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## **AGENCY OVERVIEW**

**640** NDSU MAIN RESEARCH CENTER

**Date:** 12/13/2006

**Time:** 06:22:52

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## **STATUTORY AUTHORITY**

North Dakota Constitution, Article XIX; North Dakota Century Code Chapter 4-05.1

## **AGENCY DESCRIPTION**

The North Dakota State University Main Research Station is located on the campus of the North Dakota State University of Agriculture and Applied Science. The station is the administrative location of the Agricultural Experiment Station. The station conducts research and coordinates all research activities of the Agricultural Experiment Station. The research has, as a purpose, the development and dissemination of technology important to the production and utilization of food, feed, fiber, and fuel from crop and livestock enterprises. The research provides for an enhancement of economic development, quality of life, sustainability of production, and protection of the environment. The Main Research Station keeps detailed records of all activities and publishes the information that will be of value to the residents of this state.

## **AGENCY MISSION**

The agricultural experiment station shall 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

## **AGENCY PERFORMANCE MEASURES**

Per NDCC 4-05.1-19 the State Board of Agricultural Research and Extension (SBARE) presents a status report to the budget section of the legislative council. SBARE's most recent presentation to the budget section was on June 14, 2006. The report they gave and provided in written form included the status of the North Dakota Agricultural Experiment Station and the NDSU Extension Service. A copy of the information is on file in the legislative council office.

## **MAJOR ACCOMPLISHMENTS**

- Continued breeding, disease and insect tests, fertility tests, responses to weed pressure, determination of desirable agronomic processing and products, and economic impacts for 14 major crops and several new crops.
- Developed and released new, improved cultivars of wheat (Glenn and Howard Hard Red Spring wheat's), one malting barley cultivar (Stellar), three durum wheat's (Divide, Grenora, and Alkibo), one potato (Dakota Crisp) and six Round-Up Ready soybean varieties.
- Evaluated the effects of nutrition on fetal development in cattle.
- Continued efforts by Main Station and REC scientists to reduce damage caused by wheat and barley scab.
- Conducted fungicide and biological control trials to minimize damage, and plant breeders continued their efforts to develop resistant germplasm.
- Continued long-term efforts to develop root rot resistant soybean and soybean resistant to soybean cyst nematode.
- Determined through research that releases of *Aphthona* leafy spurge flea beetles continue to be successful in controlling leafy spurge in the majority of the sites tested.
- Found that the majority of 185 commercial and public soybean varieties were too susceptible to iron deficiency chlorosis for planting on calcareous soils in North Dakota.

- Continued research on groundwater quality as affected by precision farming. Soil scientists are working with USDA scientists to determine the fate and transport of bioactive chemicals and compounds in the soil.
- Determined that plant-root development and soil development is enhanced with managed grazing. Managed grazing enhances several soil properties, most notably soil infiltration.
- Assessed the impact of alternative Farm Bills and presented results in U.S. House and Senate hearings.
- Continued using economic models and made revisions to monitor land values, flood damage, impacts of value added activities in the state.
- Continued studies of flax seed as a human food because of associations with reduced forms of certain cancers.
- Studied the risk of illness due to antibiotic resistance brought about by contamination of food by food-borne pathogens.
- Analyzed nutritional studies of different grass varieties, allowing forage growers, livestock producers, and wildlife managers to select one or more grasses that fit their needs and goals.

## **FUTURE CRITICAL ISSUES**

Adjustments for Costs to Continue include the following:

05-07 EQUIPMENT>\$5,000= \$1,720,000.

05-07 Extraordinary Repairs=\$740,465

05-07 Major Capital Project=\$7 million (\$2 Million State Bonding, \$5 Million Special Funds)

**REQUEST SUMMARY**

Date: 12/13/2006

640 NDSU MAIN RESEARCH CENTER

Bill#: HB 1020

Time: 06:22:52

Biennium: 2007-2009

Description	Expenditures 2003-2005 Biennium	Present Budget 2005-2007	Budget Request Change	Requested Budget 2007-2009 Biennium	Optional Budget Request
<b>BY MAJOR PROGRAM</b>					
AGRICULTURAL RESEARCH	61,971,543	76,106,713	6,228,357	82,335,070	2,777,100
<b>TOTAL MAJOR PROGRAMS</b>	<b>61,971,543</b>	<b>76,106,713</b>	<b>6,228,357</b>	<b>82,335,070</b>	<b>2,777,100</b>
<b>BY LINE ITEM</b>					
CAPITAL ASSETS	0	7,000,000	4,057,750	11,057,750	0
OPERATIONS	61,971,543	69,106,713	2,170,607	71,277,320	2,777,100
<b>TOTAL LINE ITEMS</b>	<b>61,971,543</b>	<b>76,106,713</b>	<b>6,228,357</b>	<b>82,335,070</b>	<b>2,777,100</b>
<b>BY FUNDING SOURCE</b>					
GENERAL FUND	27,718,332	30,644,067	458,313	31,102,380	2,777,100
FEDERAL FUNDS	4,777,677	4,749,242	0	4,749,242	0
SPECIAL FUNDS	29,475,534	40,713,404	5,770,044	46,483,448	0
<b>TOTAL FUNDING SOURCE</b>	<b>61,971,543</b>	<b>76,106,713</b>	<b>6,228,357</b>	<b>82,335,070</b>	<b>2,777,100</b>
<b>TOTAL FTE</b>	<b>349.19</b>	<b>345.08</b>	<b>.00</b>	<b>345.08</b>	<b>9.70</b>

**REQUEST DETAIL**

**640 NDSU MAIN RESEARCH CENTER**  
**Biennium: 2007-2009**

**Bill#: HB 1020**

**Date: 12/13/2006**

**Time: 06:22:52**

Description	Expenditures 2003-2005 Biennium	Present Budget 2005-2007	Budget Request Change	Requested Budget 2007-2009 Biennium	Optional Budget Request
<b>SALARIES AND WAGES</b>					
<b>SALARIES AND WAGES</b>					
GENERAL FUND	0	0	0	0	0
FEDERAL FUNDS	0	0	0	0	0
SPECIAL FUNDS	0	0	0	0	0
<b>TOTAL</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>
<b>CAPITAL ASSETS</b>					
SALARY INCREASE	0	0	0	0	0
BENEFIT INCREASE	0	0	0	0	0
LAND AND BUILDINGS	0	7,000,000	4,057,750	11,057,750	0
EXTRAORDINARY REPAIRS	0	0	0	0	0
<b>TOTAL</b>	<b>0</b>	<b>7,000,000</b>	<b>4,057,750</b>	<b>11,057,750</b>	<b>0</b>
<b>CAPITAL ASSETS</b>					
GENERAL FUND	0	0	0	0	0
FEDERAL FUNDS	0	0	0	0	0
SPECIAL FUNDS	0	7,000,000	4,057,750	11,057,750	0
<b>TOTAL</b>	<b>0</b>	<b>7,000,000</b>	<b>4,057,750</b>	<b>11,057,750</b>	<b>0</b>
<b>SPECIAL LINES</b>					
OPERATIONS	61,971,543	69,106,713	2,170,607	71,277,320	2,777,100
<b>TOTAL</b>	<b>61,971,543</b>	<b>69,106,713</b>	<b>2,170,607</b>	<b>71,277,320</b>	<b>2,777,100</b>
<b>SPECIAL LINES</b>					
GENERAL FUND	27,718,332	30,644,067	458,313	31,102,380	2,777,100
FEDERAL FUNDS	4,777,677	4,749,242	0	4,749,242	0
SPECIAL FUNDS	29,475,534	33,713,404	1,712,294	35,425,698	0
<b>TOTAL</b>	<b>61,971,543</b>	<b>69,106,713</b>	<b>2,170,607</b>	<b>71,277,320</b>	<b>2,777,100</b>
<b>FUNDING SOURCES</b>					
GENERAL FUND	27,718,332	30,644,067	458,313	31,102,380	2,777,100
FEDERAL FUNDS	4,777,677	4,749,242	0	4,749,242	0
SPECIAL FUNDS	29,475,534	40,713,404	5,770,044	46,483,448	0
<b>TOTAL FUNDING SOURCES</b>	<b>61,971,543</b>	<b>76,106,713</b>	<b>6,228,357</b>	<b>82,335,070</b>	<b>2,777,100</b>

**CHANGE PACKAGE SUMMARY**

640 NDSU MAIN RESEARCH CENTER

Biennium: 2007-2009

Bill#: HB 1020

Date: 12/13/2006

Time: 06:22:52

Description	FTE	General Fund	Federal Funds	Special Funds	Total Funds
<b>AGENCY BUDGET CHANGES</b>					
Cost To Continue	.00	-332,152	0	-6,845,706	-7,177,858
1 OTHER REV	.00	0	0	0	0
3 2007-09 MAJ CAP PROJ	.00	0	0	11,057,750	11,057,750
4 CAP ASSET BASE	.00	740,465	0	0	740,465
5 BASE EQUIPMENT OVER 5000	.00	50,000	0	1,558,000	1,608,000
<b>Agency Total</b>	<b>.00</b>	<b>458,313</b>	<b>0</b>	<b>5,770,044</b>	<b>6,228,357</b>
<b>OPTIONAL REQUEST</b>					
10 OPT 15 PCT INCR	9.70	2,777,100	0	0	2,777,100
<b>Optional Total</b>	<b>9.70</b>	<b>2,777,100</b>	<b>0</b>	<b>0</b>	<b>2,777,100</b>

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**BUDGET CHANGES NARRATIVE**  
640 NDSU MAIN RESEARCH CENTER

Date: 12/13/2006

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<b>Change Group: A</b>	<b>Change Type: A</b>	<b>Change No: 1</b>	<b>Priority: 1</b>
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OTHER REV -

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This change package was not used

<b>Change Group: A</b>	<b>Change Type: A</b>	<b>Change No: 3</b>	<b>Priority: 1</b>
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2007-09 MAJ CAP PROJ -

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All details of the major capital projects are included in the Capital Assets subschedule.

<b>Change Group: A</b>	<b>Change Type: A</b>	<b>Change No: 4</b>	<b>Priority: 1</b>
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CAP ASSET BASE -

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This provides an amount equal to the 2005-07 base funding for extraordinary repairs. A prioritized listing of extraordinary repair projects is included in the extraordinary repairs subschedule (because of OMB's requirement to do so); however these priorities can very easily change, due to unforeseen circumstances and emergencies. The priority listing is only a best estimate at this time. The actual use of these dollars will be left to the discretion of the agencies (with appropriate approvals by the SBHE where required for projects greater than \$100,000). All NDUS entities will be given the authority to allocate dollars to repair and replacement priorities for both deferred maintenance and regular repair and replacement projects as determined by each entity.

<b>Change Group: A</b>	<b>Change Type: A</b>	<b>Change No: 5</b>	<b>Priority: 1</b>
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BASE EQUIPMENT OVER 5000 -

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Equipment over \$5,000 that is included in the base budget request

<b>Change Group:</b> A	<b>Change Type:</b> A	<b>Change No:</b> 100	<b>Priority:</b>
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OMB Equipment and Operating Pool -

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The executive recommendation includes \$555,100 general funds for an equipment and operating expense pool for the Main Research Center.

Equipment Pool – A revolving fund for equipment purchases allows the Research Extension Centers to maintain their equipment base. Establishment of this fund has allowed each REC to purchase expensive research equipment on a timely basis, with a degree of regularity. In order to effectively purchase both field and laboratory equipment, which is extremely difficult using competitive grant funds, reasonable resources are needed for the Main Station and REC's to utilize the funds successfully.

Operating funds – A formula of \$6,100 per scientist year (SY) has been used for allocating operating funds to departments on the Main Station. The costs associated with conducting research important to the state continues to increase. An increase in the formula funding to \$10,000 per SY is needed to stay in line with inflation and should be sufficient for several years. In addition, increased operating funds will be used to offset increases in fixed operating costs, including energy.

<b>Change Group:</b> A	<b>Change Type:</b> A	<b>Change No:</b> 101	<b>Priority:</b>
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OMB Bio-products -

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The executive recommendation includes \$400,000 general funds and 2.0 additional FTE to focus on Bio-products. FTE will be utilized as follows:

1. Engineering faculty position (60% research: 40% Extension) - Will focus in biomass-based systems which hold great potential for becoming the preferred sources for liquid fuels. Needed research will focus on harvest, collection, and transport systems for raw products including crops, crop residues, animal production co-products, by-products from food processing, etc. Additional work will focus on conversion systems (engines, gasifiers, etc.) that will improve efficiency of conversion of cellulosic and other materials to liquid fuel and other products.
2. Research specialist to assist faculty position.
3. Economics faculty position (40% research: 60% Extension) - Will focus in determining production costs, logistics, and market analysis for bio-based products. Working closely with colleagues throughout the university system, research would lead to the development of efficient processes for supply chain management and for efficient processing strategies.

Bio-products were ranked number 2 on the SBARE priority list.

<b>Change Group:</b> A	<b>Change Type:</b> A	<b>Change No:</b> 102	<b>Priority:</b>
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OMB Scab / NDAWN -

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The executive recommendation authorizes \$550,000 general funds to address the following issue:

Operating expenses for breeding/genetics, plant pathology, cereal quality, and entomology research programs to enhance efforts on Scab resistance, pest management, and improved quality. Enhanced support of these programs is essential to maintain an advantage over the pest's ability to change and cause major economic losses to the state's farmers, as evidenced by the disastrous outbreaks of scab the last several years.

NDAWN support and field scouting – One research specialist will work on the NDAWN weather network to aid in the development of predictive models for disease development and to distribute timely weather information needed by producers to determine timing of pesticide application. Crop scouts located throughout the state will aid in identifying development of scab in various production regions in the state. Disease development will be monitored and compared to predictive crop models – these highly successful forecasting models continue to be improved as additional information is added to the model.

Scab / NDAWN was ranked number 3 on the SBARE priority list.

<b>Change Group:</b> A	<b>Change Type:</b> A	<b>Change No:</b> 103	<b>Priority:</b>
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OMB Pulse Improvement -

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The executive recommendation dedicates \$280,000 general funds and 1 additional FTE to enhance the Pulse Improvement program.

A faculty position at the Main Station is needed to develop improved varieties of pea, lentil, and chickpea that are adapted to the northern Great Plains.

Pulse Improvement was ranked number 3 on the SBARE priority list.

<b>Change Group:</b> A	<b>Change Type:</b> A	<b>Change No:</b> 104	<b>Priority:</b>
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OMB Deferred Maintenance Pool -

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The executive recommendation includes \$100,000 general funds for a deferred maintenance pool to address needs at the Main and seven branch research centers.

<b>Change Group: A</b>	<b>Change Type: A</b>	<b>Change No: 105</b>	<b>Priority:</b>
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OMB Research Greenhouse Facility -

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The executive recommendation includes \$9,000,000 general funds to construct a research greenhouse facility.

<b>Change Group: A</b>	<b>Change Type: A</b>	<b>Change No: 106</b>	<b>Priority:</b>
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OMB Building Additions and Renovations -

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The executive recommendation includes \$ 1,107,750 general funds for headquarters office building additions / renovations at the following research extension centers:

Carrington Research Extension Center Headquarters Office Building Addition - \$ 465,000

The proposed project consists of the construction of an addition to the existing REC office/meeting building that would include a dedicated room for video conferencing and computer instruction, additional office space, and a room for equipment storage. The current facility is fully utilized, and subsequently, we are unable to effectively accommodate expanding technologies and programs. The estimated 3,000 sq. ft. addition would allow for expansion of our programs and outreach services.

Hettinger Research Extension Center Headquarters Office Addition - \$ 222,750

Construction and dedication of the existing center was completed in 1991. Use of the facility has grown immensely to the point that more room is needed for office and conference uses. Annual use of the meeting and conference complex has grown from around 4,000 in 1991 to approximately 10,000 in 2001. Part of this growth comes from the interactive connection for distance learning directed from other NDUS entities and the computer cluster located here that is used by many people and entities for technology training. Funds utilized for establishment of the technology supplied from the center came from local and grant fund sources. The original facility was constructed from community and grant fund sources without any requirement for North Dakota general fund dollars.

Two new efforts in southwestern North Dakota potentially will come with requirements for office space: 1) Southwest Feeders is a local effort that will require housing for one or two personnel; 2) Value Added Ruminant Consortia (VARAC) is a federally funded, four-state initiative that will require additional office and conference space.

North Central Research Extension Center Office & Technology Transfer Building Addition - \$ 420,000

All offices in the current building are fully occupied, so three workstations are being used in the room designed to be the electronic library. The use of video-conferencing and “teleplant medicine” have exceeded our expectations and have also caused congestion in the classroom and video-conferencing room. The proposed addition would add additional office space, specimen analysis areas, and data processing rooms to the current office and technology transfer building. The project would also encompass the replacement of the present carpeting and painting the existing headquarters office building.

Ongoing operating and maintenance expenses for these three projects are estimated to be \$33,000.

<b>Change Group: A</b>	<b>Change Type: A</b>	<b>Change No: 107</b>	<b>Priority:</b>
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OMB Beef Research Facility -

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The executive budget does not include funding for the Beef Research Facility project.

<b>Change Group: O</b>	<b>Change Type: A</b>	<b>Change No: 10</b>	<b>Priority: 10</b>
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OPT 15 PCT INCR -

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An increase of \$8,295,600 or 15 percent over the 2005-07 general fund base would provide funds to address priorities of the State Board of Agricultural Research and Education and related needs of North Dakota agriculture. The Main Research Station is including \$2,777,100 (of the \$8,295,600) in their optional package.

SBARE ranked all of the projects for Extension, Main Station, and Branch Stations together since a lot of the projects are joint efforts. Please refer to the ranked projects by reviewing the narrative in all of the agencies.

SBARE Ranking NDSU Main Research Center - \$2,777,100 (Branch Stations \$2,282,700)

#1 ranked: AES Equipment and operating pool  
 \$940,000 Total General Fund Increase  
 (\$490,000 equipment and \$450,000 operating)  
 Main Station \$355,000 equipment  
 Hettinger \$11,666 equipment  
 Streeter \$11,667 equipment  
 Langdon \$11,667 equipment  
 North Central \$100,000 equipment  
  
 Main Station \$200,100 operating  
 Dickinson \$35,700  
 Central Grasslands \$35,700  
 Hettinger \$35,700  
 Langdon \$35,700  
 North Central \$35,700  
 Williston \$35,700  
 Carrington \$35,700

Equipment Pool – A revolving fund for equipment purchases has been extremely successful for the Research Extension Centers to maintain their equipment base. Establishment of this fund has allowed each REC to purchase expensive research equipment on a timely basis, with a degree of regularity. In the 2005-07 Legislative session, a small amount of funding (\$50,000 to the Main Station for equipment) was used to establish a similar revolving fund for the research departments on the Main Station. In order to effectively purchase both field and laboratory equipment, which is extremely difficult using competitive grant funds, additional funding to the base of each of these revolving funds is needed for the Main Station and REC's to utilize the funds successfully.

Operating funds – A formula of \$6,100 per scientist year (SY) has been used for allocating operating funds to departments on the Main Station. The costs associated with conducting research important to the state continue to increase. An increase in the formula funding to \$10,000 per SY is needed to stay in line with inflation and should be sufficient for several years. In addition, increased operating funds for the REC's are needed to offset increases in fixed operating costs, including energy.

#2 ranked: Bio-products/bioenergy development

\$400,000 Total General Fund Increase

(\$120,000 salary and fringe benefits, .6 new FTE) – Engineering Faculty Main Station

(\$100,000 salary and fringe benefits, 1.0 new FTE) – Research Specialist Main Station

(\$80,000 salary and fringe benefits, .4 new FTE) – Economics Faculty Main Station

(\$100,000 Main Station operating funds)

Engineering faculty position (60% research: 40% Extension) Focus in biomass-based systems which hold great potential for becoming the preferred sources for liquid fuels. Needed research will focus on harvest, collection, and transport systems for raw products including crops, crop residues, animal production co-products, by-products from food processing, etc. Additional work will focus on conversion systems (engines, gasifiers, etc.) that will improve efficiency of conversion of cellulosic and other materials to liquid fuel and other products.

Research specialist to assist faculty position.

Economics faculty position (40% research: 60% Extension) focus in determining production costs, logistics, and market analysis for bio-based products. Working closely with colleagues throughout the university system, research would lead to the development of efficient processes for supply chain management and for efficient processing strategies.

#2 ranked: REC support staff

\$462,800 Total General Fund Increase

(\$462,800 Salary and Fringe benefits, 7.0 new FTE - (1 FTE at each Branch Station)

Support Staff (7) – Research Extension Centers have a desperate need for additional office support staff to deal with the changing and increasing demands of today's workplace. Decentralization and an increase in record keeping for compliance issues, regulation, scheduling, accountability, data management, and other facets of the ever-changing technologies place extreme pressure on a reduced workforce to remain current.

#3 ranked: Scab (operating, NDAWN, etc.)

\$625,000 Total General Fund Increase

(\$425,000 operating scab)

Main Station Operating \$350,000

Langdon Operating \$25,000

Carrington Operating \$25,000

North Central \$25,000

(\$200,000 operating NDAWN)

Main Station Operating \$200,000

Operating for breeding/genetics, plant pathology, cereal quality, and entomology research programs to enhance efforts on Scab resistance, pest management, and improved quality. Enhanced support of these programs is essential to maintain an advantage over the pest's ability to change and cause major economic losses to the state's farmers, as evidenced by the disastrous outbreaks of scab the last several years.

NDAWN support and field scouting – One research specialist will work on the NDAWN weather network to aid in the development of predictive models for disease development and to distribute timely weather information needed by producers to determine timing of pesticide application. Crop scouts located throughout the state will aid in identifying development of scab in various production regions in the state. Disease development will be monitored and compared to predictive crop models – these highly successful forecasting models continue to be improved as additional information is added to the model.

#3 ranked: Pulse improvement

\$470,000 Total General Fund Increase

(\$200,000 salary and fringe benefits, 1.0 new FTE Faculty) - Main Station

(\$150,000 salary and fringe benefits, 1.0 new FTE assistant breeder) - NCREC

(\$120,000 operating funds for pulse program)

Main Station operating \$80,000

North Central operating \$40,000

Pulse improvement program – North Dakota has experienced rapid growth and continued interest in the pulse industry. Acreages of pea, lentil, and chickpea have increased dramatically, particularly in the central and western regions of North Dakota. North Dakota leads the nation in pea production and acreage will continue to increase as demand continues. Pea production provides many benefits to the soil and environment and is an excellent protein source for livestock feed. A faculty position at the Main Station is needed to develop improved varieties of pea, lentil, and chickpea that are adapted to the northern Great Plains. Assistant breeder/agronomist to be located at NCREC will aid the effort to develop improved varieties and evaluate appropriate production techniques.

#4 ranked: Waste management

\$280,000 Total General Fund Increase

(\$160,000 salary and fringe benefits, .8 new FTE) Main Station

(\$84,000 salary and fringe benefits, .6 new FTE) Carrington

(\$36,000 operating funds)

Main Station \$24,000 operating

Carrington \$12,000 operating

Engineering (80% research: 20% Extension). A faculty member in Ag and Bio-systems Engineering will focus on development of innovative waste management systems with an emphasis on developing uses and products from wastes that can generate revenue for the enterprise, innovative facilities that will minimize odors, and reduce costs for production.

Waste management specialist (60% research: 40% Extension) located at Carrington. To work with animal production, feedlot, engineering colleagues, and livestock producers in developing economical and efficient systems.

#5 ranked: Host resistance and pest research

\$700,000 Total General Fund Increase

(\$700,000 salary and fringe benefits, 7.0 new Research Specialists FTE @ \$100,000 each)

2 FTE Main Station, 2 FTE Williston, 1 FTE Carrington, 1 FTE North Central, 1 FTE Langdon

Host resistance and pest biology – research specialists (7) will enhance ongoing efforts to more rapidly develop varieties with improved resistance to major diseases, including sclerotinia, wheat and barley scab, blackleg, root rot and other diseases affecting major crops in the state and to understand the biology of the pathogens important to the cropping systems present in the state. Two specialists will be located at Fargo (Main Station), two at Williston REC (one to focus on barley improvement with supervision from Main Station scientists), one each at CREC, NCREC, and LREC.

#6 ranked: Swine specialist

\$100,000 Total General Fund Increase

(\$80,000 salary and fringe benefits, .4 new FTE) - Main Station

(\$20,000 operating) - Main Station

Swine specialist – At one point in time, North Dakota produced over 500,000 market hogs per year and had more than 2000 producers. Presently North Dakota produces 160,000 market hogs and has 450 producers. However, because of its economic impact, interest in increasing swine production in the state has grown recently. Each dollar of return from pigs marketed turns over 3.49 times for feed, labor trucking, vet service, utilities, etc. This industry needs technical expertise, management assistance and an unbiased resource that can help the state develop its hog industry. A swine specialist that is 60% Extension: 40% research is needed to fill this role.

#7 ranked: Livestock development

\$58,000 Total General Fund Increase

(\$40,000 salary and fringe benefits, .2 new FTE) - Main Station

(\$18,000 operating) - Main Station

Livestock industry specialist (80% Extension: 20% research). There are many driving forces including the desire of many ag producers to grow their existing enterprises and/or to diversify their operations, utilization of potential feedstuffs that presently are shipped to other states for their livestock operations, opportunities to enhance production of feedstuffs to service a growing ND industry, use of co-products emerging from the rapidly expanding bio-energy/bio-products enterprises as feedstuffs, utilization of grazing capacity in range and managed areas. A faculty position will continually work with colleagues and industry to evaluate opportunities and to provide information that can be used for timely decision making.

#7 ranked: Pest Management

\$128,000 Total General Fund Increase

(\$128,000 salary and fringe benefits, .8 new FTE) - Carrington

Area Pest Management Specialist – This 80% research: 20% Extension position is critically needed to provide information to area growers affected by crop diseases. The position will be located at the Carrington REC. The CREC is located in the center of great crop diversity, an area that has been greatly affected by severe outbreaks of many major diseases.

#8 ranked: Pest application research

\$90,000 Total General Fund Increase

(\$90,000 salary and fringe benefits, 1.0 new FTE, Research Specialist) - Main Station

Improving pesticide application efficiency – One research specialist is needed to continue efforts identifying best methods to apply pesticides effectively and efficiently to control scab.

#9 ranked: Livestock/range

\$322,000 Total General Fund Increase

(\$294,000 salary and fringe benefits, .7 for each of the 3 new FTE @ \$98,000 each)

3 FTE - 1 FTE Streeter, 1 FTE Hettinger, 1 FTE Main Station

(\$28,000 operating)

Main Station \$12,000

Central Grasslands \$8,000

Hettinger \$8,000

Three livestock/range specialists (70% research: 30% Extension) to compare whole systems management of organic, natural, grass-fed, and conventional beef production systems, as well as the relationship of these systems on the environment. Help determine market causes affecting cattle sales. Feedlot research will focus on evaluating co-product use for efficient livestock production. One specialist will focus on animal health issues. The specialists will be located at the Central Grasslands REC near Streeter, Hettinger REC, and the Main Station.

#10 ranked: Irrigation

\$180,000 Total General Fund Increase

(\$180,000 salary and fringe benefits, 1.0 new FTE, Research scientist) - Williston

Irrigated agriculture is becoming increasingly important in NW North Dakota, with high value crops evident in the region. One research scientist is needed to evaluate irrigated production practices in ND, stationed at WREC.

#11 ranked: Food industry

\$250,000 Total General Fund Increase

(\$120,000 salary and fringe benefits, .6 new FTE Faculty) - Main Station

(\$100,000 salary and fringe benefits, 1.0 new FTE Faculty) - Main Station

(\$30,000 operating funds) - Main Station

Faculty position (60% research: 40% Extension) Position in enhanced processing of existing and new crops. Will have expertise in processing/engineering/plant operations. Will work in collaboration with colleagues throughout system to assure that supply chains as well as processing are optimized. Will work in close collaboration with business/marketing and technical associates in agricultural business development program above.

Research specialist to assist faculty position.

#12 ranked: Sustainable Agriculture

\$54,000 Total General Fund Increase

(\$54,000 salary and fringe benefits, .3 new FTE) - Dickinson

North Dakotans support current production agriculture, but also see a need to explore long term sustainability. The Dickinson REC is exploring new sustainable agricultural opportunities through research and Extension efforts, including coordination of the Professional Development Program sponsored by the USDA Sustainable Agriculture Research and Education Program. These research and Extension programs will help rural North Dakotans develop new sustainable systems to enhance the economic viability of rural areas and to meet their economic, social and environmental needs within a diversified agriculture. Additional support for these efforts is needed, as is a strong program of direct outreach to farmers and ranchers. One sustainable agricultural specialist (70% Extension: 30% research) is needed at Dickinson to provide this support and outreach to southwestern North Dakota.