

V(A). Planned Program (Summary)

Program # 1

1. Name of the Planned Program

Global Food Security and Hunger

Reporting on this Program

V(B). Program Knowledge Area(s)

1. Program Knowledge Areas and Percentage

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

V(C). Planned Program (Inputs)

1. Actual amount of FTE/SYs expended this Program

Year: 2014	Extension		Research	
	1862	1890	1862	1890
Plan	12.0	0.0	37.0	0.0
Actual Paid	18.2	0.0	46.8	0.0
Actual Volunteer	0.0	0.0	0.0	0.0

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

Extension		Research	
Smith-Lever 3b & 3c	1890 Extension	Hatch	Evans-Allen
546496	0	1372371	0
1862 Matching	1890 Matching	1862 Matching	1890 Matching
546496	0	1372371	0
1862 All Other	1890 All Other	1862 All Other	1890 All Other
486801	0	3270054	0

V(D). Planned Program (Activity)

1. Brief description of the Activity

Meet with stakeholder groups to gather input and refine program directions.
 Develop improved crop cultivars acceptable to growers and those who use and process the grain.
 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. Brief description of the target audience

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

3. How was eXtension used?

We provided eXtension expertise advice to the clients who had questions related to grazing and feed lot management.

V(E). Planned Program (Outputs)

1. Standard output measures

2014	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Actual	2088	93500	995	8450

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

Patent Applications Submitted

Year: 2014
 Actual: 2

Patents listed

Jopa durum wheat

Rosie dry edible beans

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

2014	Extension	Research	Total
Actual	12	42	54

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

- {No Data Entered}

V(G). State Defined Outcomes

V. State Defined Outcomes Table of Content

O. No.	OUTCOME NAME
1	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 Measures

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. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2014	27

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Crop producers, crop consultants, nutritionists, commodity groups, Extension personnel, Crop Improvement Associations, food processors, millers, bakers and consumers world wide depend on ND to supply high value crops such as durum wheat for pasta, hard red spring wheat for high protein flour, peas for noodles and other crops developed to meet the increasing demand for nutritious food.

What has been done

NDSU has been key to the development of new and improved germplasm in 14 crops, including some with multiple market classes. This Improved germplasm has increased plant resistance to abiotic and biotic stresses. The improved germplasm also has improved end use quality that is desired by those who use and process the harvested seed

Results

As a result of these actions and commitment, approximately 27% of seeded acres in ND utilize crop varieties developed at NDSU. As evidence of NDSU's commitment to supplying new and improved varieties for ND, in 2014 NDSU released one dark red kidney dry bean, one light red kidney dry bean, and one red potato for use primarily in ND and surrounding states and Canadian provinces.

4. Associated Knowledge Areas

KA Code	Knowledge Area
----------------	-----------------------

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

Outcome #2

1. Outcome Measures

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. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2014	22

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

As land prices continue to escalate and a need to produce more food from the current land base, livestock producers and farmers are looking for ways to increase the amount of food produced from their limited land base without adding costs. As the world population continues to grow, creating cost effective farming and ranching management strategies are critical to produce more food from the same land base, or even shrinking land bases.

What has been done

A three year cover crop grazing trial studying economic efficiency and livestock performance using single and dual cropping systems for grain production followed by late-season grazing was conducted.

Also, a series of two day beef production workshops in four towns to cover the southwest region

of North Dakota was conducted. The goal of the workshop is help producers incorporate new livestock management systems to increase efficiencies in raising cattle while creating environmentally beneficial grazing programs.

Results

The cover crop study showed heifers can be developed on a dual cropping system utilizing full use grazing; however, drylot heifers performed better in terms of average daily gain. The only cover crop grazing option that was economically viable was full use grazing (compared to take half/leave half). The full use grazing dual crop option was the best option compared to take half/leave half and drylot in one of three years. The full use single crop option (no commodity crop planted) was cost effective two of three years. The take half/leave half and non-use single and dual cropping systems were not cost effective in any of the three years. Drylot feeding of heifers was always cost effective.

4. Associated Knowledge Areas

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

V(H). Planned Program (External Factors)

External factors which affected outcomes

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

Brief Explanation

Weather extremes occurred at times that had minimal impact on research and Extension programs. Locally wet conditions in the northeast and north central areas of the state increased preventive plant acres and the use of cover crops. 2014 was a good year in crop production, but commodity prices were low. 2014 was an excellent year for livestock production with record commodity prices. Public policy changes were minimal and government regulations were stable.

V(I). Planned Program (Evaluation Studies)

Evaluation Results

Livestock growers attending the beef day workshops in southwestern North Dakota increased their knowledge of range/grazing management from neutral knowledge to somewhat knowledgeable after attending the workshops. Over 33 percent of the beef day workshop attendees shared the information gained from the workshops with other people five months after the workshops, with 22 percent implementing change as a result of the workshops. Almost 39 percent implemented ideas learned from the workshop five months

after the workshops. The most significant impact reported by participants centered around the topic "managing today's rangeland", with 61 percent of those surveyed incorporating what they learned into their operation. They incorporated new grazing systems that increased stocking density and improving grazing efficiency of the resource, increasing the economic return from each acre of rangeland.

Key Items of Evaluation