

V(A). Planned Program (Summary)

Program # 3

1. Name of the Planned Program

Global Food Security, Hunger, Ag Sustainability and Profitability

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
112	Watershed Protection and Management	5%			
205	Plant Management Systems	20%			
213	Weeds Affecting Plants	10%			
216	Integrated Pest Management Systems	15%			
301	Reproductive Performance of Animals	10%			
307	Animal Management Systems	15%			
311	Animal Diseases	5%			
601	Economics of Agricultural Production and Farm Management	5%			
602	Business Management, Finance, and Taxation	5%			
603	Market Economics	5%			
604	Marketing and Distribution Practices	5%			
	Total	100%			

V(C). Planned Program (Inputs)

1. Actual amount of FTE/SYs expended this Program

Year: 2012	Extension		Research	
	1862	1890	1862	1890
Plan	8.8	0.0	0.0	0.0
Actual Paid Professional	8.6	0.0	0.0	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
132885	0	0	0
1862 Matching	1890 Matching	1862 Matching	1890 Matching
0	0	0	0
1862 All Other	1890 All Other	1862 All Other	1890 All Other
313495	0	0	0

V(D). Planned Program (Activity)

1. Brief description of the Activity

The Montana Beef Network uses a variety of delivery methods to reach producers including interactive video conferencing, workshops, newsletters, seminars and interactive TV that addresses nutrition, production, marketing and other topics important to the clientele. The Montana Sheep Institute uses demonstration sites associated with grazing of noxious weeds (leafy spurge and spotted knapweed) by small ruminants, provides workshops and seminars for producers on best practices for effective/efficient production and marketing strategies and clinics for people interested in learning to shear their sheep or hire out to shear others animals. The weed issue is addressed by landowners learning to monitor their property for weed infestations and then knowing when and how to address the problems. Workshops, tours and field days are used to raise the ability of the landowners to curtail weed infestations. The crops area use workshops and seminars to help producers with keeping records, decision making aids, leasing alternatives/marketing, computer applications as well as test plots, tours and other demonstration strategies that provide information on varieties, fertilizer and soils. Master Gardener programs are delivered both live and by internet as well as printed resources to use in answering questions. Workshops on financial management, developing business plans, analyzing individual enterprise techniques are all associated with helping producers make decisions that will result in making a profit/staying in business.

2. Brief description of the target audience

Livestock Producers, especially beef, swine and sheep
 Commodity Associations
 Land Managers/Owners (small and large)
 Weed Control Professionals
 Gardening Club members/people interested in gardening
 Small Grain Producers (Dry Land and Irrigated)

3. How was eXtension used?

Extension professionals and clientele are encouraged to use the eXtension system as a resource for locating information and educational materials related to specific questions and interests.

V(E). Planned Program (Outputs)

1. Standard output measures

2012	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Actual	14750	6069	63052	2035

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

Patent Applications Submitted

Year: 2012
 Actual: 0

Patents listed

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

2012	Extension	Research	Total
Actual	39	0	0

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

- Montana Beef Network: Number of people participating in demonstration/tour opportunities. Number of producers attending workshops on disease mitigation and prevention. Number of producers attending presentations on "best practices" in beef cattle production and marketing.

Year	Actual
2012	3495

Output #2

Output Measure

- Montana Sheep Institute: Number of people attending workshops teaching innovative ways to using sheep. Number of projects being conducted with sheep grazing invasive plants Number of sheep producers involved with sheep grazing projects Number of landowners involved in sheep grazing projects Number of acres where weeds were controlled and documentation of vegetative composition trends. Number of wool growers involved in developing larger, more marketable clips Number of people attending workshop related to using "best practices" in sheep production and marketing of wool Number of people trained as shearing instructors. Number of people shearing their own sheep or being hired to shear for others.

Year	Actual
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2012 4682

Output #3

Output Measure

- Weed Control: Number of producers participating in workshops on weed control. Number of producers and landowners attending tours. Number of people attending meetings on pesticide control and applicator training. Number of people being recertified for pesticide use.

Year	Actual
2012	1600

Output #4

Output Measure

- Crops: Number of producers attending cropping systems workshops Number of producers adopting soil moisture conservation practices Number of producers adopting an annual crop rotation focused on profitability and soil health. Number of producers attending workshops on fertilization, reading soil test reports, pest management programs and field records. Number of people accessing web site for information on fertilizer and soils. Number of people attending field days, crop guides, research plot sites, and research center summaries. Number of people using pulse crops in the cropping rotation.

Year	Actual
2012	3245

Output #5

Output Measure

- Master Gardener: Number of people who become certified Master Gardeners.

Year	Actual
2012	641

Output #6

Output Measure

- Profitability: Number of producers attending farm management workshops including financial record guidelines and computer applications. Number of management plans developed including costs of production worksheets and summaries.

Year	Actual
2012	5755

V(G). State Defined Outcomes

V. State Defined Outcomes Table of Content

O. No.	OUTCOME NAME
1	Montana Beef Network: Number of people learning about new practices in livestock production. The percent of increase in the value of calves sold at weaning. Number of people who made changes in the way records are kept on ranches. Percent of breeding programs that are meeting the needs of the consumer in terms of quality and yield grade of calves. Add value to weaned calves
2	Montana Sheep Institute: Number of people who learned about using sheep to control invasive plants. Increased number of grazing management programs initiated and monitoring programs developed. Increase in the number of Wool Pools organized and wool delivery and marketing of consolidated pools implemented. Number of producers who developed plans to implement technology in their own production unit. (Ribeye program) Acres of infested landscape controlled by small ruminant grazing. Wool from smaller growers prepared and marketed on the national/international market. Producers improving production efficiency of their sheep enterprise. Number of people involved with shearing their own or others sheep.
3	Weed Control: Producers participating in workshops will be able to identify weeds and know how to control them. People attending meetings will understand pesticide control and appropriate applicator training. People will be recertified for pesticide use.
4	Master Gardener: Participants learn about plants and how to grow them successfully. Participants' volunteer hours of service to their communities in answering questions about horticultural issues.
5	Crops: Producers improve their understanding of nutrient cycling, weed control, variety selection and alternative crop possibilities. Producers will plant short water varieties when moisture conditions are low, plant sawfly resistant varieties to minimize losses, and forage varieties that will improve production. Pounds of fertilizer used in farming systems will be reduced. Producers will adopt weed, crop and forage management strategies that sustain agricultural crop production and lessen environmental damage. Farm operators who implement best practices will increase their profitability and enhance long-term sustainability.
6	Profitability: Ag producers gain knowledge associated with development of standard financial statements, and track machinery costs as well as fixed and variable costs associated with crop enterprises. Producers will adopt financial management programs that will provide financial statements for business analysis and bank lending requirements. Producers will analyze enterprise cost of production that will aid in cropping decisions, marketing, leasing, machinery and land purchases. Successful farm and ranch businesses provide stability and continuity for local communities, businesses and schools.

Outcome #1

1. Outcome Measures

Montana Beef Network: Number of people learning about new practices in livestock production. The percent of increase in the value of calves sold at weaning. Number of people who made changes in the way records are kept on ranches. Percent of breeding programs that are meeting the needs of the consumer in terms of quality and yield grade of calves. Add value to weaned calves

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Actual
2012	2623

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

According to the Montana Stockgrowers Association, there are 2.5 million head of cattle in Montana and cash receipts from beef cattle operations form the largest part of agriculture industry which is the largest economic driver in Montana. The statewide Extension Beef Cattle program is key to supporting this industry and Montana families in the business. In July 2012 the Extension Beef Cattle Specialist relocated to Bozeman from Miles City and has focused on reinvigorating the program around key issues including nutrition, ration balancing, management, youth programming and profitability. The Montana Beef Network, became a private entity in 2010, and is no longer directly affiliated with MSU Extension.

What has been done

Twenty-three classes, including 9 webinars, were attended by nearly 900 consumers. Topics were determined based specifically on the needs of producers and agents and included: Pre-Calving Nutrition Considerations, Impacts of Different Post-Weaning Development Strategies on Subsequent Feedlot Performance and Carcass Characteristics, and Feeding Risks from Drought Impacted Feeds and Forages. Focus also remained on youth programming including coordinating the statewide Steer of Merit carcass contest and Youth Livestock Quality Assurance training. Written materials were available both in hard copy and electronically, web delivered newsletters and eXtension offer other sources of information used by producers.

Results

Market beef was the 4th most popular 4-H youth project with 2623 youth completing the project in 2012. Youth with market animals are required to take a Livestock Quality Assurance Class every two years. They report learning how to care for their animal, husbandry, how to make ethical choices and that how they care for their animal directly affects the quality of meat. Steer of Merit

designations were awarded to 126 youth. The Bovine Connection, a two day event that occurs every two years and rotates around Eastern Montana and North Dakota was successfully hosted in Sidney, Montana. Attendees heard from national experts who reported that networking with others in the ranching industry was a huge benefit to their own operations. Ranchers who learned from methods provided by Extension including balancing rations, adjusting for antagonists and considering alternatives to buying hay or supplementing, reported saving from \$35 to \$45 per head as a result.

4. Associated Knowledge Areas

KA Code	Knowledge Area
301	Reproductive Performance of Animals
307	Animal Management Systems
311	Animal Diseases
601	Economics of Agricultural Production and Farm Management

Outcome #2

1. Outcome Measures

Montana Sheep Institute: Number of people who learned about using sheep to control invasive plants. Increased number of grazing management programs initiated and monitoring programs developed. Increase in the number of Wool Pools organized and wool delivery and marketing of consolidated pools implemented. Number of producers who developed plans to implement technology in their own production unit. (Ribeye program) Acres of infested landscape controlled by small ruminant grazing. Wool from smaller growers prepared and marketed on the national/international market. Producers improving production efficiency of their sheep enterprise. Number of people involved with shearing their own or others sheep.

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2012	2662

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

MSU is home to one of two wool labs in the United States and provides critical research and support for sheep producers nationwide. The National Ag Statistics Service indicates Montana had 230,000 sheep in 2012, a decline of about 2 percent. Sheep producers are looking for ways to stay in business and stay profitable. Research has shown producers with weed issues have

successfully used sheep to address infestations of unwanted plants. As this becomes a more generally adopted method of controlling weeds, producers may be more inclined to invest in sheep as a weed controlling entity as well as increasing profit margins for their operations.

What has been done

The statewide Extension sheep program has focused on research and outreach programs in a variety of projects including grazing and noxious weeds, disease susceptibility, rib eye, residual feed intake and wool pool work. More than 120 programs were conducted reaching over 2662 direct contacts in areas including 4-H Market Lamb projects, Wool Preparation and Marketing, Ultrasound Measurement, Sheep Selection and Sheep Nutrition.

Results

Producers who attended the Montana Sheep Seminar reported that information presented on the lamb and wool markets would improve the profitability of their operations and 80 percent indicated they would make changes in their operations based specifically on information they gained on culling strategies and the management of parasites and worming. 2020 Montana Youth enrolled in the 4-H youth sheep project. Youth learned care and ethics in Quality Assurance classes earning several the label of Montana Certified Lamb. Research indicated a 40-70% reduction in alfalfa weevil populations by grazing sheep in the early spring and preliminarily data showed an increase in some spotted knapweed bio-control agents when sheep grazing was present. Research for the Montana Wool Lab indicated that US wools are superior to Australian wools for the knitting of socks because of the loft and bulk. This could lead to a major manufacturer, Crescent Socks, moving their current precut line to all US wool, an excellent prospect for Montana producers.

4. Associated Knowledge Areas

KA Code	Knowledge Area
213	Weeds Affecting Plants
301	Reproductive Performance of Animals
307	Animal Management Systems
601	Economics of Agricultural Production and Farm Management
603	Market Economics
604	Marketing and Distribution Practices

Outcome #3

1. Outcome Measures

Weed Control: Producers participating in workshops will be able to identify weeds and know how to control them. People attending meetings will understand pesticide control and appropriate applicator training. People will be recertified for pesticide use.

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2012	1600

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Noxious weeds continue to impact all land utilized in production agriculture from no-till cropping systems to pastures to native rangeland. Extension agents located around the state are vital to combatting infestations. Agents continually visit sites, make recommendations, develop and implement integrated weed management plans, and focus on the many impacts to the environment; from what happens if nothing is done, to using herbicides safely. In addition, agents and specialists recognize that early detection and rapid response (EDRR) to invading or still spreading species is critical to protecting non-infested lands and is the most cost effective.

What has been done

Extension Weed Specialists are very active in research, education and outreach. They frequently answer phone calls and emails from clients/agents with solutions and responses, visit Farmers Markets, trade shows and visible, public, easily accessible places to share knowledge and the latest in science-based research on weed control through timely technical bulletins, ag alerts, and news releases. Information is featured on web sites from the Weed and Invasive Plant Ecology and Extension Invasive Plant Ecology and Management group and appearing regularly on Montana PBS, Montana Ag Live. Two specialists conducted 54 workshops/demonstrations reaching 1575 people.

Results

Participants in Early Detection and Rapid Response (EDDR) classes entered over 400 new records into the invader reporting database. The Schutter Diagnostic lab identified 467 unknown plant specimens and herbicide injury samples. Those attending off-campus presentations rated on a scale of 1/poor, 5/excellent, improved ability to understand (4.29) and improved ability to make sound decisions (4.3) related to weed control. Extension directed considerable attention toward drought and post fire recovery needs. It helped secure a \$20,000 grant to assist nine land owners in Powder River County with post-fire noxious weed control. Sixteen property owners in a moderately-dense residential area in the Paradise Valley are participating in the Pine Creek Fire Reseeding Program, which is being led by Park County Extension. This program will save them up to 75% of the costs to reseed their property post-fire either aurally or with ground seeding. Reseeding grass and planting trees and shrubs will reduce the potential for soil erosion and weed infestation of nearly 500 acres burned by the Pine Creek Fire.

4. Associated Knowledge Areas

KA Code	Knowledge Area
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205	Plant Management Systems
213	Weeds Affecting Plants
216	Integrated Pest Management Systems
307	Animal Management Systems

Outcome #4

1. Outcome Measures

Master Gardener: Participants learn about plants and how to grow them successfully. Participants' volunteer hours of service to their communities in answering questions about horticultural issues.

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2012	641

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

There is a need for consumer horticulture and IPM information in the counties and reservations. During the growing season the calls to a county Extension office are over 50% horticulture or IPM related and in some counties the percentage is upwards of 90%. Master Gardener Curriculum is written and produced by the MSU Extension Horticulture professional staff with the goal to better educate the general public in horticulture, yard and garden maintenance and IPM. This education will benefit the agents with an overall competency of the students to then educate others in the community effectively. Because this program is so successful there are hundreds of participants statewide at different levels and various points in volunteer contributions, etc.

What has been done

Three levels of classes are offered: level 1 (16 hours class time/20 hours volunteer commitment) includes basic and intermediate curriculum, level 2 (16 hours class time/30 hours volunteer commitment) includes a large emphasis on integrated pest management and Level 3 (30 hours class time and 40 hours volunteer commitment) is a three day intensive training held on the campus of MSU in Bozeman.

Results

Montana Master Gardeners who were active online in 2012, reported volunteering 13,831 hours. The value of the program from that volunteering is \$301,377.49 (calculated using the national average for volunteer time 2011 of \$21.79) Because of the number of Master Gardeners completing Level 3 (the highest certified level), there are at least 5 counties where the Level 3

Master Gardeners have taught or supported the Level I and II programs in their area. In 2012 at least 7600 pounds of fresh produce was donated to community partners statewide easing the burden on local food banks and supplying fresh food.

4. Associated Knowledge Areas

KA Code	Knowledge Area
205	Plant Management Systems
213	Weeds Affecting Plants
216	Integrated Pest Management Systems

Outcome #5

1. Outcome Measures

Crops: Producers improve their understanding of nutrient cycling, weed control, variety selection and alternative crop possibilities. Producers will plant short water varieties when moisture conditions are low, plant sawfly resistant varieties to minimize losses, and forage varieties that will improve production. Pounds of fertilizer used in farming systems will be reduced. Producers will adopt weed, crop and forage management strategies that sustain agricultural crop production and lessen environmental damage. Farm operators who implement best practices will increase their profitability and enhance long-term sustainability.

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2012	3245

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Increased market volatility and changing climatic conditions, as well as recent advancements in agricultural research have led producers to diversify their production to include less conventional crops. While this diversification is helping producers make a profit there is an inherent need to educate the producer about potential pitfalls in the production of these crops and an obligation to share the knowledge gleaned with other producers. Growers request up-to-date, unbiased research-based educational programs and look to Extension to learn the latest information related to varieties, flexible cropping strategies, alternative crops, oilseed crops and marketing.

What has been done

Specialists and agents are involved on a daily basis with producers around the state. In addition to answering direct email and phone calls, Extension specialists produce resources including Ag Alerts, news articles, Montguides and journals and frequently appear on Montana PBS Montana Ag Live and at Farmers Markets, Fairs and Professional Organization Meetings. In 2012, two specialists provided 38 workshops (sugarbeet disease management, Urban IPM, barley IPM, biological controls, cropping seminars, potato diseases) for 3245 clients. County agents and community partners conducted pulse seed tours and Field Days in locations throughout the state.

Results

The evaluation from the Regional Barley Workshop indicated the growers gained the most knowledge and were most interested in the barley storage and drying class. The Cropping Seminar evaluations showed growers rating the program around 4.7 out of 5. In 2012, the MonDak Pulse Day was held in Montana for the first time in twelve years. Of the producers attending this event, 81% indicated they considered pulse crops in rotation as extremely useful or useful. The Northeast Montana Pulse Plot tour also brought researchers, industry representatives and producers to the field to view first hand how 46 pea, 24 lentil and 11 chickpea varieties responded to the growing conditions of 2012.

4. Associated Knowledge Areas

KA Code	Knowledge Area
205	Plant Management Systems
213	Weeds Affecting Plants
216	Integrated Pest Management Systems
602	Business Management, Finance, and Taxation

Outcome #6

1. Outcome Measures

Profitability: Ag producers gain knowledge associated with development of standard financial statements, and track machinery costs as well as fixed and variable costs associated with crop enterprises. Producers will adopt financial management programs that will provide financial statements for business analysis and bank lending requirements. Producers will analyze enterprise cost of production that will aid in cropping decisions, marketing, leasing, machinery and land purchases. Successful farm and ranch businesses provide stability and continuity for local communities, businesses and schools.

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
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2012

72268

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Agriculture will continue to face challenges from environmental, economic, political, and social issues. In the US, the decrease in forage production has put increased demands on those who raise forage, to increase production and better manage harvesting and it has given the growers new opportunities for marketing. Wise management practices are more important now than ever before. Profit-loss margins are tight, so producers must be aware of opportunities to cut costs and increase profits.

What has been done

Extension workshops/classes/demonstrations/newsletters/MontGuides provided information for producers to make decisions on management practices. Classes and individual meetings cover topics including learning to do a break even analysis, partial and whole farm budgeting, use of Quicken for farm and ranch accounts, determining cash and share lease rates, and custom rates and futures, options and insurance. Agents provide financial tools to help with record keeping and billing, ration balancing, enterprise analysis, reproduction information and equipment costing. Individual producers learn how to determine optimum fertilizer rates, tillage and other management decisions based on input prices and estimated yield potential. Some producers learned bunk management, corral design, herd health and marketing.

Results

The impact of Agriculture Agents on the profitability of producers statewide is evident in fields and corrals in every county and in the fact that agriculture continues to be the leading industry in Montana. In the past three years, profitability of crops has increased in part due to Extension, the Montana Ag Experiment Station and partnerships with other agencies. Through drought, fire and economic instability, Montana producers receive leading-edge research information directly related to them where they are; on their land. In 2012, the number of farms with economic sales over \$10,000 grew by more than 1200 to 17,100. Growers report increased tons per acre as a result of better fertility management in drought conditions. They report decreased cattle mortality and illness as a result of soil and water testing. They report increased meat quality due to ration balancing. Because of MSU Extension, producers have access to the best tools and latest knowledge giving them the best opportunity to be successful while protecting their land, improving sustainability and preserving for future generations. Impacts are often individual but add up to a thriving agricultural economy.

4. Associated Knowledge Areas

KA Code	Knowledge Area
205	Plant Management Systems
601	Economics of Agricultural Production and Farm Management
602	Business Management, Finance, and Taxation

V(H). Planned Program (External Factors)

External factors which affected outcomes

- Natural Disasters (drought, weather extremes, etc.)
- Economy
- Appropriations changes
- Public Policy changes
- Government Regulations
- Populations changes (immigration, new cultural groupings, etc.)
- Other (High cost of fuel, fertilizer)

Brief Explanation

V(I). Planned Program (Evaluation Studies)

Evaluation Results

Montana production agriculture is largely dependent on small grains and livestock. MSU Extension is committed in every county and reservation across the state to providing the latest scientific-based research and technologies to Montana's people. MSU Extension had many successes in reaching goals in this area in 2012.

The MSU Beef Cattle specialist relocated in from the Eastern part of the state to the main MSU Campus during 2012. As a result, her efforts were focused on delivering training, conducting site visits and meeting specific producer needs. She delivered excellent services to drought ridden areas as well as to ranchers impacted by fires. She worked with youth in the Quality Assurance programming and provided 23 classes (9 were webinars) for 900 adult clients. With the move to campus completed, data collection on specific impacts will be improved in 2013.

Sheep studies continued in the area of grazing and wool quality with recent research indicating that US wools are superior to those from Australia for knitting socks. The research is the basis for new markets opening to Montana producers.

MSU Extension weed specialists have been active in education and noxious weed prevention and eradication. More than 400 new records were entered into the Early Detection/Rapid Response (EDRR) database. Thousands of acres were certified noxious weed free. The MSU Extension Schutter Diagnostic Lab identified 467 unknown plant specimens and herbicide injury samples. Fifty four workshops/demonstrations were conducted around the state directly reaching 1575 people, while the Montana PBS program, Montana Ag Live, regularly featured weed and invasive plant ecology specialists to a much broader audience.

The Master Gardener program and urban horticulture efforts of MSU Extension also continued to grow. With more Level 3 Master Gardeners certified and active across the state, more people are being reached with the latest research-based and regionally oriented information about gardening and urban landscaping. Evaluation of this program continues for those still involved with MSU Extension, but as people graduate the program, the impact multiplies even as collecting the data becomes more difficult. An online reporting system has been established and will be a large part of ongoing data

management.

Cropping seminar evaluations show the classes to be a large success with attendees reporting an average rating of 4.7 on a scale of 1-5 with 5 being excellent.

Agriculture profitability is a focus of nearly all Extension efforts. Measurement and evaluation is likely underreported as the largest benefit of Extension continues to be its ability to work one-on-one with producers in unique situations.

Key Items of Evaluation

LIVESTOCK

2623 youth enrolled in the market beef project and 2020 youth enrolled in the market sheep project; with each required to take a Livestock Quality Assurance class every two years.

Class participants report learning how to care for their animal, husbandry, how to make ethical choices and that care for their animal directly affects the quality of meat.

Steer of Merit designations were awarded to 126 youth.

Producers who attended the Montana Sheep Seminar reported that the information presented on the lamb and wool markets would improve the profitability of their operations and 80% indicated they would make changes in their operations based specifically on information they gained on culling strategies and the management of parasites and worming.

Research indicated a 40-70% reduction in alfalfa weevil populations by grazing sheep in the early spring and preliminarily data showed an increase in some spotted knapweed bio-control agents when sheep grazing was present.

Research for the Montana Wool Lab indicated that US wools are superior to Australian wools for the knitting of socks because of the loft and bulk.

WEED CONTROL

Participants in EDRR classes entered over 400 new records into the invader reporting database and provided information appropriate for the diagnosis.

The Schutter Diagnostic lab identified 467 unknown plant specimens and herbicide injury samples.

Those attending off-campus presentations on weeds rated on a scale of 1/poor, 5/excellent, improved ability to understand (4.29) and improved ability to make sound decisions (4.3) related to weed control.

MASTER GARDENER

Montana Master Gardeners who were active online in 2012, reported volunteering 13,831 hours. The value of the program from that volunteering is \$301,377.49 (calculated using the national average for volunteer time 2011 of \$21.79)

In 2012 at least 7600 pounds of fresh produce was donated to community partners statewide easing the burden on local food banks and supplying fresh food.

CROPS

The Cropping Seminar evaluations showed growers rating the program around 4.7 out of 5.

Of the producers attending the MonDak Pulse Day event, 81% indicated they considered pulse crops research and information on rotation as extremely useful or useful.

PROFITABILITY

In 2012, the number of farms with economic sales over \$10,000 grew by more than 1200 to 17,100. Growers report increased tons per acre as a result of better fertility management in drought conditions. They report decreased cattle mortality and illness as a result of soil and water testing. They report increased meat quality due to ration

balancing. Because of MSU Extension, producers have access to the best tools and latest knowledge giving them the best opportunity to be successful while protecting their land, improving sustainability and preserving for future generations.