

V(A). Planned Program (Summary)

Program # 6

1. Name of the Planned Program

Food Safety -- Sustainable Agriculture

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			20%	
204	Plant Product Quality and Utility (Preharvest)			10%	
205	Plant Management Systems			10%	
206	Basic Plant Biology			20%	
213	Weeds Affecting Plants			10%	
215	Biological Control of Pests Affecting Plants			10%	
601	Economics of Agricultural Production and Farm Management			10%	
711	Ensure Food Products Free of Harmful Chemicals, Including Residues from Agricultural and Other Sources			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	30.0	0.0
Actual	0.0	0.0	66.0	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
0	0	432777	0
1862 Matching	1890 Matching	1862 Matching	1890 Matching
0	0	2848919	0
1862 All Other	1890 All Other	1862 All Other	1890 All Other
0	0	2342559	0

V(D). Planned Program (Activity)

1. Brief description of the Activity

Our long-term strategies are designed to make Montana agricultural products more desirable in U.S. and world markets. Sustainability rests on the principle that we must meet the needs of the present without compromising the ability of future generations to meet their own needs. Researching new crops and finding new markets for existing crops are potential ways to enhance Montana's growth in sustainable agriculture. The development of high-value food, feed, and biofuel crops involves close collaboration among research and extension faculty in Montana and in neighboring states. We communicate research results through field days, news releases, and presentations at county and state meetings and conventions as well as distribute results of research via the Internet. We hold strategic planning discussions with state agricultural groups. The development of new, highly nutritious crop cultivars with characteristics that improve health and well-being are priorities at MSU. Beef producers must address methods to improve and document ranch biosecurity and biocontainment protocols to prevent perceived food safety events and thus, irreparable harm to beef's market share. MSU researchers work to improve animal and human nutrition, add value to raw products, improve safety of products, and increase product development of biobased chemicals, fuels, lubricants, pharmaceuticals, and nutraceuticals.

2. Brief description of the target audience

- Alternative energy groups and state agricultural advisory committees
- Crop and livestock producers in Montana
- Montana wheat and barley committees, companies, fertilizer advisory committees, conservation tillage equipment companies
 - State of Montana, Montana Department of Agriculture, Bureau of Land Management, USFS, and other government entities
 - Participants in extension 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	500	125	0	0
Actual	900	1100	0	0

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

Patent Applications Submitted

Year: 2010
 Plan: 0
 Actual: 4

Patents listed

Steven Cash. "Montana" meadow Bromegrass [license]

Steven Cash. "Willow Creek" Forage Winter Wheat [license]

Jerald Bergman. Plant Variety Protection Certificate Application 20080000065 for "Cardinal" Safflower. Patent issued February 10, 2010

Jerald Bergman. Plant Variety Protection Certificate Application 20080000066 for "MonDak" Safflower. Patent issued February 10, 2010

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

2010	Extension	Research	Total
Plan	0	5	
Actual	0	22	22

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

- Number of research citations

Year	Target	Actual
2010	8	15

V(G). State Defined Outcomes

V. State Defined Outcomes Table of Content

O. No.	OUTCOME NAME
1	Number of interactive meetings with state groups and agencies.
2	Number of producers per year implementing new farm management and budgeting practices.
3	Increased number of new crops adapted to Montana through percent acres increased.
4	Number of field days, news releases and presentations at conventions.
5	Number of new producers per year adopting measures to improve agricultural efficiency (e.g. better seed quality, higher numbers of fields with soil tested, optimization of fertilizer use).
6	Percent increase in acres per year of alternative crops compared to wheat and barley.
7	Number of programs established to enhance global food biosecurity
8	Number of producers that participate in livestock tracking programs

Outcome #1

1. Outcome Measures

Number of interactive meetings with state groups and agencies.

2. Associated Institution Types

- 1862 Research

3a. Outcome Type:

Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2010	10	10

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

There is a need for continuing meetings with crop and livestock producers, state wheat and barley committees, crop protection companies, fertilizer advisory committee, conservation tillage equipment companies, alternative energy groups, and state agricultural advisory committees to identify research and outreach needs for MSU COA/MAES.

What has been done

Annual meetings are held with producers, commodity groups, advisory boards, and industry to present research results and to plan future research and outreach activities. Surveys are conducted at meetings where producers are present to continue to develop research programs that reflect stakeholder needs. In addition, resolutions are passed in numerous associations and approved by voting members providing direction to MAES.

Results

MSU research continues to provide new small grain varieties and alternative crops that meet the need of Montana producers. Researching new crops and finding new markets for existing crops are potential ways to enhance growth in sustainable agriculture in Montana. As technology advances and producers begin to rely more on computer-aided information, the role of MSU research and outreach will continue to increase in their importance and impact. As more input is provided to MAES leadership, programs are refined and redirected providing stakeholders realistic time frames for outputs.

4. Associated Knowledge Areas

KA Code	Knowledge Area
121	Management of Range Resources

205	Plant Management Systems
213	Weeds Affecting Plants

Outcome #2

1. Outcome Measures

Number of producers per year implementing new farm management and budgeting practices.

2. Associated Institution Types

- 1862 Research

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2010	100	100

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Montana is a state with limited crop and livestock diversity due to semi-arid conditions, a short growing season, and the potential for severe winters. Producers recognize that to maintain profitability and sustainability requires considerable effort in ensuring that the right balance of enterprises, innovative marketing, and accurate record keeping occurs.

What has been done

MSU agricultural economists with farm management expertise make over 200 off-campus educational presentations each year. Many of these focus on the economics, management, and budgeting processes required to sustain agricultural enterprises. Presentations include software training, estate planning sessions, succession planning, risk management, and crop sustainability. Cooperation with the MAES research centers and tribal agents have resulted in successful programs involving Native Americans in range, livestock, and crop management.

Results

Extension agents in cooperation with researchers from the College of Agriculture hold commercial and private pesticide applicator workshops, including applicators ranching in reservation lands.

4. Associated Knowledge Areas

KA Code	Knowledge Area
121	Management of Range Resources
205	Plant Management Systems
213	Weeds Affecting Plants

215 Biological Control of Pests Affecting Plants
 601 Economics of Agricultural Production and Farm Management

Outcome #3

1. Outcome Measures

Increased number of new crops adapted to Montana through percent acres increased.

2. Associated Institution Types

- 1862 Research

3a. Outcome Type:

Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2010	5	5

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Surveys at Montana farm conferences indicate a strong interest in diversified crop rotations for increasing on-farm receipts while reducing a monoculture of small grains. Winter and spring peas, canola, corn, lentils, mustard, sunflowers, triticale, and chickpeas are included in long-term rotation studies. MSU research has been instrumental in identifying potential oilseed crops suitable for production in Montana for use as culinary oils, biolubricants, omega-3 oils, feeds, and production of biodiesel and bioenergy products.

What has been done

Oilseeds (including *Camelina sativa*, canola, soybeans, and safflower) are rapidly emerging as important Montana crops for production of oils. Barley varieties with improved feed quality could provide sustainable seed and grain markets for regional grain producers and marketing advantages to regional beef producers. Additional initiatives will provide new insights into food safety and risk assessment, including the development of new wheat varieties.

Results

We anticipate several new camelina products will be commercially available in the near term including bread, soil amendments, and omega-3 rich beef and pork. New high-tocopherol lines of safflower will add value to producers in Eastern Montana and Western North Dakota.

4. Associated Knowledge Areas

KA Code	Knowledge Area
121	Management of Range Resources

- 205 Plant Management Systems
- 206 Basic Plant Biology
- 601 Economics of Agricultural Production and Farm Management

Outcome #4

1. Outcome Measures

Number of field days, news releases and presentations at conventions.

2. Associated Institution Types

- 1862 Research

3a. Outcome Type:

Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2010	20	20

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Surveys at farm conferences in Montana highlight strong producer interest in improving cropping system diversity. Field days, news releases, and presentations are direct ways for producers to gain insights into alternative enterprises and make site-specific decisions.

What has been done

MSU research and extension personnel attend conferences, state and regional professional meetings, and publish articles, news releases and fact sheets that are applicable for producers interested in enhancing their sustainable agriculture practices.

Results

Montana's growth in alternative crops, such as canola and camelina, demonstrate stakeholder's acceptance of information presented by MSU research and extension personnel.

4. Associated Knowledge Areas

KA Code	Knowledge Area
121	Management of Range Resources
205	Plant Management Systems
213	Weeds Affecting Plants
215	Biological Control of Pests Affecting Plants

Outcome #5

1. Outcome Measures

Number of new producers per year adopting measures to improve agricultural efficiency (e.g. better seed quality, higher numbers of fields with soil tested, optimization of fertilizer use).

2. Associated Institution Types

- 1862 Research

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2010	100	100

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Producers are faced with ever increasing costs of raising crops, including seed, land, and fertilizer and chemical inputs. Maximizing efficiency is paramount for producers to remain in business and address consumer preferences.

What has been done

MSU agronomists make hundreds of off-campus educational presentations each year focusing on the adoption of new crop varieties, new nutrient management concepts, and pest management practices. Some of these presentations are made to Native Americans engaged in crop or livestock production. Activities include demonstrations at field days, class room instruction, providing 24/7 materials on the Internet, distributing CDs, and presentations at state and regional conferences.

Results

Producers maintain high yields with rapid adoption of new varieties and practices. An added incentive to producers is to reduce the amount of inputs due to increasing costs needed to raise a crop. Rate reduction and better utilization of inputs adds significantly to the producer's bottom line profits.

4. Associated Knowledge Areas

KA Code	Knowledge Area
121	Management of Range Resources
205	Plant Management Systems
213	Weeds Affecting Plants
215	Biological Control of Pests Affecting Plants

Outcome #6

1. Outcome Measures

Percent increase in acres per year of alternative crops compared to wheat and barley.

2. Associated Institution Types

- 1862 Research

3a. Outcome Type:

Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2010	5	5

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Producers are searching for alternatives to growing monocultures of small grains in Montana. Economists have determined that many small grain producers are marginally sustainable and need other income sources.

What has been done

Growth in the production of specialty crops has been strong from 2004 through 2010. The production of dry peas (including Austrian winter peas, lentils, dry beans), mustard seed, camelina, and flaxseed have increased drastically during the time period.

Results

Montana camelina oil is currently being used for commercial production of omega-3 rich pet feeds and supplement, omega-3 rich eggs, cosmetics including lotions, massage oils and soaps, and culinary oils. Omega-3 enriched meat products have higher market value than traditional meat products. Direct return to the poultry industry for omega-3 enriched eggs is 50% higher than for traditional eggs. Several new cultivars of Camelina sativa have been developed, new uses for camelina oil and meal are being evaluated, two new selections/cultivars of high protein oats have been developed, and new oil products for fuel, food, feed, enzymes and lubricants are being investigated. Oilseed crops continue to represent important new sources of income for farmers and provide opportunities for increasing crop diversity.

4. Associated Knowledge Areas

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

206	Basic Plant Biology
213	Weeds Affecting Plants
215	Biological Control of Pests Affecting Plants

Outcome #7

1. Outcome Measures

Number of programs established to enhance global food biosecurity

2. Associated Institution Types

- 1862 Research

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2010	{No Data Entered}	1

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Food safety and security have become important concerns for the beef industry at all production levels. Domestic and international consumers are demanding more information about the source of the meat products they purchase, including the age, health, nutrition, and handling management of the animal.

What has been done

An integrated network is in place to ensure that a quality and consistent beef product is being produced and to enable the tracking of calves from Montana ranches to feedlots and packing plants in other states.

Results

Utilizing the processes and organizational structure established by the SBS research and educational programs will continue to address the animal health, biosecurity, and production efficiency concerns expressed by producers and consumers.

4. Associated Knowledge Areas

KA Code	Knowledge Area
205	Plant Management Systems
711	Ensure Food Products Free of Harmful Chemicals, Including Residues from Agricultural and Other Sources

Outcome #8

1. Outcome Measures

Number of producers that participate in livestock tracking programs

2. Associated Institution Types

- 1862 Research

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2010	{No Data Entered}	10

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Domestic and international consumers are demanding more information about the source of the meat products they purchase, including the age, health, nutrition, and handling management of the animal.

What has been done

Tracking will provide both source and process verification for easy trace-back in case there is a disease outbreak. With the sustainable beef supply (SBS) program in place, it will be relatively easy for Montana producers to adapt to traceability and animal ID.

Results

Traceability of livestock through the production chain is being demanded by the consumer and can add substantially to the cost of production. Methods are being developed that facilitate traceability of livestock at minimal additional expense. A major effort will be directed at identifying alternative solutions to reduce cost of animal ID technology.

4. Associated Knowledge Areas

KA Code	Knowledge Area
711	Ensure Food Products Free of Harmful Chemicals, Including Residues from Agricultural and Other Sources

V(H). Planned Program (External Factors)

External factors which affected outcomes

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

Brief Explanation

High grain prices have encouraged growers to stay with traditional crops to take advantage of improved markets.

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

1. Evaluation Studies Planned

- Retrospective (post program)
- During (during program)

Evaluation Results

Evaluations are in progress. The interest in alternative crops, reduced inputs, and reduced tillage continues to suggest that growers are looking for alternatives to current cropping systems.

Key Items of Evaluation

The increased interest in camelina, winter and spring peas, and dry beans indicates a shift in production goals and enhanced opportunities for Montana farmers.