop mixtures as forage to improve livestock production per land area, reduce costs to feed an animal, and ability to produce a high quality forage crop for livestock grazing under both favorable and marginal growing conditions.

2. Outcome Type : Change in Knowledge Outcome Measure

3. Associated Knowledge Area(s)

- 121 - Management of Range Resources
- 301 - Reproductive Performance of Animals
- 302 - Nutrient Utilization in Animals
- 305 - Animal Physiological Processes

4. Associated Institute Type(s)

- 1862 Extension
- 1862 Research

V(J). Planned Program (External Factors)

1. External Factors which may affect Outcomes

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

Description

Natural disasters such as extreme weather, drought, excess precipitation, etc. may directly affect research sites and the ability to obtain reliable data that can be provided to stakeholders. Changes in public policy and government regulations may alter what crops growers choose to grow and agronomic practices they use for producing these crops. Decisions on the production levels of livestock producers can also be affected by the same set of external factors.

With the increasing gap in knowledge of how food is produced by our US consumers, new challenges are faced each day in production agriculture. Moreover people making regulatory policies do not have first-hand knowledge of production agriculture. Without consistent priorities in extramural funding, developing a research program to address the needs of our citizens is difficult. Moreover, producers are facing more social pressures as they develop food, and therefore this alters the direction of extension programs.

V(K). Planned Program - Planned Evaluation Studies

Description of Planned Evaluation Studies

Data will be collected on which crop cultivars are being produced by North Dakota producers. Annual surveys are done on barley and wheat cultivars produced in North Dakota and other crops as well. These surveys will allow us to accurately determine if growers are adopting the cultivars developed by NDSU.

NDSU Extension has adopted the Kirkpatrick Model for evaluation of Extension programming. All staff receive training on this evaluation model during orientation and Extension provides ongoing training and support with this model from an evaluation expert in the Education Department. Each team leader is working with this expert to develop a comprehensive plan for evaluation of their program and individual staff use the Kirkpatrick model as the basis of further annual impact reports.

V(A). Planned Program (Summary)

Program # 2

1. Name of the Planned Program

Climate Change

2. Brief summary about Planned Program

Increasing climate variation has affected crop production in North Dakota. From 1992-2011 increased rainfall in North Dakota has created challenges in production agriculture due to not being able to plant or delayed planting of crops, increased salinity of soil in fields, more fungal plant diseases, and a change or increase in weed species and insect pests. In contrast, in 2012 drought plagued much of North Dakota stressing field crops and causing changes in pest dynamics and reduced crop yield. Cool summer temperatures in some years have prevented full season crops from maturing and have altered fertility requirements. Recent wet falls have delayed harvest and reduced grain quality. Cyclical drought conditions and in-season increased rainfall intensities produce challenging conditions for farming. Climate change programming is focused on identifying cropping systems and practices to reduce the production risks for agricultural producers in North Dakota.

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

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

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

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

V(B). Program Knowledge Area(s)

1. Program Knowledge Areas and Percentage

KA Code	Knowledge Area	%1862 Extension	%1890 Extension	%1862 Research	%1890 Research
102	Soil, Plant, Water, Nutrient Relationships	10%		10%	
103	Management of Saline and Sodic Soils and Salinity	17%		17%	
205	Plant Management Systems	7%		7%	
211	Insects, Mites, and Other Arthropods Affecting Plants	8%		8%	
212	Pathogens and Nematodes Affecting Plants	15%		15%	
213	Weeds Affecting Plants	15%		15%	
216	Integrated Pest Management Systems	10%		10%	
405	Drainage and Irrigation Systems and Facilities	18%		18%	
	Total	100%		100%	

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

1. Situation and priorities

Previously, higher precipitation and a slight increase in the growing season changed some of the agricultural issues in North Dakota. Planting and carrying out field operations on time were more challenging due to the excess moisture. The additional rainfall also increased salinity issues in many fields. After a wet cycle, the second half of the 2011 and 2012 were relatively dry. Producers need information and practices to manage their risk by managing the water table for wet and dry conditions in order to increase yields and reclaim areas in fields with salinity. The technologies for sub-surface water management are relatively new for the flat and northern growing region in the state. With wetter conditions, diseases, weeds and insect pest management also has to be adjusted. Drier conditions requires Extension to be flexible prepared to help producers deal with both dry soil conditions and wet conditions in sequential years. 2012 was a dry growing season ranging from Texas to North Dakota; dry soil condition reduced crop yields, which impacted food production. Livestock producers also see higher prices for feeding cattles and hogs; and these prices will eventually trickle on down to consumers at the supermarket. Producers need information and practices to manage their risks by knowing which field crops are drought tolerant and which pests (diseases, insect pests and weeds) are more prevalent. Research and education will help to increase the management under increasingly variable climatic conditions and help producers mitigate some of the negative effects of the weather changes.

2. Scope of the Program

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

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

1. Assumptions made for the Program

Funding will remain available to conduct the necessary research and Extension. Variable weather conditions will continue to occur in North Dakota. Crop production will remain a major economic activity in North Dakota and Extension will be able to partner with major commodity organizations as stakeholders to more effectively reach target audiences.

A Soil Health Team was hired in 2012 to focus on growing salinity and sodicity issues in the state. Funding was obtained from outside grants to provide opportunities for collaborative demonstration projects and educational programs dealing with salinity, sodicity, use of cover crops, improved cropping choices and implementation of tile drainage and alternative practices for drainage improvement. On-going programs on moisture conserving tillage systems will aid growers in moving towards lower intensity tillage systems should dry conditions become the norm. Crop production continues to be a major economic driver in the economy of North Dakota. Extension will be able to partner with major commodity organizations as stakeholders to more effectively reach target audiences.

2. Ultimate goal(s) of this Program

Reduce production risks and stabilize crop production yields at a higher level in order to maintain profitable farming systems in North Dakota.

V(E). Planned Program (Inputs)

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

Year	Extension		Research	
	1862	1890	1862	1890
2014	22.0	0.0	24.0	0.0
2015	22.0	0.0	24.0	0.0
2016	22.0	0.0	24.0	0.0
2017	22.0	0.0	24.0	0.0
2018	22.0	0.0	24.0	0.0

V(F). Planned Program (Activity)

1. Activity for the Program

1) Establish best water management practices for wet and dry conditions in North Dakota
2) Produce systems to reclaim saline and sodic areas within farm fields
3) Calibrate fertilizer application under both lower and higher moisture environments
4) Adjust disease management for all the major crops due to increased rainfall and higher humidity or drought conditions
5) Survey and improve management recommendations for insect pests on the major crops
6) Adapt weed management strategies to changing cropping systems, including resistance management
7) Investigate agronomic systems that are adapted to the change in rainfall amounts and intensity and longer growing season
8) Translate scientific findings into practical producer applications and provide transformational education through workshops, field days and conferences, and resource materials

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

Extension

Direct Methods	Indirect Methods
● Education Class ● Workshop ● Group Discussion ● One-on-One Intervention ● Demonstrations ● Other 1 (tours, email listserves) ● Other 2 (field days)	● Newsletters ● TV Media Programs ● Web sites other than eXtension ● Other 1 (Circulars) ● Other 2 (video)

3. Description of targeted audience

1) Crop producers in both North Dakota and adjacent states
2) Crop consultants and agricultural advisors
3) County Extension personnel
4) Agribusiness and agricultural finance personnel
5) Government agency staff

V(G). Planned Program (Outputs)

NIFA no longer requires you to report target numbers for standard output measures in the Plan of Work. However, all institutions will report actual numbers for standard output measures in the Annual Report of Accomplishments and Results. The standard outputs for which you must continue to collect data are:

- Number of contacts
  - Direct Adult Contacts
  - Indirect Adult Contacts
  - Direct Youth Contacts
  - Indirect Youth Contact
- Number of patents submitted
- Number of peer reviewed publications

☑ Clicking this box affirms you will continue to collect data on these items and report the data in the Annual Report of Accomplishments and Results.

V(H). State Defined Outputs

1. Output Measure

☐ Clicking this box affirms you will continue to collect data on these items and report the data in the Annual Report of Accomplishments and Results.

V(I). State Defined Outcome

O. No	Outcome Name
1	Number of farmers adopting new practices to achieve highly productive crops in a changing environment.
2	Number of farmers adopting new practices to improve pest management in a changing environment.
3	Number of farmers adopting improved soil and water management practices in response to a changing environment.

Outcome # 1

1. Outcome Target

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

2. Outcome Type : Change in Action Outcome Measure

3. Associated Knowledge Area(s)

- 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

4. Associated Institute Type(s)

- 1862 Extension
- 1862 Research

Outcome # 2

1. Outcome Target

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

2. Outcome Type : Change in Action Outcome Measure

3. Associated Knowledge Area(s)

- 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

4. Associated Institute Type(s)

- 1862 Extension
- 1862 Research

Outcome # 3

1. Outcome Target

Number of farmers adopting improved soil and water management practices in response to a changing environment.

2. Outcome Type : Change in Action Outcome Measure

3. Associated Knowledge Area(s)

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

4. Associated Institute Type(s)

- 1862 Extension
- 1862 Research

V(J). Planned Program (External Factors)

1. External Factors which may affect Outcomes

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

Description

Extreme weather conditions can interfere with the successful conduct of planned field research and affect grower perceptions of practices that are demonstrated in the field. Grain prices, costs of inputs, and farm policies affect the economic viability of new management practices and the willingness of farmers to try new practices. Public policies such as permitting processes affect the ability of growers to use certain practices such as installing drain tile. Government regulations dictate the availability of pesticides and genetically modified crop technologies that are available to growers to manage pests.

V(K). Planned Program - Planned Evaluation Studies

Description of Planned Evaluation Studies

NDSU Extension has adopted the Kirkpatrick Model for evaluation of Extension programming. All staff receive training on this evaluation model during orientation and Extension provides ongoing training and support with this model from an evaluation expert in the Education Department. Each team leader is working with this expert to develop a comprehensive plan for evaluation of their program and individual staff use the Kirkpatrick model as the basis of further annual impact reports.

V(A). Planned Program (Summary)

Program # 3

1. Name of the Planned Program

Sustainable Energy

2. Brief summary about Planned Program

Petroleum supplies more than 95% of our transportation fuel needs. Under the Energy Independence and Security Act (EISA) of 2007, the agriculture sector and rural communities have been challenged to provide 36 billion gallons per year of renewable biofuels. Biobased fuels will strengthen rural economies by adding value to crops and crop residues while decreasing agriculturally related fuel costs. Development of biomass to biofuel processing infrastructure was emphasized in 2011-2012. Research and extension activities to support the creation of a new energy beet to biofuel industry are continuing along with an expanding interest in complementary opportunities for industrial sugar. Production and storage of energy beets, processing and storage of industrial sugar, and market opportunities for sugar for energy and other industrial uses are in progress. Life cycle analysis (LCA) for energy beet to fuel, crop insurance for energy beets, and the economics of producing energy beets and processing industrial sugar also are in progress.

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

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

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

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

V(B). Program Knowledge Area(s)

1. Program Knowledge Areas and Percentage

KA Code	Knowledge Area	%1862 Extension	%1890 Extension	%1862 Research	%1890 Research
205	Plant Management Systems	5%		5%	
402	Engineering Systems and Equipment	20%		20%	
404	Instrumentation and Control Systems	10%		10%	
511	New and Improved Non-Food Products and Processes	10%		10%	
512	Quality Maintenance in Storing and Marketing Non-Food Products	20%		20%	
601	Economics of Agricultural Production and Farm Management	15%		15%	
604	Marketing and Distribution Practices	20%		20%	
	Total	100%		100%	

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

1. Situation and priorities

Petroleum supplies more than 95% of our transportation fuel needs. Under the Energy Independence and Security Act of 2007, the agriculture sector and rural communities have been challenged to provide 36 billion gallons per year of renewable biofuels. Biobased fuels will strengthen rural economies by adding value to crops and crop residues while decreasing agricultural-related fuel costs. Additional benefits include decreased national reliance on foreign energy sources, the environmental benefits of reduced greenhouse gas emissions, and increased opportunities for rural workforce employment. Priorities include making significant improvement in biomass collection, storage, transportation, pre-processing and conversion. Additional challenges are in the areas of process economics, economic policy, agronomics, crop development, product quality, and marketing. A primary project in progress includes research and extension activities to support the creation of a new energy beet to biofuel and industrial sugar industry. This project will include conducting varietal trials in new production regions, evaluating new juice storage methods, designing new logistics and transportation strategies, and organizing groups of producers in new dryland and irrigated production regions.

2. Scope of the Program

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

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

1. Assumptions made for the Program

Funding will remain available to conduct planned research and Extension activities. North Dakota is the nation's leading supplier of sugar beets and a potential leader in biomass production. EISA provides an important new opportunity to develop these resources and new rural development economic activity. The creation of an energy beet to biofuel and industrial sugar industry is a strong opportunity for growth in North Dakota. Growth potential also exists for production of perennial grasses or use of agricultural residues from corn or wheat, especially. Farm producers and rural communities have limited understanding of such opportunities and should be kept aware of new technologies for energy beets and biomass utilization, unique market quality and production standards, and alternative risk management strategies.

2. Ultimate goal(s) of this Program

New biomass markets will be developed for North Dakota growers and growers will profitably produce energy beets and biomass while sustaining natural resources.

V(E). Planned Program (Inputs)

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

Year	Extension		Research	
	1862	1890	1862	1890

Year	Extension		Research	
	1862	1890	1862	1890
2014	3.0	0.0	2.6	0.0
2015	3.0	0.0	2.6	0.0
2016	3.0	0.0	2.6	0.0
2017	3.0	0.0	2.6	0.0
2018	3.0	0.0	2.6	0.0

V(F). Planned Program (Activity)

1. Activity for the Program

• Conduct research on processing, densifying, storage, and transportation of energy beets and biomass.
• Conduct economic analyses of biomass sources for energy production.
• Assist growers in new producing regions with business organization, technology adoption, and market development, and formation of risk management strategies.
• Provide educational materials and programming on production, economics, and policy analysis to decision makers, growers, and industry personnel.

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

Extension

Direct Methods	Indirect Methods
● Workshop ● Demonstrations	● eXtension web sites ● Web sites other than eXtension ● Other 1 (News releases)

3. Description of targeted audience

• Farmers
• Policy makers
• Biomass processors
• Equipment manufacturers

V(G). Planned Program (Outputs)

NIFA no longer requires you to report target numbers for standard output measures in the Plan of Work. However, all institutions will report actual numbers for standard output measures in the Annual Report of Accomplishments and Results. The standard outputs for which you must continue to collect data are:

- Number of contacts
  - Direct Adult Contacts
  - Indirect Adult Contacts
  - Direct Youth Contacts
  - Indirect Youth Contact
- Number of patents submitted
- Number of peer reviewed publications

☑ Clicking this box affirms you will continue to collect data on these items and report the data in the Annual Report of Accomplishments and Results.

V(H). State Defined Outputs

1. Output Measure

☐ Clicking this box affirms you will continue to collect data on these items and report the data in the Annual Report of Accomplishments and Results.

V(I). State Defined Outcome

O. No	Outcome Name
1	Number of growers and industry personnel who are aware of the potential opportunities of growing and processing energy beets or cellulosic biomass for industrial sugars or other biofuel feedstock.

Outcome # 1

1. Outcome Target

Number of growers and industry personnel who are aware of the potential opportunities of growing and processing energy beets or cellulosic biomass for industrial sugars or other biofuel feedstock.

2. Outcome Type : Change in Knowledge Outcome Measure

3. Associated Knowledge Area(s)

- 205 - Plant Management Systems
- 511 - New and Improved Non-Food Products and Processes
- 512 - Quality Maintenance in Storing and Marketing Non-Food Products

4. Associated Institute Type(s)

- 1862 Extension
- 1862 Research

V(J). Planned Program (External Factors)

1. External Factors which may affect Outcomes

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

Description

The development of the proposed biomass-based energy industries is dependent on several external factors including the overall market strength which will affect investors, federal policy which affects market incentives, and the profit potential for potential biomass crops versus traditional crops.

V(K). Planned Program - Planned Evaluation Studies

Description of Planned Evaluation Studies

NDSU Extension has adopted the Kirkpatrick Model for evaluation of Extension programming. All staff receive training on this evaluation model during orientation and Extension provides ongoing training and support with this model from an evaluation expert in the Education Department. Each team leader is working with this expert to develop a comprehensive plan for evaluation of their program and individual staff use the Kirkpatrick model as the basis of further annual impact reports.

V(A). Planned Program (Summary)

Program # 4

1. Name of the Planned Program

Food Safety

2. Brief summary about Planned Program

Education and training is needed to improve food handling practices and technologies, which will contribute to reductions in foodborne illness. Educational programs will be targeted at youth, teens, and adults.

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

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

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

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

V(B). Program Knowledge Area(s)

1. Program Knowledge Areas and Percentage

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

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

1. Situation and priorities

Food safety from farm to table remains an issue of concern in the U.S. Over 5,000 deaths and 76 million cases of foodborne illness occur annually. About half the food dollar is spent on foods away from home, and more people are involved in the handling of foods. Priorities are safe food handling in the home and in the food service/processing sectors. Interest in local foods, farmer's markets, and gardening will increase interest in food preservation techniques like canning. Many younger adults lack experience and skills in safely preserving foods and require education.

2. Scope of the Program

- In-State Extension
- In-State Research

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

1. Assumptions made for the Program

Food safety will remain a concern in the U.S. Numerous inexperienced youth will enter the food service industry as new employees each year. The number of individuals involved in food preservation in the home will increase.

2. Ultimate goal(s) of this Program

Foodborne illness outbreaks will decrease.
Food companies will decrease recalls of contaminated product.

V(E). Planned Program (Inputs)

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

Year	Extension		Research	
	1862	1890	1862	1890
2014	1.8	0.0	6.0	0.0
2015	1.8	0.0	6.0	0.0
2016	1.8	0.0	6.0	0.0
2017	1.8	0.0	6.0	0.0
2018	1.8	0.0	6.0	0.0

V(F). Planned Program (Activity)

1. Activity for the Program

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

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

Extension

Direct Methods	Indirect Methods
● Education Class ● Workshop ● Group Discussion ● One-on-One Intervention ● Demonstrations ● Other 1 (Online modules)	● Newsletters ● eXtension web sites ● Web sites other than eXtension ● Other 1 (newspaper articles)

3. Description of targeted audience

Children in school and youth program settings
Teen food handlers in high school and community

Adults in home settings
Volunteer food handlers in community settings
Professionals in foodservice and food processing environments

V(G). Planned Program (Outputs)

NIFA no longer requires you to report target numbers for standard output measures in the Plan of Work. However, all institutions will report actual numbers for standard output measures in the Annual Report of Accomplishments and Results. The standard outputs for which you must continue to collect data are:

- Number of contacts
  - Direct Adult Contacts
  - Indirect Adult Contacts
  - Direct Youth Contacts
  - Indirect Youth Contact
- Number of patents submitted
- Number of peer reviewed publications

☑ Clicking this box affirms you will continue to collect data on these items and report the data in the Annual Report of Accomplishments and Results.

V(H). State Defined Outputs

1. Output Measure

☐ Clicking this box affirms you will continue to collect data on these items and report the data in the Annual Report of Accomplishments and Results.

V(I). State Defined Outcome

O. No	Outcome Name
1	Number of teens reporting changes in food handling practices to reduce risk of foodborne illness outbreaks.
2	Number of adult participants in consumer food safety classes reporting intent to change one or more food handling behaviors.

Outcome # 1

1. Outcome Target

Number of teens reporting changes in food handling practices to reduce risk of foodborne illness outbreaks.

2. Outcome Type : Change in Action Outcome Measure

3. Associated Knowledge Area(s)

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

4. Associated Institute Type(s)

- 1862 Extension

Outcome # 2

1. Outcome Target

Number of adult participants in consumer food safety classes reporting intent to change one or more food handling behaviors.

2. Outcome Type : Change in Action Outcome Measure

3. Associated Knowledge Area(s)

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

4. Associated Institute Type(s)

- 1862 Extension

V(J). Planned Program (External Factors)

1. External Factors which may affect Outcomes

- Appropriations changes
- Government Regulations
- Competing Public priorities

Description

The availability and interest of youth and adults to receive food safety training is dependent on incentives provided by policies and regulations. Their interest may be limited because of competing

activities, especially for youth.

V(K). Planned Program - Planned Evaluation Studies

Description of Planned Evaluation Studies

NDSU Extension has adopted the Kirkpatrick Model for evaluation of Extension programming. All staff receive training on this evaluation model during orientation and Extension provides ongoing training and support with this model from an evaluation expert in the Education Department. Each team leader is working with this expert to develop a comprehensive plan for evaluation of their program and individual staff use the Kirkpatrick model as the basis of further annual impact reports.

V(A). Planned Program (Summary)

Program # 5

1. Name of the Planned Program

Childhood Obesity

2. Brief summary about Planned Program

Overweight and obesity plus physical inactivity will continue to be a problem in North Dakota. Chronic disease (heart disease, type 2 diabetes and certain types of cancer) related to being overweight or obese will continue to be a problem in North Dakota. Educational curricula have been developed and will be delivered through a network of county agents to reach youth in schools and adults in communities. The curricula are based on both improved nutrition and increased physical activity.

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

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

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

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

V(B). Program Knowledge Area(s)

1. Program Knowledge Areas and Percentage

KA Code	Knowledge Area	%1862 Extension	%1890 Extension	%1862 Research	%1890 Research
703	Nutrition Education and Behavior	45%		45%	
724	Healthy Lifestyle	35%		35%	
806	Youth Development	20%		20%	
	Total	100%		100%	

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

1. Situation and priorities

Changes in food intake and physical activity patterns in North Dakota have increased the prevalence of overweight and obese youth and adults and the risk for chronic diseases such as heart disease, type 2 diabetes and cancer. Priorities are promoting the development/maintenance of healthy lifestyles for individuals/families within homes, worksites and communities. Extension staff have access to youth through school nutrition programs and by working in partnership with school lunch programs.

2. Scope of the Program

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

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

1. Assumptions made for the Program

Overweight and obesity plus physical inactivity will continue to be a problem in North Dakota. Chronic disease (heart disease, type 2 diabetes and certain types of cancer) related to being overweight and obese will continue to be a problem in North Dakota. Low income families will continue to struggle to make healthy and nutritious meal plans because of high costs of fresh fruits and vegetables. Many North Dakota families that qualify for supplemental nutrition programs have not enrolled, which can limit their access to educational opportunities.

2. Ultimate goal(s) of this Program

The goal is to increase in number of people with healthy body weights and to reduce risk factors for development of chronic diseases.

V(E). Planned Program (Inputs)

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

Year	Extension		Research	
	1862	1890	1862	1890
2014	4.0	0.0	1.5	0.0
2015	4.0	0.0	1.5	0.0
2016	4.0	0.0	1.5	0.0
2017	4.0	0.0	1.5	0.0
2018	4.0	0.0	1.5	0.0

V(F). Planned Program (Activity)

1. Activity for the Program

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 for adults and children will continue.

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

Extension

Direct Methods	Indirect Methods
● Education Class	● Newsletters
● Workshop	● TV Media Programs
● Group Discussion	● Web sites other than eXtension
● One-on-One Intervention	● Other 1 (Circulars)
● Demonstrations	● Other 2 (Radio/TV/Youtube)

3. Description of targeted audience

Children and adults will be the target groups for the programming. They will be reached with both direct and indirect methods.

V(G). Planned Program (Outputs)

NIFA no longer requires you to report target numbers for standard output measures in the Plan of Work. However, all institutions will report actual numbers for standard output measures in the Annual Report of Accomplishments and Results. The standard outputs for which you must continue to collect data are:

- Number of contacts
  - Direct Adult Contacts
  - Indirect Adult Contacts
  - Direct Youth Contacts
  - Indirect Youth Contact
- Number of patents submitted
- Number of peer reviewed publications

☑ Clicking this box affirms you will continue to collect data on these items and report the data in the Annual Report of Accomplishments and Results.

V(H). State Defined Outputs

1. Output Measure

☐ Clicking this box affirms you will continue to collect data on these items and report the data in the Annual Report of Accomplishments and Results.

V(I). State Defined Outcome

O. No	Outcome Name
1	Number of children participating in the youth education curricula that improved their diet quality and/or their physical activity level.
2	Number of adults participating in educational curricula that improved their knowledge and practices related to nutrition and/or physical activity.

Outcome # 1

1. Outcome Target

Number of children participating in the youth education curricula that improved their diet quality and/or their physical activity level.

2. Outcome Type : Change in Action Outcome Measure

3. Associated Knowledge Area(s)

- 703 - Nutrition Education and Behavior
- 724 - Healthy Lifestyle
- 806 - Youth Development

4. Associated Institute Type(s)

- 1862 Extension
- 1862 Research

Outcome # 2

1. Outcome Target

Number of adults participating in educational curricula that improved their knowledge and practices related to nutrition and/or physical activity.

2. Outcome Type : Change in Action Outcome Measure

3. Associated Knowledge Area(s)

- 703 - Nutrition Education and Behavior
- 724 - Healthy Lifestyle
- 806 - Youth Development

4. Associated Institute Type(s)

- 1862 Extension
- 1862 Research

V(J). Planned Program (External Factors)

1. External Factors which may affect Outcomes

- Competing Public priorities
- Competing Programmatic Challenges

Description

Inclement weather which includes blizzards and spring flooding, a frequent occurrance in the past 5 years, has closed schools and prevented the instruction of these curricula. The student enrollment in small rural schools can change dramatically and alter the number of youth targeted. The federal reduction in the Family Nutrition Program will reduce staffing in several counties. The final implications are unknown at this time.

V(K). Planned Program - Planned Evaluation Studies

Description of Planned Evaluation Studies

NDSU Extension has adopted the Kirkpatrick Model for evaluation of Extension programming. All staff receive training on this evaluation model during orientation and Extension provides ongoing training and support with this model from an evaluation expert in the Education Department. Each team leader is working with this expert to develop a comprehensive plan for evaluation of their program and individual staff use the Kirkpatrick model as the basis of further annual impact reports.

V(A). Planned Program (Summary)

Program # 6

1. Name of the Planned Program

Citizenship and Leadership Development

2. Brief summary about Planned Program

The 4-H Youth Development program includes opportunities for youth to become involved in their community, build personal skills, and develop positive attitudes about their behaviors, their community, and place in the community. Youth will develop awareness through participation in state and national citizenship events. Leadership is developed through club and other group activities.

Rural Leadership North Dakota (RLND) is an adult leadership development program that is designed for men and women who are dedicated to strengthening agriculture and rural North Dakota. This 18-month development program includes seminars, tours, international experiences, and personal skill development.

Small businesses are a crucial part of the ND economy with 99% of businesses identified as 'small businesses.' Given that crucial role for local economies, the NDSU ES assists rural and agricultural entrepreneurs in identifying local businesses opportunities and then developing new and enhancing existing businesses that capitalize on those opportunities.

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

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

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

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

V(B). Program Knowledge Area(s)

1. Program Knowledge Areas and Percentage

KA Code	Knowledge Area	%1862 Extension	%1890 Extension	%1862 Research	%1890 Research
602	Business Management, Finance, and Taxation	20%		0%	
803	Sociological and Technological Change Affecting Individuals, Families, and Communities	5%		0%	
806	Youth Development	75%		0%	
	Total	100%		0%	

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

1. Situation and priorities

Youth desire a connection to their community. They want to feel needed, useful, and a part of the community. The study of positive youth development has shown a link between youth involved in a youth development program and positive outcomes related to Competence, Caring, Connections, Confidence, Character, and Contribution. The 4-H program will provide opportunities for leadership development and community involvement.

North Dakota is highly dependent on a prosperous agricultural economy. Sustaining this infrastructure and the affiliated rural communities is important, yet challenging. Part of the solution to maintaining healthy rural communities is to develop a network of agricultural and rural leaders who are engaged and committed to these issues and projects. RLND is a leadership development program that will strengthen participant's skills while developing a network of new leaders.

In the United States, long term economic strength and personal income growth requires a base of small businesses. For North Dakota that small business base must capitalize on our strong agriculture base and reflect our rural nature. Small businesses are a crucial part of the ND economy with 99% of businesses identified as small. In the ag community, 40% of farmers are part-time, 48% farm less than 500 acres, and 42% have sales under $10,000.

In response, the NDSU Extension Service developed, in 2010, a new position that of Rural and Agribusiness Enterprise Development Specialist. The priority of the position was to help rural and agricultural entrepreneurs and small business owners identify local opportunities and then develop and implement effective business strategies that capitalize on those opportunities.

2. Scope of the Program

- In-State Extension
- Multistate Extension

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

1. Assumptions made for the Program

Efforts by the program will continue to depend substantially on the efforts of other NDSU Extension and Research personal as well as other NDSU employees. The support of other ND agencies along with Extension colleagues located throughout the country will be necessary. Finally, the shared involvement in these efforts by other North Dakota and Federal agencies and nonprofit organizations is required. Finally the program will continue to need financial support in the form of state and grant funding.

Financial support is available for youth to participate in citizenship events on a statewide or national level. Clubs and groups have officers and provide other leadership opportunities.

2. Ultimate goal(s) of this Program

The 4-H Youth Development program will develop leadership and community skills of youth. Results of the study of positive youth development show differences between youth in 4-H and non 4-H youth with respect to competence, caring, connections, confidence, character, and contribution. Youth are confident with abilities to contribute to community, lead meetings, and participate in groups.

The RLND entrepreneuership program will develop a complete and seamless system of support that can assist the entrepreneur and small business owners from idea development through implementation and on through the growth of the business until it is eventually sold or taken over by other entrepreneurs, hopefully those from one's family or the local community. A strong, stable local business segment at some level in every community would be ideal.

V(E). Planned Program (Inputs)

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

Year	Extension		Research	
	1862	1890	1862	1890
2014	10.0	0.0	0.0	0.0
2015	10.0	0.0	0.0	0.0
2016	10.0	0.0	0.0	0.0
2017	10.0	0.0	0.0	0.0
2018	10.0	0.0	0.0	0.0

V(F). Planned Program (Activity)

1. Activity for the Program

Youth will gain skills through 4-H club and summer camp programs. A citizenship event will be held at the state capital and youth partipation is planned. Youth will participate in national 4-H events. Parliamentary procedure and leadership resources will be provided to youth groups.

Rural Leadership North Dakota will enroll adult participants in the next leadership development class. Short course leadership programs will be offered regionally in the state.

A regular and ongoing entrepreneurial education program will be implemented using face-to-face educational programming done directly by Extension or in partnership with various agencies and nonprofits. Along with that support through email, web-based questions, and telephone contacts will be in place including the eXtension COP "Entrepreneurs and Their Communities." Written materials will be developed or modified focusing on specific topics identified by small business owners or those working with this group. Finally, traditional media such as newspapers and radio will be utilized along with online tools such as websites and the new social media tools that more and more individuals are using for answers to their questions.

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

Extension

Direct Methods	Indirect Methods
● Education Class	● Newsletters
● Workshop	● TV Media Programs
● Group Discussion	● Web sites other than eXtension
● Other 1 (Webinars)	● Other 1 (Social media, & network dvlpmt)
● Other 2 (summer camp)	● Other 2 (traditional media; printed media)

3. Description of targeted audience

The 4-H Youth Development program includes opportunities for youth to become involved in their community, build personal skills, and develop positive attitudes about their behaviors, their community, and place in the community. Youth will develop awareness through participation in state and national

citizenship events. Leadership is developed through club and other group activities.

The program will work with existing and potential entrepreneurs and small business owners across all of North Dakota. Special emphasis will be given to those in rural areas or involved in agriculture or value-added agriculture activities. Work will also include education, interaction, and involvement with other agencies that work or might be a resource to this identified target audience.

Rural Leadership North Dakota targets emerging agricultural and rural leaders from across the state.

V(G). Planned Program (Outputs)

NIFA no longer requires you to report target numbers for standard output measures in the Plan of Work. However, all institutions will report actual numbers for standard output measures in the Annual Report of Accomplishments and Results. The standard outputs for which you must continue to collect data are:

- Number of contacts
  - Direct Adult Contacts
  - Indirect Adult Contacts
  - Direct Youth Contacts
  - Indirect Youth Contact
- Number of patents submitted
- Number of peer reviewed publications

☑ Clicking this box affirms you will continue to collect data on these items and report the data in the Annual Report of Accomplishments and Results.

V(H). State Defined Outputs

1. Output Measure

☐ Clicking this box affirms you will continue to collect data on these items and report the data in the Annual Report of Accomplishments and Results.

V(I). State Defined Outcome

O. No	Outcome Name
1	Number of 4-H youth contributing hours in service to others in their community.
2	Number of 4-H club members who show improved leadership skills.
3	Number of jobs created or retained as a consequence of small business entrepreneurial education.

Outcome # 1

1. Outcome Target

Number of 4-H youth contributing hours in service to others in their community.

2. Outcome Type : Change in Condition Outcome Measure

3. Associated Knowledge Area(s)

- 803 - Sociological and Technological Change Affecting Individuals, Families, and Communities
- 806 - Youth Development

4. Associated Institute Type(s)

- 1862 Extension

Outcome # 2

1. Outcome Target

Number of 4-H club members who show improved leadership skills.

2. Outcome Type : Change in Action Outcome Measure

3. Associated Knowledge Area(s)

- 803 - Sociological and Technological Change Affecting Individuals, Families, and Communities
- 806 - Youth Development

4. Associated Institute Type(s)

- 1862 Extension

Outcome # 3

1. Outcome Target

Number of jobs created or retained as a consequence of small business entrepreneurial education.

2. Outcome Type : Change in Action Outcome Measure

3. Associated Knowledge Area(s)

- 602 - Business Management, Finance, and Taxation
- 803 - Sociological and Technological Change Affecting Individuals, Families, and Communities

4. Associated Institute Type(s)

- 1862 Extension

V(J). Planned Program (External Factors)

1. External Factors which may affect Outcomes

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

Description

The engagement of youth in 4-H clubs and their subsequent level of activity may be affected by the overall economy. Declining rural populations and number of farms may reduce the number of youth in 4-H. Adults participating in RLND is also dependent on a strong economy as these participants need to secure sponsors for their tuition and need to take leave from their employment to attend the training seminars.

The development and success of entrepreneurs and small businesses can be impacted by several external factors. Natural disasters can have a devastating effect on the success of small businesses that may not have the resources necessary to rebound. Similarly an economic downturn can have the same affect. Such a downturn can also both restrict or possible accelerate the growth in the number of small businesses. Declining rural populations and number of farms may reduce small business opportunities as can public policy and regulatory changes. The flow of capital, both private and public, also can influence business growth and success.

V(K). Planned Program - Planned Evaluation Studies

Description of Planned Evaluation Studies

NDSU Extension has adopted the Kirkpatrick Model for evaluation of Extension programming. All staff receive training on this evaluation model during orientation and Extension provides ongoing training and support with this model from an evaluation expert in the Education Department. Each team leader is working with this expert to develop a comprehensive plan for evaluation of their program and individual staff use the Kirkpatrick model as the basis of further annual impact reports.

Depending upon the type and length of the program as well as the level of involvement, some type of evaluation will be done on most workshops and educational programs. In addition a yearly survey of program participants who have asked to be included on the mailing list will also be undertaken. Finally with the continued and on-going contact with some small business owners as well as undertaking some random follow-ups, some mini-case study efforts will be gathered. Sampling will be the primary means of data collection. However case study and observation will also be used during on-going work with certain clients as well as repeat contacts with others who return for additional support and assistance.