

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
101	Appraisal of Soil Resources	5%			
204	Plant Product Quality and Utility (Preharvest)	5%			
205	Plant Management Systems	5%			
211	Insects, Mites, and Other Arthropods Affecting Plants	5%			
213	Weeds Affecting Plants	5%			
215	Biological Control of Pests Affecting Plants	5%			
216	Integrated Pest Management Systems	5%			
301	Reproductive Performance of Animals	5%			
307	Animal Management Systems	5%			
308	Improved Animal Products (Before Harvest)	5%			
311	Animal Diseases	5%			
315	Animal Welfare/Well-Being and Protection	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%			
903	Communication, Education, and Information Delivery	20%			
	Total	100%			

V(C). Planned Program (Inputs)

1. Actual amount of FTE/SYs expended this Program

Year: 2013	Extension		Research	
	1862	1890	1862	1890

Plan	8.8	0.0	0.0	0.0
Actual Paid Professional	7.1	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
128912	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
247048	0	0	0

V(D). Planned Program (Activity)

1. Brief description of the Activity

- Interactive video conferencing
- Workshops, clinics and seminars
- Newsletters, MontGuides, AgAlerts, articles and press releases
- Television (Montana PBS) and radio
- Demonstration sites associated with grazing of noxious weeds (leafy spurge and spotted knapweed)
- Field Days
- Research experiments
- Train-the-Trainer

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

2013	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Actual	10703	133813	4192	4716

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

Patent Applications Submitted

Year: 2013
 Actual: 0

Patents listed

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

2013	Extension	Research	Total
Actual	44	0	44

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

- Montana Beef Program: Number of producers attending meetings/workshops/clinics etc about information to successfully balance rations at the least-cost formulation. Number of people attending beef cattle production presentations about nutrition, reproduction, quality assurance and other management topics.

Year	Actual
2013	1756

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
2013	799

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
2013	2773

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
2013	5800

Output #5

Output Measure

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

Year	Actual
2013	767

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
2013	3000

V(G). State Defined Outcomes

V. State Defined Outcomes Table of Content

O. No.	OUTCOME NAME
1	Montana Beef Program: Number of producers using Extension information to successfully balance rations for the least-cost formulation. Number of people using information gained at beef cattle production presentations about nutrition, reproduction, quality assurance and other management topics.
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 Program: Number of producers using Extension information to successfully balance rations for the least-cost formulation. Number of people using information gained at beef cattle production presentations about nutrition, reproduction, quality assurance and other management topics.

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2013	1756

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Beef cattle production results in the greatest share of agriculture cash receipts in Montana. Volatile cattle and feed markets, as well as rising input costs, provide challenges to sustainable beef cattle production. Cattle producers are seeking information on how to adapt to changing markets and remain in business. The Steer of Merit program is a method for county fair market beef exhibitors, parents, volunteers, beef cattle producers and other industry members to learn about carcass characteristics.

What has been done

The Extension beef cattle specialist presented to 1365 beef cattle industry stakeholders in Montana via 43 formal beef production and management programs. Topics included harvested forage utilization, mineral nutrition, ration balancing, genetics and selection, a systems approach to beef cow nutrition and reproduction, carcass grading, cow condition impacts on reproduction and nutrition, drought strategies, and forage analyses as risk management. More than 300 phone calls and emails were answered addressing individual questions. Ration-balancing software training was delivered to 23 county agents in four locations. The specialist conducted three workshops about market beef selection, feeding and carcass characteristics for youth, parents, agents and livestock producers. 916 beef carcass entries from county fairs were collected and reviewed. The information for Steer of Merit qualifying steers was sent to the Montana Stockgrowers Association (MSGA). Three workshops covering market beef selection, feeding and carcass characteristics were conducted for youth, parents, agents and livestock producers.

Results

Twenty producers followed up after formal programming to learn more about forage nutrient analysis and ration balancing. Every penny saved on a ration results in a \$1.50 per cow savings for a 5-month winter/spring feeding period. In a mid-size 250-300 cow herd, this would result in a \$375-\$450 of feed cost savings. There were 111 carcass division and 24 ultrasound division qualifiers among 916 total entries. The Top 5 Steer of Merit awards in the carcass and ultrasound divisions were presented at the annual MSGA Convention. Students and parents involved in the program gained knowledge related to the basics of carcass grading and how those measures influence the Steer of Merit designation. Students in 4-H Market Quality Assurance workshops reported increased knowledge related to raising animals in proper conditions, proper feeding, consumer satisfaction, how to minimize the potential for animal disease, methods of treating sick animals, appropriate injection sites for treatment and the importance of record-keeping.

4. Associated Knowledge Areas

KA Code	Knowledge Area
301	Reproductive Performance of Animals
307	Animal Management Systems
308	Improved Animal Products (Before Harvest)
311	Animal Diseases
315	Animal Welfare/Well-Being and Protection
601	Economics of Agricultural Production and Farm Management
603	Market Economics
604	Marketing and Distribution Practices
903	Communication, Education, and Information Delivery

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
2013	799

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

The sheep industry has identified a need for skilled trained sheep shearers to support the industry and promote the growth of the industry. Montana experienced a 1% growth in sheep numbers in 2013 leading to a growing need for shearing education and training of those wishing to work for hire as well as those individuals needing to learn the skill in order to manage their own sheep. Since 2000, the MSU Shearing School is an ongoing program that has addressed the continuing need for shearers.

What has been done

The efforts to address the shearing shortage can be divided into three areas, promotion, education and support. To promote the opportunity to become involved in sheep shearing, as well as provide the public with exposure to the process, Extension hosts the annual Miles City Bucking Horse Sale Sheep Shearing Contest and the Speed Shear event in conjunction with the Montana Woolgrowers convention. Formal sheep shearing schools are offered in Montana at the Red Bluff Research Station and in North Dakota at Hettinger. Market Quality Assurance classes are required for youth taking market sheep projects.

Results

An MSU Shearing School survey indicated that thirty-one graduates plan to seek shearing for hire during the spring 2014 season. In Montana, shearers get paid \$2.75 per head for shearing. In 2013, the estimated revenue earned by graduates was \$87,375. In Montana 157 youth earned Certified Lamb Certificates and 137 youth received Ultrasound Lamb certificates.

4. Associated Knowledge Areas

KA Code	Knowledge Area
301	Reproductive Performance of Animals
307	Animal Management Systems
308	Improved Animal Products (Before Harvest)
311	Animal Diseases
315	Animal Welfare/Well-Being and Protection
601	Economics of Agricultural Production and Farm Management
603	Market Economics
604	Marketing and Distribution Practices
903	Communication, Education, and Information Delivery

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
2013	2773

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

New potentially invasive plants are being moved around the western U.S. and could become established in Montana. Economic analysis indicates that for every dollar spent in prevention and early detection of invasive plants, 17 dollars are saved that would be spent on management of large-scale infestations had the species gone unchecked. This program informs Montana residents about new plant invaders and what they should do if/when they find a new invader. The Early Detection and Rapid Response Program is applicable and available to all Montana citizens, but emphasis has been placed on reaching out to managers and users of public lands. The integrated management of agricultural weeds continues to evolve as costs associated with management increase and consumer attitudes toward the products they purchase change. This continues to be a primary focus of MSU Extension.

What has been done

Five programs on the identification of new invaders and two visits to special interest/recreation groups to discuss how to handle invaders were conducted in 2013. At least 23 Extension/outreach presentations related to agricultural weed management in eight locations across Montana were presented to over 1751 participants. Specialists coordinated the Montana USDA Western Sustainable Agriculture Research and Education (WSARE) Professional Development Program which included topics such as cropping system diversification, ecologically-based pest management and farmer networks. Specialists organized the 10th Annual Crop and Weed Field Day at the MSU Post Farm which had 70 participants. During 2013, the Cropland Weed Management Website, www.ipm.montana.edu/cropweeds was fully re-designed, as was the Montana IPM Center web site.

Results

Participants in Extension programming are becoming more aware of the importance of prevention, including early detection and rapid response, for managing invasive plants on range and wild lands. In addition, participants are increasing their ability to identify invasive plants that are currently not established in Montana. For example, one presentation on new invaders that was delivered to county weed district coordinators resulted in an improvement between pre- and post- test scores by about 33 percent. Many workshop participants (84%) indicate they have begun to implement control measures or changed their control measures due to programming. Evaluations of agricultural weed presentations indicated that the presentations were thought provoking, easy to understand, and of good educational value. Programming helped increase awareness on management practices to prevent or delay the selection of herbicide resistance in Montana, diminish the spread and impact of cheatgrass (*Bromus tectorum*) and develop integrated weed management programs.

4. Associated Knowledge Areas

KA Code	Knowledge Area
205	Plant Management Systems
213	Weeds Affecting Plants
215	Biological Control of Pests Affecting Plants
216	Integrated Pest Management Systems
601	Economics of Agricultural Production and Farm Management
903	Communication, Education, and Information Delivery

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 Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2013	767

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 percent horticulture

or integrated pest management (IPM) related and in some counties the percentage is upwards of 90 percent. Master Gardener Curriculum, written and produced by the MSU Extension Horticulture professional staff, has a goal of educating the general public in horticulture, yard and garden maintenance and IPM. This education will benefit the agents as those successfully completing the course will educate others in the community. The Master Gardener program requires that participants volunteer as part of becoming certified.

What has been done

Three levels of classes are offered: Level 1 (16 hours of class time/20 hours volunteer commitment) includes basic and intermediate curriculum, Level 2 (16 hours of 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

The Master Gardener program provided 13,480 student hours of training for 616 participants, which led to 156 Level 1 certifications, 35 Level 2 certifications and eight Level 3 certifications. Volunteer hours among participants totaled 12,846, equating to over \$284,000. In fall of 2013, a survey of all prior participants of the Master Gardener classes in Gallatin County was completed. The survey found that before participating in the Master Gardener program, 77 percent had never attended an MSU Extension program. After attending the Master Gardener program, 47 percent said they attended at least one additional Extension program and 100 percent said they would recommend Extension programs to others. In Fergus County, Master Gardeners helped the Boys and Girls Club grow over 15 percent of the vegetables they used in their summer lunch program.

4. Associated Knowledge Areas

KA Code	Knowledge Area
101	Appraisal of Soil Resources
204	Plant Product Quality and Utility (Preharvest)
205	Plant Management Systems
211	Insects, Mites, and Other Arthropods Affecting Plants
213	Weeds Affecting Plants
215	Biological Control of Pests Affecting Plants
216	Integrated Pest Management Systems
602	Business Management, Finance, and Taxation
603	Market Economics
604	Marketing and Distribution Practices
903	Communication, Education, and Information Delivery

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
2013	5800

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Plant diseases often reduce crop yield and quality. MSU Extension specialists work to educate growers, county agents, industry and academic personnel about plant diseases in order to mitigate plant disease threats in cropping systems. This includes educating people on proper identification and disease management using an integrated strategy and research that is focused on disease threats to cropping systems. The Schutter Plant Disease Diagnostic Laboratory is an excellent diagnostic resource and facilitates MSU's involvement in regional (Great Plains Diagnostic Network) and national (National Plant Diagnostic Network) efforts to identify and communicate about plant disease threats, including threats to food security.

What has been done

One specialist educated 2319 producers, county agents, and other professionals in 29 presentations. She educated 3,000 children and parents at the MSU Science and Engineering Festival and 100 stakeholders during Ag Days at MSU. Approximately 80,000 viewers saw eight television episodes on Montana Ag Live on Montana PBS. The specialist wrote an article in the Western Farmers Stockman magazine, reaching 30,000 readers, conducted two radio interviews about crop disease and distributed 13 AgAlerts (downloaded 5,716 times). She created a 2014 Wheat Pest Calendar that was distributed to 5000 growers and produce a new "Montana Cool-Season Pulse Production Guide".

Results

Recognizing the value of the Schutter Diagnostic Lab to the state, the specialist worked with the Office of the Commissioner of Higher Education and was successful in securing \$200,000 in state funding for the lab. A study of 119 participants in six counties, representing 47,500 acres and \$37.7 million in revenue, showed strong interest by producers to participate in on-farm research. The majority (70%) indicated they would be willing to devote 1-5% of their revenue to on-farm research in the future. Using 3% for the whole, that's potentially \$1.1 million in on-farm research in-kind donations. Failures of Priaxor fungicide were noted on Ascochyta blight of chickpea in 2013. An isolate from a grower in northern Montana was found resistant to Headline, a component of Priaxor. Advice from the MSU Extension Plant Pathologist to spray the crop with Proline saved the chickpea crop. One grower yielded 1700 lb/A on 580A, a gross profit of \$385,000.

4. Associated Knowledge Areas

KA Code	Knowledge Area
101	Appraisal of Soil Resources
204	Plant Product Quality and Utility (Preharvest)
205	Plant Management Systems
211	Insects, Mites, and Other Arthropods Affecting Plants
213	Weeds Affecting Plants
215	Biological Control of Pests Affecting Plants
216	Integrated Pest Management Systems
602	Business Management, Finance, and Taxation
603	Market Economics
604	Marketing and Distribution Practices
903	Communication, Education, and Information Delivery

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
2013	3000

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Agriculture continues to face challenges from environmental, economic, political and social issues. 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. Farm Service Agency borrower training is needed to enhance the management skills of farmers and ranchers borrowing capital from the Farm Service Agency. The need was determined by meeting with FSA loan officials and selected producers. Training is required to qualify for FSA loans which are often needed by producers who have been denied credit from traditional lenders.

What has been done

FSA Loan training was delivered using webinar and distance education technology to 3000 direct contacts. Some producers view the webinars at local FSA Offices and take an examination after each session. Other producers view the recording of the webinar on their home computer and take an examination on Moodle. The entire training session requires about 24 hours of the farmer/ranchers time. When the examinations have been successfully completed (80 percent or higher score), the farmer/rancher is awarded a certificate from FSA.

Results

FSA Loan Training is critically important to producers who are not able to get financing through traditional means. This training is required to be eligible for funds. The knowledge gained by each borrower is assessed immediately after each session. The project has brought Montana-based finance and production training to Montana producers. Without this training, many producers would not be able to access financing and may not be able to stay in business. No follow-up evaluation to assess changes in behavior or long-term outcomes has been completed.

4. Associated Knowledge Areas

KA Code	Knowledge Area
601	Economics of Agricultural Production and Farm Management
602	Business Management, Finance, and Taxation
603	Market Economics
604	Marketing and Distribution Practices
903	Communication, Education, and Information Delivery

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 2013.

MSU Beef Cattle programs received a boost when the 2013 Montana Legislature voted to help fund a second Beef Cattle Specialist position. This is a clear indication of the value that the state's leaders place on this Extension program. The position is in the final stages of being filled.

In June of 2013, President Waded Cruzado led a group of Montana State University's vice presidents, deans and other senior officers including the Director of Extension, on a 48-hour educational, outreach tour called the "Follow the Beef Bus Tour". Extension was heavily involved in the planning and implementation. The tour included stops at operating cattle ranches, a feedlot, the Northern Agricultural Research Center, the Aaniiih Nakoda College, and the Fort Belknap Livestock Facility. One evening, a homemade dinner was provided by 4-H youth and the Wheatland County Extension office. The tour highlighted Extension's work, along with the MSU College of Agriculture and the Montana Agricultural Experiment Station to support the beef industry.

The Beef Cattle Specialist provided training for 1365 beef cattle industry stakeholders through 43 formal beef cattle production training and management programs. Twenty producers followed up formal programming to learn more about forage nutrient analysis and ration balancing. Every penny saved on a ration results in a \$1.50 per cow savings for a 5-month winter/spring feeding period. In a mid-size 250-300 cow herd, this would result in a \$375-\$450 of feed cost savings for each cent saved per ration.

In 2013, MSU Extension's Sheep Specialist of 33 years retired. Work continued through county agents and partnerships. The Montana State University sheering school trained 31 shearers who are actively working in the industry.

MSU Extension weed specialists continued to be actively engaged in the industry, providing training and information statewide. Analysis indicates that for every dollar spent preventing an invasive plant from becoming established, 17 dollars were saved. Many workshop participants (84%) indicated they have begun to implement control measures or changed their control measures due to programming.

The Master Gardener program provided 13,480 student hours of training for 616 participants, which led to 156 Level 1 certifications, 35 Level 2 certifications and 8 Level 3 certifications. Volunteer hours amongst participants totaled 12,846; a value of over \$284,000.

The MSU Extension plant pathologist conducted a study of 119 participants in six counties, representing 47,500 acres and \$37.7 million in revenue. Results showed strong interest by producers to participate in on-farm research. The majority (70%) indicated they would be willing to devote 1-5% of their revenue to on-farm research in the future. Using 3% for the whole, that's potentially \$1.1 million in on-farm research in-kind donations.

Farm Service Agency Loan Training has increased the opportunity for producers to access financing, potentially enabling them to stay in business.

Key Items of Evaluation

- MSU Extension received partial funding from the Montana Legislature to add a second Beef Cattle Specialist.
- Senior leadership of the university, including the President, several vice presidents, deans, the Director of Extension took a two-day "Follow the Beef Bus Tour" visiting cattle ranches, feedlots, research centers, a reservation livestock facility and more to better understand the industry.
- Ration-balancing software training was completed in three counties, giving agents the ability to directly assist producers. Every penny saved by ration-balancing, equals \$1.50 per cow savings over a five-month feeding period.
- There were 111 carcass division and 24 ultrasound division qualifiers amongst the 916 total entries in the Steer of Merit program.
- An MSU Shearing School survey indicated that thirty-one graduates plan to seek shearing for hire during the spring 2014 season. In Montana, shearers get paid \$2.75 per head for shearing. In 2013, the estimated revenue earned by graduates was \$87,375.
- Failures of Priaxor fungicide were noted on Ascochyta blight of chickpea in 2013. An isolate from the grower in northern Montana was found resistant to Headline, a component of Priaxor. Advice from the MSU Extension Plant Pathologist to spray the crop with Proline saved the chickpea crop. One grower yielded 1700 lb/A on 580A, a gross profit of \$385,000.
- MSU Extension weed specialists continued to be actively engaged in the industry, providing training and information statewide. Analysis indicates that for every one dollar spent preventing an invasive plant from becoming established, 17 dollars are saved. Many workshop participants (84%) indicated they have begun to implement control measures or changed their control measures due to programming.
- One County survey showed that prior to taking the Master Gardener class, 77 percent had never attended an MSU Extension program. After attending the Master Gardener program 47 percent said they had attended at least one additional Extension program and 100 percent said they would recommend Extension programs to others.

- The Master Gardener program provided 13,480 student hours of training for 616 participants, which led to 156 Level 1 certifications, 35 Level 2 certifications and 8 Level 3 certifications. Volunteer hours amongst participants totaled 12,846, a value of over \$284,000.