PLAN OF WORK

Federal Fiscal Years
2005-2006 (Updates)

North Dakota State University

North Dakota State University Extension Service
North Dakota Agricultural Experiment Station

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Plan of Work

North Dakota State University Extension Service
North Dakota Agricultural Experiment Station

April 1, 2004

A. Introduction

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

This Plan of Work is an overview of the updates to programs intended to be carried out by the extension service and experiment station during 2000 to 2004 extending to 2005-2006. This Plan of Work is prepared to meet the requirements of the Agricultural Research, Extension, and Education Reform Act of 1998 (AREERA) and the CSREES-USDA "Guidelines for Land Grant Institution Plan of Work."

B. Planned Programs

Function	Goal 1	Goal 2	Goal 3	Goal 4	Goal 5
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GOAL 1: AN AGRICULTURAL SYSTEM THAT IS HIGHLY COMPETITIVE IN THE GLOBAL ECONOMY

Program 1: Competitive and Profitable Crop Production

Statement of Issue

North Dakota agricultural production is important to the domestic vitality of the United States and to its position as a leader in the global economy. *North Dakota leads the nation in production of durum wheat, hard red spring wheat, oats, barley, flaxseed, navy beans, pinto beans, all dry edible beans, dry edible peas, sunflowers, and canola. The state ranks second in production of all wheat and lentils; and third in rye and sugarbeets. Exports of North Dakota commodities and products are valued at $1.2 billion. The lead export is wheat (and wheat products) at $620 million, followed by soybeans and products ($146 million), feed grains ($114 million), and sunflower and oils ($102 million).*

Crop production is critically important to the economy of the Northern Great Plains. *Cash receipts from crops provide more than $3.54 billion to the economic base of North Dakota, primarily from wheat (33%), oilseeds (22%), feed crops (19%), dry beans and potatoes (8%) and sugarbeets (6%). A short growing season (120 frost-free days) and low rainfall (12 inches in the northwest corner to about 16 inches in the southeastern corner of the state) limits crop yields and rotations. However, North Dakota is one of the most agriculturally diverse states in the nation. More than 40 different crops are grown in the state. Ninety percent of the state is in farmland or ranches, and North Dakota growers realize efficiencies from scale of operations (farms are three times larger than the national average of 441 acres). The human resources engaged in farming are now older (average age 54.4 vs. 51.4 in 1997) and 79.5% are male).*

Issues facing agriculture on the Northern Great Plains were articulated in the report of the 1998 North Dakota Commission on the Future of Agriculture: 1) make (our) agricultural products synonymous with high quality, dominating the premium markets; 2) increase value-added agricultural processing; 3) diversify and increase the value of agricultural production; 4) increase farm and non-farm cooperation that supports thriving rural communities and enhances our natural resources; and 5) create a political, regulatory, economic, trade, financial, and natural resource environment in which (our) producers can compete in the global marketplace.

Performance Goals

Following extensive statewide, multi-source inputs, the North Dakota 1998 Committee on the Future of Agriculture identified the following items as important in crop production: establish quality standards for crop commodities, produce high quality products, determine needs for commodity improvements; reduce the impacts of weeds, plant diseases, and insects; produce commodities with characteristics for value-added processing; diversify and increase the value of crop production by evaluating new crops and appropriate technologies for food, fiber, fuel, and other industrial uses; develop and conserve water resources through efficient irrigation, drought-tolerant crops, and moisture conserving farming practices.

Output Indicators

- Release of adapted and improved crop varieties
- Workshops, meetings and schools for growers
- Publications, computer programs and videos on crop production
- Refereed journal articles and regional research reports

Outcome Indicators

- Adoption of techniques, technologies, or practices by growers and scientists
- Acceptability of products by processing industries
- Adoption of IPM strategies by growers

Key Program Components

I. Genetic improvement of major crops

A. Introgression, selection, and testing for genetic characteristics of crop plants that improve adaptation to the agroecosystem of the Northern Great Plains.

1. Use traditional breeding methods to develop a menu of improved varieties or germplasms that are released to constituents for their agronomic, industrial, conservation, or other purposes.
   a. Resistance to biotic and abiotic stressors.
   b. Improved agronomic, handling, or industrial characteristics.
2. Use novel methods, including molecular procedures, to increase genetic diversity of major crop species and/or introduce genes for specific purposes.
3. *Describe and diagnose the genetic and physiological mechanisms of weed resistance to improve weed control practices and cost-effectiveness.*
4. Reciprocally share genetic stocks with regional, national, and international partners, especially other land-grant institutions and the USDA-ARS, for the purposes of describing the range of adaptation of potentially useful materials, and for increasing genetic diversity.

B. Determine the fundamental characteristics of crop plants, their competitors (weeds), predators (insects), parasites (diseases) and beneficial symbionts.

1. Describe important genetic, physiological, biochemical, or morphological features of plants, plant products, and foods/feeds/fuels from plants.
2. Describe life cycles, behavioral characteristics, biological adaptations and population dynamics of insects; fungal, bacterial, viral and phytoplasma plant pathogens, and weeds
3. Develop methods for improving and evaluating natural dinitrogen fixation and nutrient availability for crop plants.

C. Assess Problems

1. Catalog and map the nature and magnitude of problems.
2. Determine impacts of problems (losses and/or restrictions).
3. Develop useful predictors for problems.
4. Chronicle introduction and spread of emerging crop pest problems.

II. Assessment of minor crops

A. Test for adaptation and assess feasibility for commercial production of new crop species that may capitalize on export potential, fill niche or developing domestic market demands, or provide benefit to other crops in cropping systems.
B. Identify and characterize useful industrial products from minor crops that may enhance their value in crop systems.
C. Describe and ameliorate production problems (nutrients, diseases, insects, weeds, harvest losses, storage problems) that would discourage or limit economic production of new crops.
D. Annually increase the research and knowledge base available from CSREES partners and cooperators on new and value-added commodities and products in U.S. agriculture.

III. Develop management strategies to sustain crop productivity

A. Describe nutritional and other edaphic factors that influence sustainable crop production.
B. Describe and assess the biological interactions that affect the cycling of nutrients, viability of beneficial and harmful organisms in the soil, or that result in benefits (nitrogen fixation biological controls, mycorrhizae) to individual crops or sustained production.
C. Evaluate pesticide chemistries, application methodologies, modes of action, timing, or other attributes for efficiency and compatibility with integrated pest management and reduction of harmful impacts to the environment while reducing input costs to the maximum practical extent.
D. *Evaluate the agronomic, pest management, and consumer desired characteristics of transgenic and non-transgenic traits introgressed into local crop cultivars through traditional breeding methods.*
E. Evaluate traditional and innovative farming practices including tillage, irrigation, rotation, and pest management strategies that affect the physical, biological, and economic sustainability of crop production.

IV. Annually increase the agricultural producer, consumer, government and social sector awareness, understanding, and information regarding agricultural systems.

A. Describe new commodities, products, practices, and problems to client groups.
B. Increase understanding of global competitiveness and opportunities in crop-based resources.
C. *Introduce new understandings of agricultural production, consumer practices, policy changes, and social changes into university classes or curricula.*

<u>Internal and External Linkages</u>
Growers are a major linkage as they continually evaluate, use, accept/reject varieties, technologies and management techniques and give feedback directly or indirectly to NDSU

researchers and extension staff. Some growers participate in "on-farm" trials. Seedstocks, county crop improvement associations and the State Seed Department are the primary conduit for increasing and making public varieties available, and insuring a reliable supply of quality seed. All provide feedback to researchers. USDA-ARS provides important germplasm and fundamental understanding of genetics/pathogens/insects for cereals, sunflower, sugarbeet and provides resources for interactions of cultivated and native species. U.S. Wheat and Barley Scab Initiative is a multi-state consortium of universities and other units dedicated to management of cereal scab disease. Collaborative studies on weeds, insects, and disease pests of sugarbeet, canola and sunflower as well as joint publications with NDSU on sugarbeet production and pest management guidelines are conducted with the University of Minnesota Crookston. Joint positions in Potato Extension, Sugarbeet Extension, weed control, soybean and corn extension are funded with the University of Minnesota, St. Paul. Joint efforts in sugarbeet pathology in the Yellowstone River Valley are conducted in cooperation with Montana State University. The Montana Experiment Station at Sydney, MT, and the NDSU Research Extension Center at Williston are headed by a single individual. A common data base for diagnostic laboratories is held in conjunction with South Dakota State University and barley, wheat and other crops are exchanged and evaluated, some for joint release.

Target Audiences

The target audiences are crop producers, consultants and other agri-business who work with crop producers and industries which utilize crops produced in the state. Particular attention will be given to the needs of small and mid-sized crop producers as these producers are being affected the most by the structural and technological changes taking place in agriculture. Basic and applied scientific advances are targeted to scientists in a number of disciplines. Emphasis will also be given to working with minority producers on the Indian reservations.

Program Duration

This program will continue for the five-year life of the plan plus the two year extension.

Allocated Resources
($ x 1,000)

			FY 04	FY 05	FY 06
1862 Extension ($)	Smith-Lever		1770	658	658
	State		2480	987	987
		FTE	55	23.5	23.5
1862 Research ($)	Hatch		1206	1360	1360
	State		1961	2000	2000
		FTE	28	40	40

Education and Outreach Programs

A major extension program is presently underway on new and alternative crops such as juneberry and onion. This program was initiated in response to crop producers searching for new

or alternative crops to increase the profitability and diversity in their present cropping system. Crop disease problems, low market prices, changes in the farm bill and fluctuations in world global markets are driving forces behind this interest. The research base for this educational program is generated by the NDAES, both at the main station in Fargo and at six research extension centers . The research base is also generated in cooperation with the Land Grant Universities in neighboring states. *A second major extension program is focused on improving profitability from the production of major crops.* These involve information on varieties developed by NDSU and other Land Grant Universities as well as the research base developed from variety trials of public and private varieties. *This program includes instruction on improved crop pest management techniques, much of which is developed through applied research at the NDSU main station and six research extension centers.*

Program 2: Competitive and Profitable Animal Production

Statement of Issues

The economies of North Dakota and the Northern Great Plains are very dependent on agriculture, and the region's agricultural productivity is an important component of American agriculture. Livestock agriculture is currently a critical portion (about 1/3 of the total) of the agriculture in the state and region. Livestock agriculture offers great potential for adding value to the crops that are produced in the region and in adding diversity to existing agriculture operations. Both activities will add stability to the state's and region's agricultural economy and will allow agricultural producers to cope better with the twin problems of fluctuating commodity markets and extreme annual fluctuations in weather.

Performance Goals

The goal of NDSU's animal production program is to increase efficiency and profitability of livestock production and to improve conservation management of the private (95%) and public (5%) range resources in North Dakota. *This includes beef, dairy, lamb, wool, and swine production and includes improvement and utilization of the state's rangeland resources for livestock production and for long-term conservation goals.*

Output Indicators

- Scientific journal articles, experiment station bulletins, extension circulars, workshops and programs for producers, training sessions for extension specialists, release of computer software to aid in animal agricultural decision making, and outreach through popular media (print, radio, TV).

Outcome Indicators

- Acceptance and implementation of new and improved livestock, forage, and range management practices by producers and land managers that will lead to efficient and profitable production of livestock in North Dakota and add stability to North Dakota's agriculture industry as a whole.

Key Program Components

Increased efficiency and profitability of animal production will be realized through several activities: improved disease management, improved reproduction management, improved

nutrition management, improved genetics management, increased usage of low-cost range and domestic forages in ruminant production systems, increased uses of crop processing and production coproducts and byproducts in growing and finishing animals, improvement of livestock product marketing capabilities, improved animal source food safety, improved animal waste management, and improved integration of all production factors in livestock production systems that will result in producer profitability.

Internal and External Linkages

This program involves the Department of Animal and Range Sciences, Department of Veterinary and Microbiological Sciences, Department of Agricultural Economics, Department of Plant Sciences, Department of Agricultural and Biosystems Engineering, Carrington Research Extension Center, Dickinson Research Extension Center, Central Grasslands Research Extension Center, Hettinger Research Extension Center, USDA/ARS/Northern Plains Research Center, Mandan, USDA/ARS/Human Health and Nutrition Center, Grand Forks, USDA/ARS/Biosciences Research Laboratory, Fargo. In addition, the program involves several private livestock producers and private companies that cooperate in our research programs.

Target Audiences

Results of the animal production program will be shared with all producers of mammalian livestock in North Dakota and the Northern Great Plains and with the livestock industry as a whole. In addition, the results of the range and forage research will be shared with all private and public land managers. And all of the results will be shared with researchers and educators in other parts of the country and world.

Program Duration

This program will continue for the five-year life of the plan plus the two year extension.

Allocated Resources ($ x 1,000)			FY 04	05	06
1862 Extension ($)	Smith-Lever		387	322	322
	State		543	483	483
		FTE	13	11.5	11.5
1862 Research ($)	Hatch		422	170	170
	State		688	250	250
		FTE	10	5	5

Education and Outreach Programs

North Dakota's animal agriculture research and extension programs are closely linked within the academic departments on campus (includes researchers, teachers, and extension specialists) and

the research and extension centers distributed throughout the state. Additionally, the departments and centers work closely together. Nearly all of the animal production and range science extension specialists devote a portion of their time to research and all work closely with scientists that have research appointments. To a large degree, the specific topics for research in animal production originate from needs identified through extension and outreach programs and through the interaction of the departmental scientists with the scientists at the research centers.

GOAL 4: GREATER HARMONY BETWEEN AGRICULTURE AND THE ENVIRONMENT

Program 11: Water Quality - Animal Waste Management

Statement of Issues

Agricultural pollution primarily from non-irrigated crop land, grazing land, and feedlots presents a significant threat to North Dakota's surface waters. About 60% of the state's total river and stream miles, and about 70% of the lakes and reservoirs are either threatened or impaired for designated uses. In both cases, the major pollutants are nutrients and sediments from agricultural nonpoint sources (U.S. EPA, 1995). Livestock waste has been identified as an increasing source of pollutants. The area occupied by feedlots and other concentrated production units is currently relatively small, however their proximity, relative location in regard to drainage ways, and the concentration of nutrients during snow melt or runoff events, make them a significant factor for pollution of surface and ground water. Alternative livestock (i.e., bison/other) production in feedlot systems may also become viable new enterprises in the Northern Plains region.

Performance Goals

Output Indicators

- *To develop and deliver information which increases awareness of educational, financial or technical assistance available to producers.*
- To develop and deliver information which can be used by regulatory officials in evaluating livestock waste management systems.

Outcome Indicators

- Facilitation of economical designs that will minimize the potential of surface and/or ground water pollution in northern climate settings.
- Reduction of water quality problems because of livestock feedlots.

Key Program Components

Research objectives include: 1) determine reliability of on-site testing of manure characteristics, 2) *determine the characteristics of beef feedlot runoff as compared to pasture and cropland runoff,* 3) evaluate the performance of runoff control system(s), *4) evaluate the use of alternative management systems as a means of decreasing the need for runoff containment systems, 5) develop economic models to evaluate changes in facilities and management.* The extension program will include publications, meetings with producers and regulatory staff and one-on-one consultations with producers.

Internal and External Linkages

This research involves the departments of Agricultural and Biosystems Engineering, Civil Engineering and Soil Science at North Dakota State University and the Research/Extension Centers in Carrington and Dickinson, North Dakota. External partners include the Natural Resources Conservation Service, North Dakota Department of Health, North Dakota Department of Agriculture, Soil Conservation Districts, Livestock Organizations, and EPA 319-Water Quality.

Target Audiences

Animal waste programming is targeted to operators of feedlot production enterprises, businesses which supply or are otherwise involved with these enterprises, federal, state, and local regulators, as well as the general public.

Program Duration

This program will continue for the five-year life of the plan plus the two year extension.

Allocated Resources ($ x 1,000)			FY 04	05	06
1862 Extension ($)	Smith-Lever		63	42	42
	State		87	63	63
		FTE	2	1.5	1.5
1862 Research ($)	Hatch		42	17	17
	State		68	25	25
		FTE	1	.5	.5

Education and Outreach Programs

An extension program is closely meshed with the research program. The specialist leading the extension education effort works closely with the major researcher of the projects. Both work closely with producers and regulators.

Program 12: Water Quality - Irrigation and Agronomic Management for Crop Production

Statement of Issues

Irrigation is viewed as a tool for economic development in rural areas because it can be used to grow long season crops as opposed to short season crops such as wheat, barley and canola. The average irrigated acre in North Dakota produces over 5 times the gross economic return of an average dryland acre. During the past decade the irrigated acreage in North Dakota has increased by over 25%, much of which is devoted to high value crops, such as potatoes, high quality alfalfa, dry edible beans, carrots, onions, and cabbage. The construction of a potato processing plant in Jamestown in 1995, the expansion of a potato processing plant in Grand

Forks and the construction of an onion processing plant in 2002 have fueled the move towards high value crop production. While increased irrigated acreage and high value crops improve the economic well being of the state, the more intensive farming attributed to these crops could affect water quality.

Performance Goals

Output Indicators

- *Improved agronomic and irrigation management practices for production of irrigated high-value crops.*
- *Protect the quality of aquifers and surface water sources using various tools for efficient irrigation scheduling to reduce the potential for runoff or leaching of nitrogen and pesticides. Less detects of contaminants by the ND Health Department aquifer-monitoring program and the ND State Water Commission sampling effort.*
- Irrigation workshops and meetings held to disseminate educational information.
- Water Spouts Newsletter sent to over 2/3 of active irrigators in the state.
- Individual assistance to practicing and potential irrigators.

Outcome Indicators

- *Increased demand and use of new irrigation technologies, agronomic management practices and high technology irrigation scheduling.*
- Improved water management and fertilizer use efficiencies.

Key Program Components

Research objectives include: 1) develop fertility, pest and irrigation management practices for irrigated high value vegetables (carrots, onions, cabbage, and sweet corn) and potatoes, 2) develop new cultivars of dry edible beans that optimize production under irrigation, 3) *develop evapotranspiration (ET) crop curves for high value vegetable crops and check the accuracy of existing ET curves for dry edible beans, alfalfa and potatoes in various parts of the state and 4) research potato planting configurations to improve water management under sprinkler irrigation. NDSU personnel will collaborate with the North Dakota Irrigation Association to develop an economic and environmentally acceptable strategic plan for irrigation development. Extension programming will use workshops and meetings to disseminate information and interact in a group setting with irrigators.* The newsletter Water Spouts will be sent to over 2/3 of the state's practicing irrigators seven times during the growing season. *Irrigation pumping plant efficiency tests and pivot sprinkler uniformity testing will be done as needed to improve water management. The information will be entered into a database and used for educational programming.*

Internal and External Linkages

This program involves the NDSU departments of Agricultural and Biosystems Engineering, Plant Science, Soil Science in collaboration with the Carrington and Williston Research/Extension Centers as well as extension agents in counties with irrigation. External partners include the ND Irrigation Association, Commercial Vegetable Growers of ND,

Northern Plains Potato Growers Association, Northharvest Bean Growers, the North Dakota State Water Commission, private companies, irrigation dealers and suppliers, and federal agencies such as the USDA-NRCS and Bureau of Reclamation.

Target Audiences
Demonstrations, field tours, and publications related to this research will educate producers, extension agents, and others regarding improved irrigation technologies.

Program Duration
This program will continue for the five-year life of the plan plus the two year extension.

Allocated Resources ($ x 1,000)			FY 04	05	06
1862 Extension ($)	Smith-Lever		100	56	56
	State		140	84	84
		FTE	3	2	2
1862 Research ($)	Hatch		62	17	17
	State		103	25	25
		FTE	1.5	.5	.5

Education and Outreach Programs
The extension program is closely meshed with the research program. The specialist leading the extension education effort works closely with the major researchers of the various high value crops projects. Both work closely with producers and the irrigation and processing industries.

GOAL 5: ENHANCED ECONOMIC OPPORTUNITY AND QUALITY OF LIFE FOR AMERICANS

Program 13: Value-Added Agriculture

Statement of Issues
Agriculture remains North Dakota's largest industry, but declining commodity prices and increasing costs are eroding profits for many producers. Adding value to the crops and livestock produced in the state has been recognized for more than a decade as a strategy to reverse the trend of declining profits. However, understanding what consumers want and determining how to profitably produce these products requires continual development and dissemination of new information. Such information has been and will continue to be developed at land-grant institutions, such as North Dakota State University.

Generally, value is added through expanded processing (e.g., quick-cooking pasta from durum

or frozen dough products from cereal grains), development of additional processed products (e.g., nutraceuticals from oilseeds or extraction of valuable compounds), production and processing of alternative crops and livestock (e.g., bast fiber, livestock finishing, meat product development or bison), or modification of current agricultural commodities for improving food, non-food, and nutritional properties to enhance value.

Researchers and extension specialists at NDSU have been involved in value-added projects for many years. A few of these projects include: 1) development of non-traditional pastas using other agricultural products such as flaxseed, edible legumes, and buckwheat, 2) development of fractionation processes designed to concentrate nutraceutical compounds from oilseeds, 3) production of mushrooms on various agriculture residues from northern grown crops, 4) production of Asian noodles using traditional and experimental wheat varieties, 5) development of sensory evaluation methods to assess raw and processed products such as flaxseed oil, soymilk and non-traditional pasta and 6) increase nutraceuticals such selenium content in read meat. Results of these efforts offer producers and businesses an opportunity to enhance the revenue of the state's agriculture industry.

Accordingly, the primary goal of value-added activities at NDSU is to continue our research efforts so that information regarding additional and alternative uses for products can be presented to producers and businesses. A second goal is to conduct risk assessments of new processes and crops in terms of food safety. The final goal is to help businesses and producers increase the level of income generated by North Dakota agriculture and to improve employment opportunities in the state. A challenge will be to assist businesses in a way that assures the extra revenue will be realized by the region's producers and businesses.

Performance Goals

Output Indicators

- The major output of NDSU's value-added projects will be information in various forms. The output may be a novel processing technique, an alternative application of existing processing technology, or the development of food products to improve an existing product.
- Educational materials and training-programs to assist businesses and producers interested in adding a value-added component to their business.
- Satisfactory feedback from producers and business persons involved with NDSU programs.

Outcome Indicators

- New, successful value-added businesses and increased employment.
- The number of businesses that have adopted an innovative production/processing technology, food safety programs, or are using improved management and marketing strategies.
- Value-added technologies and educational materials developed by the researchers and specialists.

Key Program Components

Value-added projects at NDSU during the next five years (2005-2009) will follow three themes: 1) basic research to explore the technical feasibility of alternative value-added strategies, *2) food safety risk assessment of current versus new technologies and products*, and 3) outreach activities to assist firms with commercially feasible ideas based on market assessments. Ideas for the above themes will arise from interactions among researchers, specialists, and business people.

Research will focus on the technical feasibility of value-added opportunities. An emphasis will be on basic research which addresses issues such as 1) processing and/or economic components of agricultural products grown, raised or indigenous to the region; 2) processing of northern grown crops by extraction of valuable compounds or fractionation into valuable compounds; and 3) developing or improving existing technologies or processes. Examples of projects that would fall under the above areas of emphasis include a) utilization of chickpea in food products such as breads, hummus & leblebi, and pasta, b) characterization of processing parameters for manufacturing non-traditional pasta (e.g., low carb), c) application of flaxseed, buckwheat and soy nutraceuticals in functional foods, d) extraction and characterization of novel food additives from northern grown commodities such as flaxseed, e) to characterize the processing parameters and quality outcomes of tortillas, develop livestock feeding and finishing strategies, and new product development and marketing opportunities, and g) characterize potential food safety risks associated with non-traditional food items.

Another key component will be close and ongoing working relationships with businesses and producers who are interested in pursuing value-added opportunities. These relationships may involve economic feasibility assessments, market analysis, business development, and management and marketing skills training.

Internal and External Linkages

Disciplines involved in NDSU value-added activities include Cereal and Food Sciences, Food Safety, Horticulture, Plant Sciences, Animal and Range Sciences, Nutrition, Agricultural Economics, Agricultural and Biosystems Engineering, and Microbiological Sciences. These researchers and specialists involved in value-added efforts are located at the Experiment Station on the NDSU campus, at Research Extension Centers, Extension offices, and Northern Crops Institute. Other NDSU entities that may be involved in value-added efforts include the College of Business, Department of Industrial Engineering, Institute for Business and Industry Development, and the Value-added Processing Center.

Likewise, NDSU faculty and specialists will collaborate and include staff at AURI (Minnesota), University of Wisconsin, University of Nebraska, Saskatchewan (POS Pilot Plant), and others. An important component of these efforts will be the interaction among businesses that are interested in adding value to North Dakota agriculture products and the researchers and specialists.

Target Audiences

Target audiences for NDSU's value-added efforts include producers and businesses interested in enhancing the value of North Dakota agricultural commodities. Many of these businesses will be

located in the state or region; however, some may be located in other regions of the nation but have an interest in using North Dakota agricultural commodities.

Program Duration
This program will continue for the five-year life of the plan plus the two year extension.

Allocated Resources ($ x 1,000)			FY 04	05	06
1862 Extension ($)	Smith-Lever		100	84	84
	State		140	126	126
		FTE	3	3	3
1862 Research ($)	Hatch		104	34	34
	State		171	50	50
		FTE	2.5	1	1

Education and Outreach Programs
The extension program is closely meshed with the research program. One specialist leading the extension education effort also carries a research appointment and works closely with other researchers in the value-added area. All researchers and extension staff work closely with producers and industry.

Program 17: Career Readiness - Preparing North Dakota Youth

Statement of Issues
Youth in North Dakota need opportunities to explore career possibilities, to view education as a tool to success, and learn the attitudes, skills, and work habits valued by employers and needed by entrepreneurs. Youth need to know what to expect in the workplace.

Science and technology affect the career opportunities for youth. Science and technology education will affect decisions relating to future education and careers. The 4-H program can supplement and enhance science and technology education now offered in schools for youth and adults.

Youth have a strong interest in entrepreneurship or starting their own business. National Gallup survey's (sponsored by the Ewing Marion Kauffman Foundation) taken in 1994, 1995 and 1999 concluded that six out of ten young people wanted to start a business. When students were asked to rate their knowledge and understanding of starting a business most (76 percent) rated themselves fair to very poor. Youth recognized the importance of education for preparation of starting a business.

Performance Goals

Output Indicators
The number of children, adults, and families participating in programs and events will be recorded.

Outcome Indicators
- Youth will explore potential career options.
- Youth will learn to research career choices, to consider the requirements of various careers and to make good decisions based on their research.
- Youth will develop the attitudes, skills and work habits needed in the workplace.
- Youth will develop greater awareness of science and technology, and their relationship to education and careers.
- Youth will develop critical thinking skills and grasp scientific concepts and processes.
- *Youth will participate in 30 hours of entrepreneurship "hands on" learning.*

Key Program Components

Career Awareness
- Appropriate partners will be identified and recruited in communities, counties, and the state to provide on-site opportunities for career exploration. Career skills will be linked to 4-H education. On-line and in-person mentoring relationships will be provided between youth and professionals.

Preparing to Work
- A curriculum on resumes, interviews and job search techniques will be provided. Service learning concepts will be expanded statewide through partnerships with the Department of Public Instruction and individual school districts. A "Service Learning" project for groups or individuals will be developed and expanded. The "WOW" (Wonders of Work) curriculum for use by elementary school aged youth and the "It's A Big World" curriculum designed for parents and caring adults to help youth prepare for a career will be implemented in communities across North Dakota.

Science and Technology
- A North Dakota Technology Corps of 4-H teens, volunteers and staff will be developed. Hands-on science opportunities will be provided for North Dakota youth.

Mini-Society
- *30 hours of entrepreneurship "hands on" learning will be held in classrooms, after school programs and 4-H clubs in North Dakota.*

Internal and External Linkages

Statewide linkages in the career readiness program will include the North Dakota Department of Public Instruction, local schools including guidance counselors and teachers assigned to help youth prepare for careers, volunteer and paid staff working with 4-H youth development programs and local business communities. The curriculums used for many 4 -H activities will be provided through work with the 4-H Cooperative Curriculum System (36 states). Program implementation plans used by 4-H programs in other states Cooperative Extension Services will be shared and adapted for use in North Dakota. The "It's a Big World" curriculum was developed through a grant from Cargill. The National 4-H Council will also help to provide program assistance.

Target Audiences

Target Audiences for Career Readiness - Preparing North Dakota Youth include youth and their families in North Dakota communities, volunteer and paid staff working with the 4-H program, schools and community organizations and citizens who form partnership or support career readiness programs.

Program Duration

This program will continue for the five-year life of the plan plus the two year extension.

Allocated Resources ($ x 1,000)			FY 04	05	06
1862 Extension ($)	Smith-Lever		100	112	112
	State		140	168	168
		FTE	3	4	4
1862 Research ($)	Hatch		104	0	0
	State		171	0	0
		FTE	2.5	0	0

Educational and Outreach Programs

4-H Youth development programming efforts are underway in all North Dakota counties. Some volunteer and paid staff have been trained in use of some of the curriculums. Efforts will be made to focus on programs with staff trained in programs related to career readiness. The preliminary steps for forming a youth technology corps have been taken.

CONTACT

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SUBMISSION

This Plan of Work is submitted to meet the requirements of the Agricultural Research, Extension, and Educational Reform Act of 1998 (AREERA) and the CSREES-USDA "Guidelines for Land Grant Institution Plan of Work."

Duane Hauck, Interim Director
North Dakota State University Extension Service

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North Dakota Agricultural Experiment Station