

V(A). Planned Program (Summary)

Program # 1

1. Name of the Planned Program

Food Safety -- Agronomic and Forage Crops

V(B). Program Knowledge Area(s)

1. Program Knowledge Areas and Percentage

KA Code	Knowledge Area	%1862 Extension	%1890 Extension	%1862 Research	%1890 Research
101	Appraisal of Soil Resources			10%	
112	Watershed Protection and Management			10%	
121	Management of Range Resources			25%	
203	Plant Biological Efficiency and Abiotic Stresses Affecting Plants			10%	
204	Plant Product Quality and Utility (Preharvest)			10%	
205	Plant Management Systems			25%	
601	Economics of Agricultural Production and Farm Management			10%	
	Total			100%	

V(C). Planned Program (Inputs)

1. Actual amount of professional FTE/SYs expended this Program

Year: 2010	Extension		Research	
	1862	1890	1862	1890
Plan	0.0	0.0	20.0	0.0
Actual	0.0	0.0	41.3	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
0	0	249225	0
1862 Matching	1890 Matching	1862 Matching	1890 Matching
0	0	1600730	0
1862 All Other	1890 All Other	1862 All Other	1890 All Other
0	0	2166450	0

V(D). Planned Program (Activity)

1. Brief description of the Activity

- Development of research summaries and fact sheets
- Training in cooperation with the Montana Alfalfa Seed Growers Association and Montana Grain Growers Association
- Workshops and meetings with federal and state land management agencies

2. Brief description of the target audience

- Crop and livestock producers in Montana
- State agricultural advisory committees
- State of Montana, Montana Department of Agriculture, Bureau of Land Management, USFS, and other government entities
- Participants in outreach and commodity group meetings, conferences, and field days.

V(E). Planned Program (Outputs)

1. Standard output measures

2010	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Plan	175	200	0	0
Actual	2000	2500	0	0

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

Patent Applications Submitted

Year: 2010
 Plan: 0
 Actual: 0

Patents listed

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

2010	Extension	Research	Total
Plan	5	5	
Actual	8	22	30

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

- Number of research citations

Year	Target	Actual
2010	12	43

V(G). State Defined Outcomes

V. State Defined Outcomes Table of Content

O. No.	OUTCOME NAME
1	Number of new crops evaluated per year for adaptation potential in Montana.
2	Number of new crops and varieties adopted per year.
3	Increase in acres of non-traditional crops planted in Montana.
4	Number of routine field crop and forage samples processed by the MSU Seed Laboratory per year.
5	New grazing plans established for livestock and wildlife in rangeland environments.

Outcome #1

1. Outcome Measures

Number of new crops evaluated per year for adaptation potential in Montana.

2. Associated Institution Types

- 1862 Research

3a. Outcome Type:

Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2010	2	2

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

The establishment of new value-added crops and the development of higher yielding crop varieties are priorities among agronomic researchers and crop producing stakeholders. Reducing Montana's dependence on small grain monocultures can potentially increase on-farm receipts.

What has been done

Producers are investing in and harvesting more feed crops, including barley hay and forage legumes. The development and establishment of high-value, alternative crops continue to gain momentum in Montana with close involvement among research, extension, and stakeholders. Oilseeds (including Camelina sativa, canola, soybeans, and safflower) are rapidly emerging as important Montana crops for production of culinary oils, biolubricants, omega-3 oils, feeds, and biodiesel. Camelina is an effective rotation crop for small grains with the potential for breaking disease and pest cycles. Camelina production could significantly reduce the cost of biodiesel and provide a source for omega-3 oil. We continue to collaborate with other states in generating data required for product registration on new crops or new pests.

Results

Over 150 germplasm accessions of camelina have been evaluated for adaptability, yield potential, and fatty acid content. An additional 200 accessions of camelina obtained from international gene banks and 50,000 mutant lines are being evaluated for increased omega-3 fats and total oil content. Additional initiatives will provide new insights into food safety and risk assessment, including the use of vegetable oils as feedstock for fuel cells, the development of new wheat varieties, non-corrosive biobased de icers, and the optimization of ethanol production from various feedstocks. Crop diversity studies continue to show promise for increasing on-farm receipts while reducing a monoculture of small grains. Some examples of new crops and alternative varieties of new crops include winter and spring peas, canola, corn, lentil, mustard, sunflower, triticale, and chickpea which are included in long-term rotation studies and plant

adaptation trials.

4. Associated Knowledge Areas

KA Code	Knowledge Area
203	Plant Biological Efficiency and Abiotic Stresses Affecting Plants
204	Plant Product Quality and Utility (Preharvest)
205	Plant Management Systems

Outcome #2

1. Outcome Measures

Number of new crops and varieties adopted per year.

2. Associated Institution Types

- 1862 Research

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2010	1	1

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Producers need to continue to evaluate alternative crops due to increasing production costs and price competition in small grains. Reducing dependence on small grain monocultures can potentially increase on-farm receipts.

What has been done

With the MSU focus on new crop development, several new or improved crops have been adopted by Montana producers. Also, value-added characteristics are being researched in small grain varieties that will improve the attractiveness of Montana grains to foreign and domestic markets.

Results

To decrease Montana's primary dependence on small grains and forage crops, crop diversity studies are being conducted on the feasibility of growing a variety of crops including: pulse crops (peas, lentils, chickpeas, and soybeans), herbs, mustard, safflower, sunflower, canola, turf, and specialty grains. Organic farming represents a new economic opportunity for farmers in the Northern Great Plains because of growing consumer demand. Studies are providing new

information to organic growers on strategies for enhancing soil fertility that will enhance the sustainability of organic farming systems in this semiarid region.

4. Associated Knowledge Areas

KA Code	Knowledge Area
203	Plant Biological Efficiency and Abiotic Stresses Affecting Plants
204	Plant Product Quality and Utility (Preharvest)
205	Plant Management Systems

Outcome #3

1. Outcome Measures

Increase in acres of non-traditional crops planted in Montana.

2. Associated Institution Types

- 1862 Research

3a. Outcome Type:

Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2010	5000	9500

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Producers need to continue to evaluate alternative crops due to increasing production costs, increasing pest populations, and price competition in small grains. Alternative crops allow producers to examine tillage, management of water resources, and markets in order to produce the maximum returns on their investments.

What has been done

With the MSU focus on new crop development, several new or improved crops have been adopted by Montana producers. As a joint effort among the outlying research stations, plant breeders, and research scientists, new small grain cultivars and new alternative crop cultivars have been developed.

Results

Montana continues to capture the attention of foreign buyers due to the high quality wheat that is grown and research that is designed to improve the characteristics of the grains. Flax acreage increased in 2010 by over 37% and production by 60% over 2009. The production of camelina (*Camelina sativa*) in Montana increased 35% in 2010 to nearly 255,000 acres. New contracts with

biodiesel producers in 2010 encouraged growers to consider camelina as a viable alternative to other dryland crops.

4. Associated Knowledge Areas

KA Code	Knowledge Area
205	Plant Management Systems
601	Economics of Agricultural Production and Farm Management

Outcome #4

1. Outcome Measures

Number of routine field crop and forage samples processed by the MSU Seed Laboratory per year.

2. Associated Institution Types

- 1862 Research

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2010	750	3487

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Montana State Seed Laboratory provides seed testing services to regional farmers, seed growers, the Montana Seed Growers Association, the Montana Department of Agriculture, and anyone with an interest in having seed tested. With today's narrow profit margins in agriculture, seed testing is an essential part of an overall crop management and production plan.

What has been done

Samples of seed are tested by the Montana State University Seed Lab for purity, germination, noxious weed seeds, restricted weed seeds, total weed seed content, and seed from other crops.

Results

The Montana Department of Agriculture Seed Program assures farmers, gardeners, and homeowners that seeds offered for sale in Montana are truthfully labeled for identity, contamination, and viability. The program encompasses license requirements, label requirements, seed dealer inspections, and seed sampling. These two programs provide a foundational partnership for quality seed production.

4. Associated Knowledge Areas

KA Code	Knowledge Area
121	Management of Range Resources
205	Plant Management Systems

Outcome #5

1. Outcome Measures

New grazing plans established for livestock and wildlife in rangeland environments.

2. Associated Institution Types

- 1862 Research

3a. Outcome Type:

Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2010	10	5

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Montana livestock producers need operations that are sustainable, that protect land and water, and are profitable. Rangeland grazing represents an important resource for producers who need to reduce costs and maintain livestock production. Livestock grazing practices are receiving increasing attention because of perceived negative impacts on soils, biodiversity, and water quality. Feeding hay in winter represents the greatest percent of variable costs for producers in cold climates. Producers need information on approaches to reducing costs while maintaining the health of cows and unborn calves.

What has been done

Ranches have been certified and have established grazing plans for the watersheds that they utilize. Research has examined cost-effective strategies for using prescribed sheep and goat browsing to suppress conifer encroachment onto foothill rangeland and for using sheep to control invasive weeds.

Results

Grazing plans have been established and distributed to producers across the state. Cattle/wildlife interaction studies have been used to assist producers in determining the best ways to protect their rangeland resources from overgrazing. This is a labor intensive partnership on behalf of MSU personnel and individual landowners or family operations. A total program effort has been implemented to facilitate the incorporation of targeted grazing strategies into weed management programs. Research has shown that by manipulating cattle grazing patterns, fisheries and wildlife habitats can be protected and improved. Because ranching enterprises make major contributions

to wildlife habitat, their viability is important to the preservation of wildlife habitat. The program direction and funding for this effort has been decreased which will further decrease activities.

4. Associated Knowledge Areas

KA Code	Knowledge Area
112	Watershed Protection and Management
121	Management of Range Resources
205	Plant Management Systems
601	Economics of Agricultural Production and Farm Management

V(H). Planned Program (External Factors)

External factors which affected outcomes

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

Brief Explanation

Grazing options are often compromised by drought, lack of access to private or public lands, and by severe weather. While these factors do not affect all producers, they require increased management on the part of the most livestock owners. New wilderness designations and stream access policies are legislative issues that affect grazing rights for ranchers.

V(I). Planned Program (Evaluation Studies and Data Collection)

1. Evaluation Studies Planned

- After Only (post program)
- During (during program)

Evaluation Results

Evaluation studies are in progress.

Key Items of Evaluation

The backlog of ranches requesting assistance has been eliminated. Future funding and program direction will reduce activities in this area.