

V(A). Planned Program (Summary)

Program # 2

1. Name of the Planned Program

Agricultural Productivity and Food Security

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
102	Soil, Plant, Water, Nutrient Relationships	5%		3%	
104	Protect Soil from Harmful Effects of Natural Elements	5%		5%	
111	Conservation and Efficient Use of Water	5%		3%	
112	Watershed Protection and Management	5%		3%	
121	Management of Range Resources	2%		3%	
201	Plant Genome, Genetics, and Genetic Mechanisms	0%		9%	
202	Plant Genetic Resources	5%		8%	
203	Plant Biological Efficiency and Abiotic Stresses Affecting Plants	0%		9%	
205	Plant Management Systems	5%		6%	
211	Insects, Mites, and Other Arthropods Affecting Plants	0%		5%	
212	Diseases and Nematodes Affecting Plants	12%		9%	
213	Weeds Affecting Plants	10%		3%	
215	Biological Control of Pests Affecting Plants	8%		5%	
216	Integrated Pest Management Systems	10%		9%	
301	Reproductive Performance of Animals	5%		3%	
302	Nutrient Utilization in Animals	5%		3%	
303	Genetic Improvement of Animals	3%		2%	
304	Animal Genome	0%		2%	
307	Animal Management Systems	10%		5%	
604	Marketing and Distribution Practices	5%		5%	
	Total	100%		100%	

V(C). Planned Program (Inputs)

1. Actual amount of FTE/SYs expended this Program

Year: 2014	Extension		Research	
	1862	1890	1862	1890
Plan	101.0	0.0	290.0	0.0
Actual Paid	150.0	0.0	447.0	0.0
Actual Volunteer	14.0	0.0	0.0	0.0

2. Institution Name: Washington State University

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

Extension		Research	
Smith-Lever 3b & 3c	1890 Extension	Hatch	Evans-Allen
1770975	0	2627929	0
1862 Matching	1890 Matching	1862 Matching	1890 Matching
1770975	0	2627929	0
1862 All Other	1890 All Other	1862 All Other	1890 All Other
11022823	0	29464969	0

V(D). Planned Program (Activity)

1. Brief description of the Activity

Fundamental, translational and applied research will be conducted in laboratories, at research and extension centers, and in collaboration with farmers and ranchers. Extension programs will operate to hasten the application of new and existing science within the agricultural industries of WA State using a variety of educational events including farm visits, workshops, seminars, field days, tours, and mass media resources including the internet and social media.

2. Brief description of the target audience

Target audiences include farmers and ranchers, agricultural consultants, scientists, commodity commissions, educators, state and federal agency professionals, elected officials, food processors, transporters, agricultural chemical producers and applicators, and the general public.

3. How was eXtension used?

eXtension was not used in this program

V(E). Planned Program (Outputs)

1. Standard output measures

2014	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Actual	131632	2522527	19861	8269

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

Patent Applications Submitted

Year: 2014

Actual: 10

Patents listed

These patents were issued in 2014:

0487-U2RF-OC to John Browse: Desaturases and methods of using them for synthesis of polyunsaturated fatty acids.

0854-OIPA-OCJan BusboomDIRECT METHOD AND REAGENT KITS FOR FATTY ACID ESTER SYNTHESIS

0931-OIPA-OCKimberlee (Kim) KidwellGlyphosate-Tolerant Wheat Genotypes

0979-U2RF-OCClarence (Bud) RyanAdditional Defense Peptide and Plant Defense

1027-U2RF-OCWendy Hoashi-Erhardt'Puget Crimson' Patent Application

1112-OIPA-OCMatthew WhitingMethods for Improving Fruit Production and Fruit Quality

1175-U2RF-OC Amit DhingraUse of Photosynthetic Pigment Stabilizing Agents to Regulate Ripening and Quality in Fruits and Vegetables

1205-OCBruce BarrittApple Tree Named 'WA 38', Cosmic Crisp

1231-U2RF-OCStephen JonesWA8092 ('Otto') Soft White Winter Wheat

1328-CAHNS-OC Arron CarterWA8118 ('Sprinter') Hard Red Winter Wheat

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

2014	Extension	Research	Total
Actual	62	479	491

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

- Number of seminars, workshops, demonstrations, field days, and educational events conducted annually

Year

Actual

2014 1701

Output #2

Output Measure

- Number of peer reviewed (official) WSU Extension publications published

Year	Actual
2014	38

Output #3

Output Measure

- Number of graduate students with a significant professional orientation in the area of agricultural productivity and food security.

Year	Actual
2014	199

Output #4

Output Measure

- 2014 Farm Bill Outreach Education Training Workshops

Year	Actual
2014	26

V(G). State Defined Outcomes

V. State Defined Outcomes Table of Content

O. No.	OUTCOME NAME
1	Percentage of evaluated participants who demonstrated increased knowledge and skills relative to one or more key learning objectives for enhancing productivity, efficiency, risk management, or sustainability of crop and livestock production systems.
2	Percentage of evaluated program participants who applied knowledge gained from the program to enhance productivity, efficiency, risk management, or sustainability of crop and livestock systems.
3	Number of acres impacted by WSU research and extension programs that enhanced productivity, efficiency, or sustainability of crop production enterprises.
4	Number of food production animals impacted by WSU research and extension programs that enhanced productivity, efficiency, or sustainability of livestock and dairy production enterprises.
5	Number of food processing facilities or direct marketing enterprises that enhanced processing, marketing, or overall efficiency of food distribution.
6	2014 Farm Bill Outreach Education

Outcome #1

1. Outcome Measures

Percentage of evaluated participants who demonstrated increased knowledge and skills relative to one or more key learning objectives for enhancing productivity, efficiency, risk management, or sustainability of crop and livestock production systems.

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2014	67

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Washington State's diverse microclimates produce over 300 crops, including small grains, vegetables, fruits, legumes, and livestock. Washington State University (WSU) conducts research and extension programs focused on increasing the productivity and efficiency of our farms and ranches by reducing plant and animal pests and diseases, developing new genetic resources, and optimizing overall food production practices and strategies.

What has been done

Program implementation utilized local, regional, state-wide, and multistate efforts in a coordinated effort that involved workshops, clinics, seminars, field days, field demonstrations, print and electronic publications, mass media, social networks, and other methods to disseminate research-based knowledge and other relevant information to targeted audiences.

Results

Sixty-seven percent of program participants increased their knowledge and skill through participation in one or more of over 1,700 educational events focused on enhancing agricultural productivity and food security for the benefit of producers and consumers alike. Participants came from diverse backgrounds, including very large commercial operations, midsize family farms, small farms, and community supported agriculture.

4. Associated Knowledge Areas

KA Code	Knowledge Area
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102	Soil, Plant, Water, Nutrient Relationships
104	Protect Soil from Harmful Effects of Natural Elements
111	Conservation and Efficient Use of Water
112	Watershed Protection and Management
121	Management of Range Resources
201	Plant Genome, Genetics, and Genetic Mechanisms
202	Plant Genetic Resources
203	Plant Biological Efficiency and Abiotic Stresses Affecting Plants
205	Plant Management Systems
211	Insects, Mites, and Other Arthropods Affecting Plants
212	Diseases and Nematodes Affecting Plants
213	Weeds Affecting Plants
215	Biological Control of Pests Affecting Plants
216	Integrated Pest Management Systems
301	Reproductive Performance of Animals
302	Nutrient Utilization in Animals
303	Genetic Improvement of Animals
304	Animal Genome
307	Animal Management Systems
604	Marketing and Distribution Practices

Outcome #2

1. Outcome Measures

Percentage of evaluated program participants who applied knowledge gained from the program to enhance productivity, efficiency, risk management, or sustainability of crop and livestock systems.

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2014	50

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Washington State's diverse microclimates produce over 300 crops, including small grains, vegetables, fruits, legumes, and livestock. Washington State University (WSU) conducts research and extension programs focused on increasing the productivity and efficiency of our farms and ranches by reducing plant and animal pests and diseases, developing new genetic resources, and optimizing overall food production practices and strategies.

What has been done

Program implementation utilized local, regional, state-wide, and multistate efforts in a coordinated effort that involved workshops, clinics, seminars, field days, field demonstrations, print and electronic publications, mass media, social networks, and other methods to disseminate research-based knowledge and other relevant information to targeted audiences.

Results

Fifty percent of program participants utilized the research-based information and training provided through this planned program to enhance productivity, efficiency, risk management, or sustainability of crop and livestock systems.

4. Associated Knowledge Areas

KA Code	Knowledge Area
102	Soil, Plant, Water, Nutrient Relationships
104	Protect Soil from Harmful Effects of Natural Elements
111	Conservation and Efficient Use of Water
112	Watershed Protection and Management
121	Management of Range Resources
201	Plant Genome, Genetics, and Genetic Mechanisms
202	Plant Genetic Resources
203	Plant Biological Efficiency and Abiotic Stresses Affecting Plants
205	Plant Management Systems
211	Insects, Mites, and Other Arthropods Affecting Plants
212	Diseases and Nematodes Affecting Plants
213	Weeds Affecting Plants
215	Biological Control of Pests Affecting Plants
216	Integrated Pest Management Systems
301	Reproductive Performance of Animals
302	Nutrient Utilization in Animals
303	Genetic Improvement of Animals
304	Animal Genome
307	Animal Management Systems
604	Marketing and Distribution Practices

Outcome #3

1. Outcome Measures

Number of acres impacted by WSU research and extension programs that enhanced productivity, efficiency, or sustainability of crop production enterprises.

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Actual
2014	10538374

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Washington State's diverse microclimates produce over 300 crops, including small grains, vegetables, fruits, legumes, and livestock. Washington State University (WSU) conducts research and extension programs focused on increasing the productivity and efficiency of our farms and ranches by reducing plant and animal pests and diseases, developing new genetic resources, and optimizing overall food production practices and strategies.

What has been done

Program implementation utilized local, regional, state-wide, and multistate efforts in a coordinated effort that involved workshops, clinics, seminars, field days, field demonstrations, print and electronic publications, mass media, social networks, and other methods to disseminate research-based knowledge and other relevant information to targeted audiences.

Results

WSU research and extension programs enhanced productivity, efficiency, and sustainability of food production on over 10 million acres of the 15 million acres of agricultural land in the state.

4. Associated Knowledge Areas

KA Code	Knowledge Area
102	Soil, Plant, Water, Nutrient Relationships
104	Protect Soil from Harmful Effects of Natural Elements
111	Conservation and Efficient Use of Water

112	Watershed Protection and Management
121	Management of Range Resources
201	Plant Genome, Genetics, and Genetic Mechanisms
202	Plant Genetic Resources
203	Plant Biological Efficiency and Abiotic Stresses Affecting Plants
205	Plant Management Systems
211	Insects, Mites, and Other Arthropods Affecting Plants
212	Diseases and Nematodes Affecting Plants
213	Weeds Affecting Plants
215	Biological Control of Pests Affecting Plants
216	Integrated Pest Management Systems
307	Animal Management Systems

Outcome #4

1. Outcome Measures

Number of food production animals impacted by WSU research and extension programs that enhanced productivity, efficiency, or sustainability of livestock and dairy production enterprises.

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Actual
2014	7662898

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Washington State's livestock industry includes a diverse mix of dairy, beef, swine, sheep, goat, and poultry enterprises. These enterprises range from small farms to very large cooperate farms with thousands of animals under management. Washington State University's research and extension programs continue to provide reliable information and training beneficial to the sustainability of these farms and food animal production.

What has been done

Program implementation utilized local, regional, state-wide, and multistate efforts in a coordinated effort that involved workshops, clinics, seminars, field days, field demonstrations, print and electronic publications, mass media, social networks, and other methods to disseminate research-based knowledge and other relevant information to targeted audiences.

Results

This planned program directly impacted the management of over 7 million food production animals, through dissemination of research information and training for producers to enhance risk management strategies, animal health, reproductive efficiency, meat quality, feeding management, grazing management, and a variety of other management and animal husbandry practices important for sustainable animal agriculture enterprises.

4. Associated Knowledge Areas

KA Code	Knowledge Area
121	Management of Range Resources
301	Reproductive Performance of Animals
302	Nutrient Utilization in Animals
303	Genetic Improvement of Animals
304	Animal Genome
307	Animal Management Systems
604	Marketing and Distribution Practices

Outcome #5

1. Outcome Measures

Number of food processing facilities or direct marketing enterprises that enhanced processing, marketing, or overall efficiency of food distribution.

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Actual
2014	2080

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Food processing and marketing are essential components of a food system and insuring food security. In addition to the importance of large scale food processing operations; on-farm processing and direct marketing of locally grown food is increasingly in high demand.

What has been done

This work included a series of outreach and training methods that included workshops, clinics, seminars, print and electronic publications, and other methods to disseminate research-based knowledge and other relevant information to targeted audiences. Program offerings were customized for each audience, ranging from midsize, commercial processing plants to farmers market associations and direct farm marketers.

Results

Over 2,000 small to mid-size enterprises were provided training and assistance resulting in improvements to processing efficiency and improved distribution of locally grown foods.

4. Associated Knowledge Areas

KA Code	Knowledge Area
604	Marketing and Distribution Practices

Outcome #6

1. Outcome Measures

2014 Farm Bill Outreach Education

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2014	100

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

The 2014 Farm included important price and production risk mitigation provisions, which required producers to make informed decisions regarding options for program participation. These decisions were more significantly more complex than previous programs and required producer training to understand the implications of their choices and on the use of decision tools.

What has been done

Twenty-six educational workshops were offered across the state with 1109 producers in attendance. Training included ARC/PLC programs as well as the Dairy MPP. These workshops were supplemented by articles in producer magazines, recorded videos, and supplemental decision tools to augment the national decision aids.

Results

Producers attending the program were surveyed for knowledge and ability to make informed decisions on program participation. Using a 6 point scale, producers rated their knowledge before the training as 2.48 and 5.26 after the training; thus demonstrating over 100% increase in their knowledge. Producers also rated the quality of materials and presentations as 5.99 on the 6.0 scale.

4. Associated Knowledge Areas

KA Code	Knowledge Area
205	Plant Management Systems
307	Animal Management Systems
604	Marketing and Distribution Practices

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
- Competing Public priorities
- Competing Programmatic Challenges

Brief Explanation

Although many factors impact the sustainability of agricultural enterprises and food production, our primary goals of providing training and research-based information to target audiences continue to be impacted by reduced or uncertain funding from federal, state, and local sources. This uncertainty directly impacts our decisions on hiring and deployment of human and financial resources. Our work in research and extension is increasingly dependent on securing competitive grants to support our system and drive our programs forward. Ultimately, competing priorities for limited funds and financial resources continue to be our most limiting factor.

V(I). Planned Program (Evaluation Studies)

Evaluation Results

This program encompassed a wide array agricultural enterprises including irrigated and dry-land agronomic crops, high value horticultural crops, fruit orchards, vine crops,

grazing lands, livestock and poultry operations, and dairy farms. The overall program evaluation for all events and projects under this program theme was evaluated in terms of "knowledge gained by participants" and "application of this knowledge" to address agricultural productivity and food security. Additionally, we collected data on the acreage of agricultural land and livestock numbers that directly benefited from our work. We also reported the number food processing facilities, direct marketing enterprises, and food banks that enhanced efficiency of food processing and distribution. Collectively, the results indicate positive impacts to agricultural productivity through the dissemination of research-based information and the application of this knowledge for sustaining agricultural enterprises and food production. Results were collected through a variety of methods including pre and post event evaluations, surveys, agricultural statistics, feedback from stakeholder groups, and other assessments of program participants. The analysis provided the aggregate results indicated below under key items of evaluation.

Key Items of Evaluation

This planned program focused on increasing agricultural productivity, food processing efficiency, and food distribution as a means of enhancing food security through a sustainable system. Our assessments indicated that 67% of program participants increased their knowledge relative to the knowledge areas covered, and 50% indicated application of one or more principles or practices learned from their participation. The aggregate outcomes of this work impacted over 10 million acres for farm land, and over 7 million food animals. This work also supported enhancements to over 2,000 enterprises associated with food processing, direct marketing, and food distribution.