2017 Washington State University Combined Research and Extension Annual Report of Accomplishments and Results

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I. Report Overview

1. Executive Summary

The primary goals of the Washington State University (WSU) Agricultural Research Center (ARC - the Agricultural Experiment Station of the State of Washington) and of Washington State University Extension are to conduct research beneficial to the citizens of Washington State and to extend relevant research results generated here and elsewhere to stakeholders within the state and beyond. We strive to create outcomes that improve the economic viability, environmental sustainability, community resilience, and quality of life for our people. We recognize that we have unique land grant research and outreach missions to serve the people of Washington in order to enhance their quality of life and to evaluate both short and long-term consequences of potential policies, decisions and actions. The ARC provides leadership in discovering and accessing knowledge by carrying out high quality research that contributes to a safe and abundant food supply; promotes the well-being of individuals, families, and communities; encourages sustainability of agricultural and economic systems; promotes energy innovation; and encourages careful stewardship of natural resources and ecological systems. WSU Extension creates programs with measurable deliverables and outcomes that leverage the research base of the University and the world to address primary and timely issues in ways that lead to economic development, sustainability and resilience as well as personal, family, and environmental wellbeing. The synergy provided by integrating research capacity, problem-solving skills and the statewide engagement of ARC and Extension provides unique capacity to address pressing issues and problems while recognizing different perspectives. This maximizes the delivery of valuable contributions to our residents and society.
The WSU ARC and WSU Extension have many natural and structural links. All Washington State University faculty members have responsibilities that include both research and outreach, with many having formal joint appointments. This is particularly true within the College of Agricultural, Human and Natural Resource Sciences (CAHNRS), which houses both ARC and Extension. More than 100 faculty in ARC or Academic positions hold partial Extension appointments. The focus of our joint efforts is to provide for the primary needs of the people of Washington State. As part of this core mission, the ARC has made significant commitments to focus on fourteen high priority research areas that advance our land-grant mission in discovery and development research. These research areas are (1) precision and automated agricultural systems, (2) soil-plant interactions: chemical, physical, and biological processes, (3) sustainable food production from livestock, (4) developing food processing, safety, quality, and supply solutions for production of high quality and safe food, (5) promoting health and wellness of individuals, families, and communities, (6) reducing the impact of pests and diseases affecting Washington agriculture, (7) crop improvement and sustainable production systems, (8) enhancing sustainability across diverse agricultural systems, (9) natural resources, (10) integrated research and societal engagement to address global water challenges, (11) functional genomics in animal improvement, food safety, and human health, (12) integrated crop and weed management systems, (13) molecular plant sciences: plant productivity in a dynamic environment, and (14) bioenergy and biofuel. And, while significant components of our Extension programs are aligned with the ARC research base, Extension also delivers significant outreach related to natural resource stewardship; food safety; health and wellness; youth and family development; governance, sustainability and community economic development. The efforts of ARC and Extension are not the only parts of WSU that work to reach these goals, but they are a committed element of a broader set of programs that reside in the many WSU colleges and interdisciplinary centers, including CAHNRS;

the Voiland College of Engineering and Architecture; the College of Arts and Sciences; the College of Pharmacy; the College of Veterinary Medicine; the Center for Environmental Research, Education and Outreach; and the three outreach centers of the Community and Economic Development program unit: the William D. Ruckelshaus Center (a joint program with the University of Washington), the Division of Governmental Studies and Services, and the new Metropolitan Center for Applied Research and Extension. Additionally, through close partnerships and collaborative agreements, our Extension faculty also extend the research conducted by faculty at other regional centers of expertise, including the University of Washington, Oregon State University, and the University of Idaho. For these and other reasons, we believe the Combined Research and Extension Annual Report is fundamental to understanding how we make our contributions.

The state of Washington is beautiful, rich in natural resources, and has a highly diverse topography and climate. This diversity is also reflected in our people, communities, industries, and our significant natural resources. Our agricultural systems are among the most diverse in the nation and the state produces nearly 300 different crops that are sold domestically or exported, largely to countries in the Pacific Rim. Washington is especially known for its apples, pears, sweet cherries, wheat, potatoes, beef, milk and milk products and wine, and it produces a major share of many specialty crops, like small fruits (e.g. grapes, berries), seeds (e.g., vegetables, alfalfa), pulse legumes, hops, and mint. Most of the state's farm and ranch lands are in Central and Eastern Washington but most of the state's population is located in a coastal zone on the west side of the Cascade Mountains in the I-5 corridor that stretches from the Canadian border south to Vancouver, Washington and the Oregon border. Western Washington is characterized by an expanding urban population, which values environmental quality and supports local food systems. As a consequence of the dense population in an area with good agricultural conditions, including a moderate climate, rich alluvial soils, and abundant rainfall, this region of Washington is home to a small but extraordinarily diverse agriculture that focuses on high value production. Eastern Washington is characterized by larger farming operations, especially in the cultivation of wheat, potatoes, legumes, and orchard crops. Our forested lands are primarily in coastal regions, the Cascade Range, and in northwestern and southwestern Washington and they contribute significantly to the state's economy and overall quality of life through economic and recreational opportunities. Washington is also home to two great rivers, the Columbia and the Snake, which provide transportation, electrical power, irrigation, and important fish and wildlife habitat. Other river systems, coastal regions, and the Puget Sound support abundant yet fragile aquatic and marine ecosystems and provide a rich mosaic unique to the Pacific Northwest.

The diversity of Washington doesn't end with its physical features as the state also has continually evolving demographic dynamics, which influence the cultural and political milieu. The state has a significant Native American population with 29 Federally-recognized tribes. There has been almost a tripling of the Hispanic population in the last twenty years, especially in the central and south-central counties, and a virtual doubling of Asian populations in Western Washington during the same period. Adding to this overall cultural diversity are the large refugee populations that now call Washington State home; Washington State is the 8th most popular resettlement area for refugees nationally. Washington now ranks second in the nation for bilingual and migrant education programs at the K-12 level.

While this diversity is enriching the tapestry of the state by bringing a multitude of new cultures, foods, and arts, these demographic shifts also strain social services and challenge educational delivery systems. The health and wellness of our youth are also at risk with over 26% of our adult population categorized as obese and almost 30% of our youth categorized as overweight or obese. Our rural communities are struggling with increased poverty and with differential access to technology, health services, and educational opportunities. In such a diverse cultural and environmental landscape, research, technology transfer, and outreach are challenging but essential.

The agricultural industry is a constantly shifting tableau. Weather variability and climate change have had significant impacts on water availability and facilitate migration of new plant and animal diseases and pests into the state. New varieties of crops, both domestically and internationally developed, compete for market share but also provide our growers with new opportunities; constant changes in disease and pest pressure, input costs, and per bushel prices affect how we grow our crops and what we incorporate into

our crop rotations; agriculture labor supplies affect the timing and cost of our fruit harvests; and, as importantly, changes in consumer demand and governmental policy shape, and may even dictate, direction. The dynamics of our communities change as the result of changing demographics, changes in transportation, communication, educational and health care opportunities, and the availability and stability of employment locally. As we examine how to adapt to these changes and challenges, we provide the expertise that allow us to take advantage of all potential opportunities. Examples of relatively newly created opportunities include the possibility of growing and processing industrial hemp for oil and fiber, a burgeoning Washington State viticulture and enology enterprise, an economically viable and important organic agriculture industry, and the increasing importance of niche legumes in crop rotations. Washington has the second largest wine industry in the United States but there are issues related to local climate, soil, and pest management that need to be resolved in order to exploit the potential of this crop. The partnership that has developed between the research, Extension, and industry components of the viticulture and enology arena are truly outstanding and a model for future endeavors. Our commercial tree fruit industry has funded several endowed faculty positions that will continue to keep us at the cutting edge of research. Our organic agriculture growers and researchers are pioneers in the 5% market share that organic agriculture has in total U.S. agricultural production, and Washington State's contributions are second in the nation. We also continue to explore avenues where we have traditionally been a world leader. We have many researchers involved in breeding programs to adapt crops such as wheat and tree fruits to drought and high temperature conditions.

There are also many other challenges to Washington State that impact our citizens. Our natural resources are at risk from land conversion, wildfires, and pollution. Counties across the state experience severe and emergency drought conditions. This had severe negative impacts on all aspects of life for our citizens but was especially impactful for agriculture. Another issue that is rising to the forefront are pollutants in our environment that are serious concerns for the safety and health of our water systems. Our Washington Stormwater Center was created in 2009 by House Bill 2222 and it is a technical resource center in partnership with the University of Washington and the Washington Department of Ecology to provide tools for storm water management. We are also partners in the State of Washington Water Research Center (it is directed by our faculty) which conducts research on water, fosters education of future water professionals, and serves as a nexus for the academic community, water resource managers, and water stakeholders. As a result of studies on water management for multiple uses, our economists are critically examining current and future water use for urban development, crop production, fisheries, and recreation. Now more than ever it is necessary to develop new ways to meet the demands of climate change and an increasing population.

Our role in dealing with these issues continues to be in both basic discovery research and highly translational applied research that provides information and assistance to our constituents. We use cutting edge technology to develop new processes and solutions and provide this information to our stakeholders. We have strategically prioritized hiring and strengthening research programs in the areas of plant biotechnology and genomics and are leading the nation in several efforts to apply these areas of expertise to issues like cropping systems research and cultivar development for specialty markets as well as genomics database technologies that are the world standards. Our biological systems engineers are working on precision systems for delivering water and fertilizer at appropriate times for efficient crop yield and resource management and on remote monitoring to close the loop and measure local effects on a large scale. Our integrated pest management programs are developing genomics as well as management techniques to minimize traditional chemical pesticide use while effectively managing pests across a broad variety of agricultural crops and urban environments. And our energy extension programs are pioneers in areas like building technology and plant operations efficiency.

WSU researchers have garnered millions of dollars in extramural support to leverage their capacity grant funds into discovery and development research important to the citizens of Washington State. External funding awards to Research and Extension has been uneven over the past several years. Total extramural awards in CAHNRS (almost entirely ARC & Extension) were $91 million in 2012; $80 million in 2013; and $85 million in 2014, $81 million in 2015, and $83 million in 2016, and $70 million in 2017. In 2016, WSU was the top university in the nation for total dollars awarded from USDA National Institute of

Food and Agriculture in total research and development dollars. The Northwest Advanced Renewables Alliance supported transformational research to make a sustainable aviation biofuels industry a reality which remains a strong initiative following the successful completion of that grant. The largest gift to Washington State University overall is still from the Washington Tree Fruit Commission, which approved check-off increases worth an estimated $32 million over the eight years of the increased assessment for support of apple, cherry and pear research and extension. Other support in endowed professorships and research funding has been made available from organizations like the Washington Grain Commission (which has endowed several professorships at WSU and notably also donated over $5 million dollars to build a new grains greenhouse), the Washington Potato Commission, the Washington Hops Commission and the Washington Wine Commission (which notably donated funding for the new Ste. Michelle Wine Estates WSU Wine Science Center). There is a very vibrant relationship between WSU Research and Extension and numerous commodity-based entities in the state and region and we view this as a validation of the value placed on our efforts by our constituents and stakeholders. Our county partners contribute more than $10 million annually - in cash and kind - to support county Extension operations and over $6 million annually in research funding.

There are some difficulties in reporting the information about our combined Research and Extension activities through the rubric that is imposed by the reporting structure. One obvious concern is in assigning "credit" to one area when an activity fits partially in more than one area, especially as our systems become more integrated. The two benchmark numbers that are especially affected by this are publications and graduate students. For publications, we have assigned equal "credit" to two Planned Programs when this seemed appropriate. Thus the number of refereed journal article publications reported in a Planned Program might be lower than the number of actual publications making a significant contribution to the area of the planned program. Under state-defined outcomes, we have separately counted refereed Extension publications. For the graduate students, we asked their major department to indicate whether individual students had a significant part of their studies focused on the Planned Program and, when appropriate, allowed them to assign effort to multiple programs to the nearest tenth. The number associated with a Planned Program represents graduate student Full Time Equivalency and a larger number of students may have had partial effort in this Planned Program. For the expenditures in a Planned Program, we asked the administrator with responsibility for each Hatch project to classify the project to Planned Program, and then proportionately allocated total expenditures in this project to the Programs. Individual administrators were given the option of assigning some of the project to "other," to represent an effort that did not fit into the classification scheme, but the dollar amount associated with this choice was small.

There are numerous societal challenges that can be addressed by cutting-edge research and through the application of that research to the practical issues that drive production. Every year we assess and evaluate our research portfolio in order to strategically prioritize our efforts to ensure the greatest impact is derived from both our research and extension programs. As a result, we are able to continue to deliver important outcomes including economic benefits to agricultural and natural resource-based industries, communities, and individuals. Additionally, our research and outreach help ensure that the people of Washington State maintain a high quality of life by limiting the negative impacts of chronic disease, food insecurity, and obesity. Finally, our programs help ensure that the beauty of the state and its natural resources are sustained for future generations. This annual report endeavors to summarize the inputs, outputs, and impacts of our work conducted during the year.

Total Actual Amount of professional FTEs/SYs for this State

Year: 2017	Extension		Research	
	1862	1890	1862	1890
Plan	520.0	0.0	440.0	0.0
Actual	371.0	0.0	708.0	0.0

II. Merit Review Process

1. The Merit Review Process that was Employed for this year

- Internal University Panel
- External University Panel
- External Non-University Panel
- Combined External and Internal University Panel
- Combined External and Internal University External Non-University Panel
- Expert Peer Review

2. Brief Explanation

During the past decade, two initiatives have driven the college and university review process. The first was an institutional goal to bring WSU to a level of prominence nationally, through achievement of AAU (Association of American Universities) status and with our new "Drive to 25" top research university goal. Within CAHNRS (College of Agricultural, Human, and Natural Resource Sciences), which is home to most of the programs supported by capacity funds, this involved each unit performing a self- evaluation, setting benchmarks, and developing assessment tools to evaluate progress made towards those benchmarks. Benchmarking was also instituted at the unit and college levels. The second driving force is associated with decreasing state funding. Since 2008, cyclical reductions in state funding, and the current requirement to reduce spending on state funds to restore fiscal stability for the University have required both significant reductions in personnel and recurring efforts to prioritize programming and services. This has included a serious examination of all departments and programs, including their research, instruction, extension and outreach priorities and capabilities. University and CAHNRS Administration accepted these challenges as opportunities to create an outstanding institution and significant changes were made to the university structure. And, while state funding has stabilized, the university, as well as CAHNRS Research and Extension, continue to follow a plan of less reliance on state funding and more reliance on self-generated funding to support its highest priority programs.
Merit evaluation takes place at several levels. Prioritization for specific programs is manifested by allocations of effort and limited funds. In 2017 we implemented a new strategic prioritization of our Hatch capacity funds in order to better align with stakeholder needs and researcher capacity. We organized our research projects into fourteen main collaborative topic areas that were based on organic associations and are reflective of college strengths. An inventory of current projects and participants and budgets was undertaken. These were first assembled into ten main areas but after review by unit chairs and faculty groups these were revised to fourteen. Each topic area was populated with faculty with current Hatch projects and reviewed. Once the groups were assembled, leaders for each group were identified. The leaders were asked to work with the participants in each group and write a collaborative project

proposal. Eight of the fourteen projects are currently approved at NIFA. Once the project proposal is reviewed and approved by all participants, it is then circulated to internal and/or external reviewers. These reviewers are asked whether the research represents solid science, is directed to topics of current need, will advance the field of study, and whether the research plan is appropriate. Reviewers are asked to offer written suggestions for improvement and to identify the strongest and weakest points of the proposal. After comments are received from the reviewers, the leader of the collaborative Hatch project assembles the commentary and discusses it with the faculty participants. If necessary, the project proposal is then revised. After examining these changes, the leader of the project submits the project proposal to the ARC where it is sent to USDA and reviewed by the appropriate National Program Leader. When approval is final, the approved project is entered into our database and into the REEPort system. We also use this system by entering our state projects as a way of tracking most projects that are funded by external funds to track the majority of our research activity in one database. In addition to review of individual projects prior to their establishment, the programs are evaluated on a yearly basis and may also be reviewed in the context of various university planning and evaluation priorities. In parallel, proposals for funding that may overlap these projects may be submitted to federal or state agencies or to commodity commissions. As appropriate, we also use the NIFA system that arranges for expert external review teams to examine specific departments or activities.

Individual WSU Extension faculty program plans are developed through statewide planning processes informed by the NIFA Plan of Work, the College of Agricultural, Human and Natural Resource Sciences Strategic Plan, and the WSU Strategic Plan. Extension faculty members are reviewed annually on a set of performance expectations that include: effective program planning, implementation, and evaluation of impact; scholarly work and creative outreach materials; success with grants and extramural funding; leadership and teamwork; professional development; and service to the public and the institution. Annual merit ratings are assigned based on accomplishment within these categories, which are also the performance expectations considered for tenure and promotion of Extension Faculty. All faculty report at the end of the calendar year into our electronic Activity Insight database (which replaced in 2018 our WORQS WSU Online Reporting and Query System), which can be accessed quickly at any time during the year that the information is needed. The progress of Extension faculty member's work is reviewed by Program Directors, Department Chairs, Associate Deans and the Dean as an integral part of the annual performance review process. WSU Extension faculty receive over 60% of their total funding from extramural sources, including USDA grants, grants from other agencies, foundation grants, and commodity commission grants. These funding agencies subject our proposals to expert peer review by scientific panels and by industry professionals and growers. All WSU Extension publications undergo a double blind peer review. Reviewers include faculty at WSU or other Grant Universities, state and federal agencies, or research faculty at non-Land Grant universities.

III. Stakeholder Input

1. Actions taken to seek stakeholder input that encouraged their participation

- Use of media to announce public meetings and listening sessions
- Targeted invitation to traditional stakeholder groups
- Targeted invitation to non-traditional stakeholder groups
- Targeted invitation to traditional stakeholder individuals
- Targeted invitation to non-traditional stakeholder individuals
- Targeted invitation to selected individuals from general public
- Survey of traditional stakeholder groups
- Survey of traditional stakeholder individuals
- Survey of the general public
- Survey specifically with non-traditional groups

- Survey specifically with non-traditional individuals
- Survey of selected individuals from the general public

Brief explanation.

Stakeholder involvement is sought through a variety of means. Electronic media (email, websites, and blogs) are increasingly being used to solicit and deliver information but we recognize that many individuals do not have convenient access to these 'new' media, so more traditional approaches are also used. These include the use of radio, direct mail, telephone contacts, and personal visits. Our many advisory councils and committees (e.g. industry, grower, county, regional, disciplinary) are kept abreast of activities within the College of Agricultural, Human, and Natural Resource Sciences and WSU Extension through newsletters, telephone calls, emails, blogs, and direct meetings. These groups meet at regular intervals. During these meetings, they are briefed about new initiatives, on-going work, and issues related to the College and WSU Extension. Feedback is also solicited at these events. This feedback is key to developing new initiatives and outreach programs.
Electronic surveys are increasingly used to capture rapid feedback from program participants, advisors, and the general public. These are generally conducted via media such as Qualtrics, Remark or Survey Monkey and we have also used Turning Point software and clicker technology at workshops to gather information rapidly. These assessments are extremely valuable in that response rates are generally much higher and data are delivered in a 'pre-analyzed' format. These rapid assessments are often critical in the development of projects with short timelines as is often the case when responding to federal, state, and foundation calls for grant proposals. Finally, web content delivery and web conferencing is frequently used to both communicate with the public and to present research results.

2(A). A brief statement of the process that was used by the recipient institution to identify individuals and groups stakeholders and to collect input from them

1. Method to identify individuals and groups

- Use Advisory Committees
- Use Internal Focus Groups
- Use External Focus Groups
- Open Listening Sessions
- Needs Assessments
- Use Surveys

Brief explanation.

The ARC and WSU Extension use local and statewide advisory committees to provide input to the leadership, the faculty, and staff of Washington State University. These include the College of Agricultural, Human and Natural Resource Sciences (CAHNRS) Advisory Council," the Center for Sustaining Agriculture and Natural Resources Advisory Committee, advisory committees at each of the four Research and Extension Centers, and county, departmental, and program-specific advisory committees.
When appropriate, feedback is sought through designed focus groups and designed surveys. This form of feedback is critical for evaluating new approaches, technology applications, and new outreach methods. Additionally, technical surveys are often designed by either an Evaluation Specialist or the Division of Governmental Studies and Services to assess public attitudes, most recently in partnership with the Washington Association of Sheriffs and Police Chiefs. Needs assessment is an expectation of all WSU Extension faculty members. These processes are deeply engrained in our program development processes. Alternative mechanisms have been developed to garner input from non- English speaking communities, refugee communities, and from other

underserved populations. In these cases, WSU Extension often employs individuals from these communities who understand the cultures and traditions. This improves communication and assessment of need.

The ARC and some parts of Extension work closely with the 22 agricultural commodity commissions in the state to clearly understand the needs of their clientele. Joint work with these commissions often involves collaborative project design and follow-up presentation of results. In addition, the leadership of CAHNRS and WSU Extension sit on several statewide boards and numerous statewide committees and councils. These venues provide opportunities for soliciting and receiving input from numerous segments of society including tribes, state and federal agencies, the private sector, and the general public.

2(B). A brief statement of the process that was used by the recipient institution to identify individuals and groups who are stakeholders and to collect input from them

1. Methods for collecting Stakeholder Input

- Meeting with traditional Stakeholder groups
- Survey of traditional Stakeholder groups
- Meeting with traditional Stakeholder individuals
- Survey of traditional Stakeholder individuals
- Meeting with the general public (open meeting advertised to all)
- Survey of the general public
- Meeting specifically with non-traditional groups
- Survey specifically with non-traditional groups
- Meeting specifically with non-traditional individuals
- Survey specifically with non-traditional individuals
- Meeting with invited selected individuals from the general public
- Survey of selected individuals from the general public

Brief explanation.

Annual assessments of general population characteristics, agricultural trends, natural resource-related issues, human health trends, and business dynamics are carried out as needed and are largely based on analysis of data collected by agencies external to the University, such as the US Census Bureau, National Agriculture Statistics Service, Washington Department of Natural Resources, Washington Department of Health, Washington Department of Agriculture, and the Washington Department of Commerce. To meet specific needs, these are supplemented in some cases by focused internal or stakeholder commissioned studies. These data help WSU faculty and staff and the commissioning stakeholders identify target audiences and define specific needs. We then develop appropriate research and outreach to address these needs. Stakeholder input from groups and individuals identified by these means is collected through a variety of processes that include meetings with individuals and groups, surveys, and other forums. Information from these activities is summarized and shared broadly. Additionally, key WSU personnel are invited to participate in these venues to receive input directly on both on-going and planned research and outreach.

3. A statement of how the input will be considered

- In the Budget Process
- To Identify Emerging Issues
- Redirect Extension Programs
- Redirect Research Programs
- In the Staff Hiring Process
- In the Action Plans
- To Set Priorities

Brief explanation.

Input is generally solicited in processes involving application of resources, including developing priorities for research and outreach, project design, and program delivery. Additionally, input from stakeholders strengthens our ability to assess need and demand, and to identify potential partners, identify emerging issues, and to evaluate the effectiveness of our research and extension programs in addressing these issues and needs as we move forward with Research and Extension activities, initiatives and programs.

Brief Explanation of what you learned from your Stakeholders

We learned that the highest priority for agricultural stakeholders was to support innovative research and extension outreach that addresses important production issues that are critical to their profitability and sustainability. This was especially true concerning efforts enabling stakeholders to adjust to new pests, diseases, and other changing production and market conditions. Other stakeholders prioritized natural resources concerns related to water quality, water quantity, forest health, rangeland health, and stewardship. Local food systems and the desire for community connections with our food supply was another recurring theme, as was the desire to have us investigate new methods and practices for organic food production. Concerns over human health and diet, along with the growing incidence of obesity in our population were clearly stated as priorities and there was a desire to implement educational outreach to change behaviors. Consumer food safety education, positive youth development, and outreach to sustain rural communities were among several other stakeholder-defined issues that are being addressed by our current work. Emerging issues this year include Trust in Government and the opioid crisis, as well.

IV. Expenditure Summary

1. Total Actual Formula dollars Allocated (prepopulated from C-REEMS)			
Extension		Research	
Smith-Lever 3b & 3c	1890 Extension	Hatch	Evans-Allen
{No Data Entered}	{No Data Entered}	{No Data Entered}	{No Data Entered}

Institution Name: Washington State University

2. Totaled Actual dollars from Planned Programs Inputs				
	Extension		Research	
	Smith-Lever 3b & 3c	1890 Extension	Hatch	Evans-Allen
Actual Formula	4144162	0	4912010	0
Actual Matching	4144162	0	4912010	0
Actual All Other	47527296	0	52391159	0
Total Actual Expended	55815620	0	62215179	0

3. Amount of Above Actual Formula Dollars Expended which comes from Carryover funds from previous				
Carryover	0	0	0	0

V. Planned Program Table of Content

V(A). Planned Program (Summary)

Program # 1

1. Name of the Planned Program

Natural Resources Stewardship

☑ 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
111	Conservation and Efficient Use of Water	10%		5%	
112	Watershed Protection and Management	10%		10%	
121	Management of Range Resources	10%		5%	
122	Management and Control of Forest and Range Fires	9%		5%	
123	Management and Sustainability of Forest Resources	10%		10%	
124	Urban Forestry	4%		4%	
125	Agroforestry	3%		10%	
133	Pollution Prevention and Mitigation	5%		0%	
135	Aquatic and Terrestrial Wildlife	5%		25%	
136	Conservation of Biological Diversity	10%		6%	
213	Weeds Affecting Plants	5%		5%	
214	Vertebrates, Mollusks, and Other Pests Affecting Plants	2%		2%	
215	Biological Control of Pests Affecting Plants	5%		0%	
302	Nutrient Utilization in Animals	0%		3%	
403	Waste Disposal, Recycling, and Reuse	5%		5%	
605	Natural Resource and Environmental Economics	3%		5%	
610	Domestic Policy Analysis	4%		0%	
	Total	100%		100%	

V(C). Planned Program (Inputs)

1. Actual amount of FTE/SYs expended this Program

Year: 2017	Extension		Research	
	1862	1890	1862	1890
Plan	79.0	0.0	25.0	0.0
Actual Paid	0.0	0.0	0.0	0.0

Actual Volunteer	0.0	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**
843218	0	455243	0
1862 Matching	**1890 Matching**	**1862 Matching**	**1890 Matching**
843218	0	455243	0
1862 All Other	**1890 All Other**	**1862 All Other**	**1890 All Other**
7455735	0	3486416	0

V(D). Planned Program (Activity)

1. Brief description of the Activity

WSU scientists will conduct research leading to a better understanding of the interaction between human development and terrestrial, aquatic, and atmospheric conditions; genetically improve poplar, alder and black cottonwood species to more effectively sequester carbon, manage and mitigate urban storm water runoff, restore riparian areas, and provide wood and fuel using sustainable production practices; develop innovative mechanisms for revegetating mining sites, watersheds, and native prairies; and understand habitat requirements of key and endemic species. Extension educators will work with researchers and local communities to develop customized, science-based solutions to local problems and to educate target audiences about new tools to more effectively manage natural resources. This education will in turn lead to behavior change and ultimately to an improved condition of the natural resource base in Washington State.

2. Brief description of the target audience

The target audiences include landowners and managers; state, federal, and local natural resource agency personnel; K-12 educators, local and state governments; and the general public, including the scientific disciplines that relate to these issues.

3. How was eXtension used?

eXtension was not used in this program

V(E). Planned Program (Outputs)

1. Standard output measures

2017	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Actual	146479	22920	0	0

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

Patent Applications Submitted

Year: 2017

Actual: 0

Patents listed

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

2017	Extension	Research	Total
Actual	43	15	0

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

- Number of extension workshops, demonstrations, field days, and conferences that focus on stewardship of natural resources and environmental protection.

Year	Actual
2017	11270

Output #2

Output Measure

- Number of peer-reviewed (official) WSU Extension publications produced on natural resource stewardship topics.

Year	Actual
2017	43

Output #3

Output Measure

- Number of graduate students with a significant professional orientation in the area of Natural Resources stewardship.

Year	Actual
2017	32

Output #4

Output Measure

- The number of WSU Master Gardeners trained during the year to address environmental concerns and natural resource stewardship.

Year	Actual
2017	494

Output #5

Output Measure

- The number of individuals trained in the safe and proper use of pesticides.

Year	Actual
2017	5991

V(G). State Defined Outcomes

V. State Defined Outcomes Table of Content

O. No.	OUTCOME NAME
1	Percentage of program participants who enhanced their knowledge of natural resource management, environmental protection, water quality, and efficient water use
2	Percentage of participants evaluated who applied their newly acquired information to conserve and use water more efficiently.
3	Number of acres of rangelands and forests receiving application of sustainable management practices as a result of WSU programs or program partnerships.
4	Percentage of pesticide training participants who applied the training received in pesticide safety and proper use.
5	Percentage of participants who applied recommended practices and strategies to protect water quality.

Outcome #1

1. Outcome Measures

Percentage of program participants who enhanced their knowledge of natural resource management, environmental protection, water quality, and efficient water use

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2017	90

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Washington?s rivers, lakes and groundwater sources provide water for agricultural, residential and recreational use in addition to providing wildlife habitat. Puget Sound has been rated as unhealthy. Multiple species of salmon are listed as endangered. Runoff from roads, parking lots and rooftops contribute to the decline in water quality in streams, lakes, Puget Sound, and potentially aquifers. Improper pesticide and fertilizer applications; inefficient irrigation systems and water use; and the selection of poorly adapted plants to local climates are major issues. Conversion of private forestlands for urban development continued with little regard for wildlife, water quality and climate change.

What has been done
Water quality education, including proper pesticide use, proper fertilizer use, and integrated pest management are core components of the Master Gardener program. Newer volunteer-based programs, included Rain Gardener Mentors, Stream Stewards, Native Plant Advisors, and Extension Livestock Advisors, taught residents how to improve water quality through workshops focused on changing their behaviors to improve water quality, install rain gardens, and maintain a buffer in riparian areas. The Shore Stewards program teaches shoreline landowners about best management practices to maintain or improve water quality. Workshops were held to assist landowners on rain garden installation, fencing to improve grazing management and livestock exclusion, integrated pest management to reduce the use of pesticides, and proper fertilizer applications to reduce nutrient contamination in water. Low impact development certification workshops were held to present the newest methods of green infrastructure to planners, engineers, and agency personnel.

Results

Volunteers, home gardeners, ranchers, crop producers and agency personnel gained a greater understanding of natural resources, stewardship of resources, and water quality protection and improvement. Green infrastructure research and outreach developed new approaches to green infrastructure and new stormwater standards for the state. Ranchers are able to use economic, workable solutions to maintain water quality that improves habitat for fish. Removal of culverts and diversion dams continued to open more spawning areas for fish.

4. Associated Knowledge Areas

KA Code	Knowledge Area
111	Conservation and Efficient Use of Water
112	Watershed Protection and Management
121	Management of Range Resources
122	Management and Control of Forest and Range Fires
123	Management and Sustainability of Forest Resources
124	Urban Forestry
125	Agroforestry
133	Pollution Prevention and Mitigation
135	Aquatic and Terrestrial Wildlife
136	Conservation of Biological Diversity
213	Weeds Affecting Plants
214	Vertebrates, Mollusks, and Other Pests Affecting Plants
215	Biological Control of Pests Affecting Plants
302	Nutrient Utilization in Animals
403	Waste Disposal, Recycling, and Reuse
605	Natural Resource and Environmental Economics
610	Domestic Policy Analysis

Outcome #2

1. Outcome Measures

Percentage of participants evaluated who applied their newly acquired information to conserve and use water more efficiently.

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2017	84

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
The demand for water increases as the population and industry expands. Changing weather patterns, increased drought, and modified stream flows to accommodate migrating fish have compounded this problem. To provide adequate water for lawns, gardens, agriculture and natural resource uses, residents must learn about and implement water saving strategies.

What has been done
Fields days, workshops, demonstration gardens, applied research, fact sheets and web sites were used to teach and demonstrate water conservation methods. Master Gardeners in the Puget Sound region were trained as Rain Garden mentors. These educational opportunities demonstrated water conserving garden practices to reduce the demand for water. Rain Garden mentors and demonstration sites demonstrated proper stormwater handling, rain barrel collection, and use of gray water in landscapes.

Results
3,405 Master Gardeners taught 36,020 residents, groundskeepers, and landscape maintenance personnel how to conserve water and protect water quality. 98% of program participants learned new information about water use and management. Selective follow-up evaluations showed that 78% of program participants used: one or more water conserving methods; highly efficient irrigation methods, especially drip hoses; adjusted watering times to reduce evapotranspiration; or rain gardens.

4. Associated Knowledge Areas

KA Code	Knowledge Area
111	Conservation and Efficient Use of Water
112	Watershed Protection and Management
133	Pollution Prevention and Mitigation

Outcome #3

1. Outcome Measures

Number of acres of rangelands and forests receiving application of sustainable management practices as a result of WSU programs or program partnerships.

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Actual
2017	142000

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Washington has 215,000 people that control 5.8 million acres of forestland, making this the largest rural land use group in the state. The majority of landowners lack the knowledge and skill to properly manage their forest nor do they have a written management plan to provide the biological and physical information necessary to make sound decisions to execute best management practices. Much of this land is at risk due to land-use conversion, landscape fragmentation, poor health, degraded habitat, invasive species, and wildfire.

What has been done
Outreach events, Forest Stewardship workshops and field days were hosted. Five social media sites and three comprehensive websites were maintained. Forestry specialists collaborated with personnel from other natural resource agencies to address the recovery from record wildfires in Eastern Washington in previous years. Public meetings were held to help landowners and communities understand how to protect the land from soil erosion and at the same time improving landowner knowledge regarding the products and services that could assist them in land restoration and prepare for future wildfires.

Results
Evaluations showed that 91% of program participants have implemented at least two new management practices. In terms of fire risk reduction cost savings alone, this translates to a minimum of $51 million saved by public and private entities, were this land to burn in a wildfire. Forestry faculty were instrumental in helping landowners recover from wildfire, including determining salvageable timber, selecting a knowledgeable consulting forester, selecting a proper grass seeding mix, and determining when to plant. Plans were coordinated with other agencies on management of noxious weeds.

4. Associated Knowledge Areas

KA Code	Knowledge Area
111	Conservation and Efficient Use of Water
112	Watershed Protection and Management
121	Management of Range Resources
122	Management and Control of Forest and Range Fires

123	Management and Sustainability of Forest Resources
124	Urban Forestry
125	Agroforestry
133	Pollution Prevention and Mitigation
135	Aquatic and Terrestrial Wildlife
136	Conservation of Biological Diversity
213	Weeds Affecting Plants
214	Vertebrates, Mollusks, and Other Pests Affecting Plants
215	Biological Control of Pests Affecting Plants
302	Nutrient Utilization in Animals
605	Natural Resource and Environmental Economics
610	Domestic Policy Analysis

Outcome #4

1. Outcome Measures

Percentage of pesticide training participants who applied the training received in pesticide safety and proper use.

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2017	95

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Pesticide use in commercial agriculture, the home garden and around the home is controversial. Improper pesticide use can result in crop and ornamental plant damage, illegal pesticide residues, contamination of water, human and animal poisonings, and unintentional death to pollinators. The spread of invasive species, including Asian Gypsy Moth, Spotted Wing Drosophila and Brown Marmorated Stink Bug, have resulted in increased monitoring of insects, outreach, and strategies for control. Although neonicotinoid insecticides have been very effective in the control of a wide range of insects, controversy remains on their direct effects on honeybee health.

What has been done
Safe pesticide use, integrated pest management concepts, and biological weed control have

been Incorporated into core Master Gardener training. Major revisions to PestSense: (http://pestsense.cahnrs.wsu.edu/Home/PestsenseHome.aspx) and HortSense (http://hortsense.cahnrs.wsu.edu/Home/HortsenseHome.aspxprograms) websites continues. Pesticide pre-training and pesticide recertification classes; online pesticide recertification modules; classes on the safe use of pesticides in demonstration gardens all were conducted in

Results
Participants in the pre-license pesticide training have a 99% test passing rate on their pesticide applicator exams. Over 98% of participants in the pesticide recertification training obtained new knowledge and applied this information to their job, business, or consulting practice. Gardeners reported the implementation of simple practices as a way of controlling weeds or insects, including; over 65% used mulches to reduce weed germination; 86% pulled weeds instead of using an herbicide; 92% reported using at least one integrated pest management technique instead of using a pesticide.

4. Associated Knowledge Areas

KA Code	Knowledge Area
112	Watershed Protection and Management
133	Pollution Prevention and Mitigation
135	Aquatic and Terrestrial Wildlife
213	Weeds Affecting Plants
214	Vertebrates, Mollusks, and Other Pests Affecting Plants
215	Biological Control of Pests Affecting Plants

Outcome #5

1. Outcome Measures

Percentage of participants who applied recommended practices and strategies to protect water quality.

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2017	94

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Rivers, lakes and groundwater sources provide water for agricultural, residential and recreational uses and wildlife habitat. Safe, reliable sources of water must be maintained to meet the needs of our growing population. Water-conserving garden practices, such as mulching, efficient irrigation, planting drought tolerant plants and xeriscaping are the most cost effective and environmentally sound ways to reduce the demand for our limited water supplies. Stormwater has been linked to pollution of drinking water supplies and declining health of fish and has been identified as the number one cause of pollution in the Puget Sound region.

What has been done
New Master Gardener training; Rain Garden Mentor training; Stream Steward training; Beach Watcher training; Master Gardener continuing education classes; e-newsletters; websites; demonstration gardens; plant clinics; online forums; webinars; fact sheets; online modules; Rain Garden installation clinics; Natural Yard Care workshops; sustainable gardening workshops; integrated pest management workshops; and livestock riparian grazing research and workshops.

Results
Master Gardener trainees passed core competencies tests on integrated pest management, safe pesticide use, and efficient water use in the home garden. Rain Garden Mentors were trained and extended outreach to homeowners. They collaborated with research and extension specialists to rebuild demonstration rain gardens. Urban gardening best management practices to protect water quality include reducing the use of pesticides and fertilizers, composting, mulching and using groundcovers to reduce erosion, grass cycling and planting rain gardens.

4. Associated Knowledge Areas

KA Code	Knowledge Area
112	Watershed Protection and Management
133	Pollution Prevention and Mitigation
403	Waste Disposal, Recycling, and Reuse

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
- Populations changes (immigration, new cultural groupings, etc.)

Brief Explanation

Economic - Home gardening remains popular for economic reasons. Families are interested in growing their own fresh fruits and vegetables with the satisfaction that they know where they came from and how they were raised; and increased interest in obesity reduction initiatives. Federal, state and local budget reductions have slowed hiring following retirements and resignations, resulting in coverage gaps in critical areas of the state.

Government regulations - New rules restrict the use of conventional fertilizers and pesticides in urban and riparian areas. Alternatives are recommended to improve water quality. More emphasis has been placed on stormwater management, including keeping stormwater from entering rivers and Puget Sound; retaining rainfall on the property to replenish groundwater; and pervious pavements. Natural disasters - Time was redirected to address post-wildfire areas in Eastern Washington, including timber salvage, soil erosion prevention, grass planting, and tree planting. This effort will continue as landowners rebuild buildings, fences, and livestock herds.

V(I). Planned Program (Evaluation Studies)

Evaluation Results

Program participants have an increased awareness, knowledge, and application of knowledge to manage their yards, forestlands and ranches. The target audiences are utilizing multiple methods for pest control and better choices are being made regarding alternative options. Home gardeners are using more efficient irrigation methods and are using less water. Forest owners implemented practices to improve forest health, reduce wildfire potential, and secure the future of their forest for future generations.

Key Items of Evaluation

The planned programs focused on protection and good stewardship of natural resources. Our assessments indicated that over 95% of program participants increased their knowledge relative to the program initiatives. The aggregate outcomes showed more productive forestlands, safer pesticide use, and conservation and protection of our water resources.

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	2%		8%	
104	Protect Soil from Harmful Effects of Natural Elements	5%		3%	
111	Conservation and Efficient Use of Water	8%		7%	
112	Watershed Protection and Management	5%		3%	
121	Management of Range Resources	2%		3%	
201	Plant Genome, Genetics, and Genetic Mechanisms	0%		12%	
202	Plant Genetic Resources	6%		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	12%		8%	
212	Pathogens and Nematodes Affecting Plants	6%		9%	
213	Weeds Affecting Plants	10%		3%	
215	Biological Control of Pests Affecting Plants	8%		5%	
216	Integrated Pest Management Systems	10%		4%	
301	Reproductive Performance of Animals	2%		3%	
302	Nutrient Utilization in Animals	2%		3%	
303	Genetic Improvement of Animals	3%		2%	
304	Animal Genome	0%		2%	
307	Animal Management Systems	8%		2%	
604	Marketing and Distribution Practices	6%		0%	
	Total	100%		100%	

V(C). Planned Program (Inputs)

1. Actual amount of FTE/SYs expended this Program

Year: 2017	Extension		Research	
	1862	1890	1862	1890
Plan	150.0	0.0	290.0	0.0
Actual Paid	0.0	0.0	0.0	0.0
Actual Volunteer	0.0	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**
1286798	0	3424177	0
1862 Matching	**1890 Matching**	**1862 Matching**	**1890 Matching**
1286798	0	3424177	0
1862 All Other	**1890 All Other**	**1862 All Other**	**1890 All Other**
10691858	0	38470954	0

V(D). Planned Program (Activity)

1. Brief description of the Activity

Discovery, 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 Washington 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

2017	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Actual	23952	41908	0	0

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

Patent Applications Submitted

Year: 2017

Actual: 0

Patents listed

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

2017	Extension	Research	Total
Actual	128	235	0

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
2017	448

Output #2

Output Measure

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

Year	Actual
2017	128

Output #3

Output Measure

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

Year	Actual
2017	60

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.

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
2017	87

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, such as mobile app development, to disseminate research- based knowledge and other relevant information to targeted, diverse audiences. This year WSU stood up a new "Food Systems Initiative."

Results
Program participants increased their knowledge and skill through participation in one or more of over 1,600 educational events focused on enhancing agricultural productivity and food security for the benefit of producers and consumers alike. Participants represented diverse agricultural enterprises, including very large commercial operations, midsize family farms, small farms, and community supported agriculture. Program participants also represented the diverse range of Washington State stakeholders.

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	Pathogens 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
2017	73

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, such as mobile apps, to disseminate research-based knowledge and other relevant information to targeted audiences.

Results
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	Pathogens 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
2017	6543500

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 almost 7 million acres of the 15 million acres of agricultural land in the state. Our new Food Systems Initiative will bring a new, more coherent approach to food, from production to consumption.

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	Pathogens 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
2017	6500000

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 almost 7 million food production animals, thought 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
111	Conservation and Efficient Use of Water
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
2017	2010

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. Food safety is increasingly an issue of public concern.

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
Just 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

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 dryland 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

Our scientists were the top awardees of USDA research and development funding 2016. WSU is 26th in the nation for capacity funds awarded. Our ability to successfully leverage our research funds to aid in the fundamental discovery and applied research in agriculture. This planned program focused on increasing agricultural productivity, food processing efficiency, and food distribution as a means of enhancing food security though a sustainable system. Our assessments indicated that 87.5% of program participants increased their knowledge relative to the knowledge areas covered, and 72.7% indicated application of one or more principles or practices learned from their participation. The aggregate outcomes of this work impacted close to 7 million acres for farm land, and almost 7 million food animals. This work also supported enhancements to over 2,000 enterprises associated with food processing, direct marketing, and food distribution.

V(A). Planned Program (Summary)

Program # 3

1. Name of the Planned Program

Sustainable Energy

☑ 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	0%		5%	
123	Management and Sustainability of Forest Resources	20%		5%	
131	Alternative Uses of Land	10%		5%	
133	Pollution Prevention and Mitigation	10%		2%	
141	Air Resource Protection and Management	5%		3%	
201	Plant Genome, Genetics, and Genetic Mechanisms	0%		5%	
203	Plant Biological Efficiency and Abiotic Stresses Affecting Plants	0%		15%	
204	Plant Product Quality and Utility (Preharvest)	0%		15%	
205	Plant Management Systems	0%		5%	
206	Basic Plant Biology	0%		5%	
211	Insects, Mites, and Other Arthropods Affecting Plants	0%		5%	
402	Engineering Systems and Equipment	25%		5%	
403	Waste Disposal, Recycling, and Reuse	15%		10%	
511	New and Improved Non-Food Products and Processes	0%		5%	
601	Economics of Agricultural Production and Farm Management	0%		5%	
603	Market Economics	10%		2%	
605	Natural Resource and Environmental Economics	5%		3%	
	Total	100%		100%	

V(C). Planned Program (Inputs)

1. Actual amount of FTE/SYs expended this Program

Year: 2017	Extension		Research	
	1862	1890	1862	1890

Plan	48.0	0.0	45.0	0.0
Actual Paid	0.0	0.0	0.0	0.0
Actual Volunteer	0.0	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**
182822	0	314582	0
1862 Matching	**1890 Matching**	**1862 Matching**	**1890 Matching**
182822	0	314582	0
1862 All Other	**1890 All Other**	**1862 All Other**	**1890 All Other**
8695326	0	3326186	0

V(D). Planned Program (Activity)

1. Brief description of the Activity

Research ucted on energy-related yield and production and processing efficiency of using agricultural and woody biomass, algae and oil seeds is conducted at WSU. Economic analyses of these diverse energy systems is conducted to assess thresholds for local and regional application of these technologies. Extension programs have been developed to teach and demonstrate alternative energy systems such as anaerobic digestion, biomass production, oil seed production, increasing energy efficiency, and utilization of wind and solar energy systems. WSU partners with the Washington Dairy industry and the Washington State Department of Agriculture on many of these projects.

2. Brief description of the target audience

The target audiences includes farmers, business owners, homeowners, industry technology providers, project developers, and public agencies and utilities.

3. How was eXtension used?

eXtension was not used in this program

V(E). Planned Program (Outputs)

1. Standard output measures

2017	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Actual	4190	6700	60	0

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

Patent Applications Submitted

Year:	2017
Actual:	0

Patents listed

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

2017	Extension	Research	Total
Actual	3	85	0

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

- Number of workshops, demonstrations, and symposia conducted related to alternative energy and energy efficiency.

Year	Actual
2017	15

Output #2

Output Measure

- Number of peer reviewed (official) WSU Extension publications related to sustainable energy that are published annually.

Year	Actual
2017	3

Output #3

Output Measure

- Number of graduate students with a significant professional orientation in the area of Sustainable Energy.

Year	Actual
2017	30

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 biofuels, energy efficiency, and alternative energy sources.
2	The number of farmers that applied information provided by this program to produce biofuel crops.
3	The number of forest and woodland owners who applied information from this program in the production of wood for biofuels.
4	The acres of forestland and cropland impacted by our programs to advance the production of biofuel feedstocks.

Outcome #1

1. Outcome Measures

Percentage of evaluated participants who demonstrated increased knowledge and skills relative to biofuels, energy efficiency, and alternative energy sources.

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2017	94

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Regional systems for renewable, biomass-based, liquid transportation fuels (i.e. gasoline, diesel, and jet fuel) are needed to support energy independence, reduce net carbon emissions, stabilize fuel prices for consumers, provide new economic opportunities for landowners, and bring jobs and economic development to rural communities. Renewable bio-based chemicals are a stepping stone to biofuels and can provide similar benefits to communities.

What has been done
To raise awareness of biofuels, increase bioenergy literacy, and prepare regional stakeholders for a developing biofuel industry, numerous field tours were held at demonstration sites, workshops, symposia, and exhibits throughout the four-state region of Washington, Oregon, Idaho, and California. In addition, presentations were made at both national and international meetings, along with a website; video segments; newsletters; and social media engagements.

Results
Based on past event evaluations, an average of 96% of surveyed participants reported a better understanding of hardwood biofuels. In addition, 98% of survey participants reported that they were moderately, or highly likely, to communicate to others what they learned. Similarly, 94% of symposia participants reported being moderately, or highly likely, to share with others knowledge from the event.

4. Associated Knowledge Areas

KA Code	Knowledge Area
123	Management and Sustainability of Forest Resources

131	Alternative Uses of Land
133	Pollution Prevention and Mitigation
141	Air Resource Protection and Management
402	Engineering Systems and Equipment
403	Waste Disposal, Recycling, and Reuse
603	Market Economics
605	Natural Resource and Environmental Economics

Outcome #2

1. Outcome Measures

The number of farmers that applied information provided by this program to produce biofuel crops.

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2017	10

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Regional systems for renewable, biomass-based, liquid transportation fuels are needed to support energy independence, reduce net carbon emissions, stabilize fuel prices for consumers, provide new economic opportunities for landowners, and create jobs and economic development to rural communities. Hybrid poplar is one species that may suit this need. In order for this system to be successful, stakeholders need to be well informed about the project, understand the opportunities and constraints, and receive technical assistance based on up-to-date research results.

What has been done
To raise awareness of the project, numerous field tours at plantation demonstration sites, workshops, symposia, and exhibits throughout the four-state region of Washington, Oregon, Idaho, and California. In addition, presentations were made at national, regional, state and local meetings. A Hardwood Biofuels Webinar Series was developed to share information to local, regional, and national audiences

Results
In post-event evaluations, an average of 95% of surveyed field tour participants reported a better understanding of hardwood biofuels, but no farms have applied the information at this stage.

4. Associated Knowledge Areas

KA Code	Knowledge Area
102	Soil, Plant, Water, Nutrient Relationships
123	Management and Sustainability of Forest Resources
131	Alternative Uses of Land
133	Pollution Prevention and Mitigation
141	Air Resource Protection and Management
201	Plant Genome, Genetics, and Genetic Mechanisms
203	Plant Biological Efficiency and Abiotic Stresses Affecting Plants
204	Plant Product Quality and Utility (Preharvest)
205	Plant Management Systems
206	Basic Plant Biology
402	Engineering Systems and Equipment
403	Waste Disposal, Recycling, and Reuse
601	Economics of Agricultural Production and Farm Management
603	Market Economics
605	Natural Resource and Environmental Economics

Outcome #3

1. Outcome Measures

The number of forest and woodland owners who applied information from this program in the production of wood for biofuels.

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2017	75

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
The legacy of the NARA project continues, with focus on overcoming key obstacles that prevent wood-based jet fuel and petrochemical substitutes from being economically viable. The goal of increasing efficiency in everything from forestry operations to conversion processes includes a broad alliance of private industry and educational institutions from throughout the Northwest.

What has been done
Research, extension and industry members worked as partners and facilitators with the ultimate goal of empowering the stakeholders to plan and implement the changes needed to build, develop, and sustain a bio-refinery infrastructure. The goal of the outreach is to promote stakeholder bioenergy literacy and build regional supply chain coalitions for development of a framework of biofuel and co-products production from woody biomass. End outcomes of this goal are sustainable production of bio-jet fuel and co-products and rural economic development

Results
Washington Clean Energy stakeholders have now formed a Forest Biomass Coordination Group (led by Peter Moulton of the WA Department of Commerce) and are coordinating with a similar group in Oregon.

4. Associated Knowledge Areas

KA Code	Knowledge Area
102	Soil, Plant, Water, Nutrient Relationships
123	Management and Sustainability of Forest Resources
131	Alternative Uses of Land
204	Plant Product Quality and Utility (Preharvest)
205	Plant Management Systems
402	Engineering Systems and Equipment
511	New and Improved Non-Food Products and Processes
603	Market Economics
605	Natural Resource and Environmental Economics

Outcome #4

1. Outcome Measures

The acres of forestland and cropland impacted by our programs to advance the production of biofuel feedstocks.

Not Reporting on this Outcome Measure

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
- Populations changes (immigration, new cultural groupings, etc.)

Brief Explanation

The relatively low fuel prices since 2014 and the high cost of manufacturing of biofuels has currently made biofuels not economical to produce. Plans for a partial capacity biofuels refinery in Northeast Oregon has been put on hold until biofuels can compete on the market and additional investors can be found. Competing priorities, reduced staffing, reduced budgets and completion of grant projects have reduced the time that Extension personnel can dedicate to energy audits and improving the energy efficiency of homes and commercial buildings.

V(I). Planned Program (Evaluation Studies)

Evaluation Results

Overall, program participants have a greater awareness, increased knowledge, and understanding of biofuel crop production but realize that it is not economical at this time.

Key Items of Evaluation

Post-event evaluations of Extension personnel, farmers, agency personnel and private business were used to determine knowledge gain. End of meeting forms are used for workshops, conferences and field day events. Major, regional field days are evaluated through personal interview or follow-up online surveys.

V(A). Planned Program (Summary)

Program # 4

1. Name of the Planned Program

Climate Change

☑ 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	0%		5%	
111	Conservation and Efficient Use of Water	5%		5%	
112	Watershed Protection and Management	5%		5%	
122	Management and Control of Forest and Range Fires	5%		5%	
123	Management and Sustainability of Forest Resources	0%		5%	
132	Weather and Climate	5%		5%	
133	Pollution Prevention and Mitigation	5%		5%	
201	Plant Genome, Genetics, and Genetic Mechanisms	0%		10%	
202	Plant Genetic Resources	5%		5%	
203	Plant Biological Efficiency and Abiotic Stresses Affecting Plants	10%		10%	
205	Plant Management Systems	10%		5%	
211	Insects, Mites, and Other Arthropods Affecting Plants	10%		10%	
212	Pathogens and Nematodes Affecting Plants	10%		10%	
213	Weeds Affecting Plants	5%		3%	
216	Integrated Pest Management Systems	10%		5%	
404	Instrumentation and Control Systems	5%		2%	
605	Natural Resource and Environmental Economics	5%		5%	
610	Domestic Policy Analysis	5%		0%	
	Total	100%		100%	

V(C). Planned Program (Inputs)

1. Actual amount of FTE/SYs expended this Program

Year: 2017	Extension		Research	
	1862	1890	1862	1890
Plan	20.0	0.0	65.0	0.0
Actual Paid	0.0	0.0	0.0	0.0
Actual Volunteer	0.0	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**
266148	0	553562	0
1862 Matching	**1890 Matching**	**1862 Matching**	**1890 Matching**
266148	0	553562	0
1862 All Other	**1890 All Other**	**1862 All Other**	**1890 All Other**
3557111	0	6143907	0

V(D). Planned Program (Activity)

1. Brief description of the Activity

Research and outreach is conducted to facilitate conversion of agricultural, forestry, and industrial waste streams into clean energy and stable construction grade materials. This includes development of new products and transfer of associated technology to the private sector. Delivery of information to the general public is a high priority.

Our plant breeding and molecular biology programs continue to develop new crop varieties that are able to withstand emerging disease and pest threats associated with climate change. Our integrated pest management programs develop new techniques to mitigate the effects of introduced pests and range expansions of pests already in the region such as the spotted wing Drosophila and the Brown Marmorated Stink Bug. Our scientists investigate the possibilities that climatic conditions present opportunities for growing new crops or growing traditional crops in new ways or in new areas.

WSU scientists and extension specialists assess climate change related policies and develop research and outreach programs to position Washington's agriculture and forestry industries effectively to increase sequestration of carbon and to benefit from future carbon trading protocols or other greenhouse gas mitigation policy mechanisms.

2. Brief description of the target audience

Owners and managers of crop and range lands, forest resources, and wood products industries; community leaders; and public agencies and organizations.

3. How was eXtension used?

eXtension was not used in this program

V(E). Planned Program (Outputs)

1. Standard output measures

2017	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Actual	3819	60153	100	30

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

Patent Applications Submitted

Year: 2017

Actual: 0

Patents listed

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

2017	Extension	Research	Total
Actual	55	30	0

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

- Number of workshops and other educational events delivered on mitigation and adaptation to climate change.

Year	Actual
2017	61

Output #2

Output Measure

- Number of peer reviewed (official) WSU Extension publications referencing climate change mitigation and adaptation published per year.

Year	Actual
2017	55

Output #3

Output Measure

- Number of graduate students with a significant professional orientation in the area of Climate Change.

Year	Actual
2017	10

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 key learning objectives on mitigating or adapting to climate change.
2	Percentage of evaluated program participants who applied knowledge or technology gained from WSU on mitigating or adapting to climate change.
3	Number of farms utilizing WSU-developed crop varieties and/or other technologies to adapt to evolving environmental conditions or newly emerging plant pests and diseases.
4	Number of farms employing anaerobic digestion or other methods to reduce GHG emissions or to sequester carbon.

Outcome #1

1. Outcome Measures

Percentage of evaluated participants who demonstrated increased knowledge and skills relative to key learning objectives on mitigating or adapting to climate change.

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2017	75

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
The impacts of climate change on Washington State could be significant, with potential changes in irrigation water availability as well as growing conditions for crops statewide. The impacts of climate change on Washington State could be significant, with potential changes in irrigation water availability and seasonal growing conditions for crops statewide. New plant and animal pests and diseases are likely to emerge over time as well. These and other factors will impact communities, agriculture and natural resource management, navigation, and electrical generation in the state.

What has been done
Program implementation utilized local, regional, and statewide efforts that involved anaerobic digester research; 30 outreach educational programs; print and electronic publications; and other methods to disseminate research-based knowledge and other relevant information to target audiences. A team of researchers also investigated how water resources can be better managed in response to climate change induced scarcity and variability of water supply for agriculture

Results
Program evaluations revealed that an average of 75 % of program participants increased their knowledge and awareness of climate change mitigation and/or adaptation practices. This knowledge included basic understanding of climate change and steps to adapt to future changes and mitigate trends that are predicted.

4. Associated Knowledge Areas

KA Code	Knowledge Area
102	Soil, Plant, Water, Nutrient Relationships
111	Conservation and Efficient Use of Water
112	Watershed Protection and Management
122	Management and Control of Forest and Range Fires
123	Management and Sustainability of Forest Resources
132	Weather and Climate
133	Pollution Prevention and Mitigation
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	Pathogens and Nematodes Affecting Plants
213	Weeds Affecting Plants
216	Integrated Pest Management Systems
404	Instrumentation and Control Systems
610	Domestic Policy Analysis

Outcome #2

1. Outcome Measures

Percentage of evaluated program participants who applied knowledge or technology gained from WSU on mitigating or adapting to climate change.

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2017	40

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

The impacts of climate change on Washington State could be significant, with potential changes in irrigation water availability and seasonal growing conditions for crops statewide. New plant and animal pests and diseases are likely to emerge over time as well. These and other factors will impact communities, agriculture and natural resource management, navigation, and electrical generation in the state.

What has been done
Program implementation utilized local, regional, and statewide efforts that involved anaerobic digester research; outreach educational programs; print and electronic publications; and other methods to disseminate research-based knowledge and other relevant information to target audiences. A team of researchers also investigated how water resources can be better managed in response to climate change induced scarcity and variability of water supply for agriculture

Results
While the metric for knowledge gained increased from the previous year, it is unclear why the application of this knowledge remains low among program participants. This seems to imply that a greater reluctance among program participants to act on the information and recommendations provided, and may be linked to the financial cost of implementation or other considerations.

4. Associated Knowledge Areas

KA Code	Knowledge Area
102	Soil, Plant, Water, Nutrient Relationships
111	Conservation and Efficient Use of Water
112	Watershed Protection and Management
122	Management and Control of Forest and Range Fires
123	Management and Sustainability of Forest Resources
132	Weather and Climate
133	Pollution Prevention and Mitigation
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	Pathogens and Nematodes Affecting Plants
213	Weeds Affecting Plants
216	Integrated Pest Management Systems
404	Instrumentation and Control Systems
610	Domestic Policy Analysis

Outcome #3

1. Outcome Measures

Number of farms utilizing WSU-developed crop varieties and/or other technologies to adapt to evolving environmental conditions or newly emerging plant pests and diseases.

Not Reporting on this Outcome Measure

Outcome #4

1. Outcome Measures

Number of farms employing anaerobic digestion or other methods to reduce GHG emissions or to sequester carbon.

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Actual
2017	70

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Farm and processor waste estimated to be 17 million tons annually can lead to major unproductive releases of fixed carbon as carbon dioxide and methane. By using anaerobic digestion (AD) to recover some of the energy content of this waste, less fossil fuel is needed and the energy associated with waste disposal is reduced. The economics of AD operations in animal production in Washington is best when tipping fees for disposal of other waste products are also available.

What has been done
WSU scientists have conducted extensive research on anaerobic digestion (AD) as a technology to recover methane (energy), stable carbon, and nutrients from organic wastes such as manure, food processing wastes and the organic fraction of municipal solid wastes. We have evaluated the technical and economic performance of commercially available systems, developed improved AD reactors, and commercialized WSU patented nutrient recovery technology.

Results

70+ farms are employing methods to reduce GHG emissions, and 22 commercial farm- based AD projects are now operating in the PNW (WA, OR, ID), processing over 7800 tons of organic waste daily. Four commercial scale nutrient recovery facilities have been installed nationally based on WSU patented technology. Data was collected from survey of project developers and estimates based on existing research.

4. Associated Knowledge Areas

KA Code	Knowledge Area
132	Weather and Climate
133	Pollution Prevention and Mitigation
205	Plant Management Systems
404	Instrumentation and Control Systems
605	Natural Resource and Environmental Economics
610	Domestic Policy Analysis

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
- Populations changes (immigration, new cultural groupings, etc.)

Brief Explanation

There are numerous factors that influence our work on climate change. Although there is some resistance to the idea of man-made climate change, our stakeholders are beginning to value research and outreach in this area as the west continues to experience drought and wild fluctuations in weather patterns. Our Decision Aid systems and AgWeatherNet programs are instrumental in delivering information to our stakeholders in real time on climactic conditions.

V(I). Planned Program (Evaluation Studies)

Evaluation Results

Increased knowledge and adoption of improved agricultural systems that support carbon sequestration is a primary focus of our work in climate change. Self-reported knowledge increase by 75% of program participants and the intent to apply that knowledge by 40 % of participants were the metrics selected to evaluate outcomes achieved through 30 educational events in this planned program. Deployment of anaerobic digesters and other GHG mitigation strategies on 70 farms was another measure of evaluation utilized.

Key Items of Evaluation

Approximately 75% of program participants indicated they acquired increased knowledge and skills relative to key learning objectives of this program. This measure is a calculated average of evaluations across program events where participants reported increased knowledge or skill through their participation.
40 percent of program participants indicated an intention to use or apply one or more principles gained from 30 educational events delivered in this program area.
More than 70 farms employed anaerobic digestion or other methods to reduce GHG emissions or to sequester carbon.

V(A). Planned Program (Summary)

Program # 5

1. Name of the Planned Program

Childhood Obesity

☑ 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
134	Outdoor Recreation	5%		0%	
601	Economics of Agricultural Production and Farm Management	5%		0%	
604	Marketing and Distribution Practices	5%		0%	
607	Consumer Economics	0%		60%	
701	Nutrient Composition of Food	10%		40%	
703	Nutrition Education and Behavior	20%		0%	
704	Nutrition and Hunger in the Population	15%		0%	
724	Healthy Lifestyle	20%		0%	
806	Youth Development	20%		0%	
	Total	100%		100%	

V(C). Planned Program (Inputs)

1. Actual amount of FTE/SYs expended this Program

Year: 2017	Extension		Research	
	1862	1890	1862	1890
Plan	83.0	0.0	2.0	0.0
Actual Paid	0.0	0.0	0.0	0.0
Actual Volunteer	0.0	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**
179920	0	368	0
1862 Matching	**1890 Matching**	**1862 Matching**	**1890 Matching**
179920	0	368	0
1862 All Other	**1890 All Other**	**1862 All Other**	**1890 All Other**
5191676	0	24028	0

V(D). Planned Program (Activity)

1. Brief description of the Activity

Educational programming was delivered to limited resource families through our nutrition education programs, which are funded by SNAP-Ed and EFNEP (Smith-Lever 3-D) programs. Additionally, youth development programs will expand emphasis on physical activity in a number of programs and project areas. Finally, technical assistance was provided to farmers in the urban fringe to help them produce and effectively market produce to urban residents.

2. Brief description of the target audience

Limited-resource families, youth enrolled in 4-H programs, and agricultural producers (generally small producers) operating in the urban fringe.

3. How was eXtension used?

eXtension was not used in this program

V(E). Planned Program (Outputs)

1. Standard output measures

2017	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Actual	45600	68000	135000	250000

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

Patent Applications Submitted

Year: 2017

Actual: 0

Patents listed

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

2017	Extension	Research	Total
Actual	10	5	0

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

- Number of educational programs delivered focused on increasing local food supplies, improving dietary quality, and increasing physical activity.

Year	Actual
2017	9500

Output #2

Output Measure

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

Year	Actual
2017	0

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 key learning objectives.
2	Percentage of participants evaluated who applied acquired knowledge to improve their diet quality, level of physical activity, or production of locally-grown produce.
3	Percentage of participants reporting increased physical activity.
4	Number of communities cooperating with WSU program with farmers' markets and community gardens producing and/or selling locally grown fruits and vegetables.

Outcome #1

1. Outcome Measures

Percentage of evaluated participants who demonstrated increased knowledge and skills relative to key learning objectives.

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2017	90

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Eating a healthy diet in childhood and adolescence is vital for proper growth and development in all areas of health. Changes in our social, physical and economic environment is making it easier for children and adults to consume more calories than they burn, leading to increased obesity rates. Approximately one quarter of the Washington State 10th graders and Washington State adults are overweight or obese.

What has been done
Washington State University Extension's Youth and Family program continued to expand the delivery on the individual level and increase focus on policy, systems and environmental approaches to address childhood obesity. Programs included SNAP Education, Expanded Foods and Nutrition Education Program, a new pilot program on family meals, and programs for minority families focused on healthy eating.

Results
Participants exceeded the national averages for increased consumption of fruits, vegetables and milk and is in line with the dietary guidelines. 95% of the adults now select food choices that more closely align with dietary guideline recommendations. On average, fruit and vegetable intake increased by ½ cup/day. 64% of adults improved their physical activity. 91% adults showed improvement in food management resource practices such as planning meals, having enough food to last the month, comparing prices.

4. Associated Knowledge Areas

KA Code	Knowledge Area

134	Outdoor Recreation
607	Consumer Economics
701	Nutrient Composition of Food
724	Healthy Lifestyle
806	Youth Development

Outcome #2

1. Outcome Measures

Percentage of participants evaluated who applied acquired knowledge to improve their diet quality, level of physical activity, or production of locally-grown produce.

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2017	85

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Childhood obesity is a growing public health problem, and nearly 1 out of 3 U.S. children is either overweight or obese. The obesity epidemic has been created by changes in the physical, social and economic environment. Each day, adults and especially children are consuming more calories than they burn off. Many barriers such as limited access to low-cost nutritious foods, poverty, lack of physical exercise, limited experience with preparing, selecting or eating nutritious foods all compound the obesity issued.

What has been done
WSU Extension has been working collaboratively with WA Dept of Health to extend SNAP-Ed services to more communities and underserved populations.

Results
From the self-reporting checklist, 59% of the Food $ense adult participants reported an increase in the amount of vegetable servings/day and 47% reported their children ate breakfast more often. 45% reported an increase in # of days they participate in physical activity for 30 minutes.

4. Associated Knowledge Areas

KA Code	Knowledge Area
134	Outdoor Recreation
604	Marketing and Distribution Practices
607	Consumer Economics
701	Nutrient Composition of Food
724	Healthy Lifestyle
806	Youth Development

Outcome #3

1. Outcome Measures

Percentage of participants reporting increased physical activity.

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2017	65

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
The issue of childhood obesity is in the forefront of research efforts across disciplines. Attributes of the rural environment make it difficult for children to access, eat healthy foods, walk, or bike to destinations, and participate in physical activity and recreational sport programs. Furthermore, features of rural schools, particularly those in under-resourced communities, are such that students often face long bus commutes, minimal/no provision of health and physical education by certified teachers, and few resources to support health and/or enrich the academic environment.

What has been done
SNAP-Ed educators work with school personnel and community organizations to increase the opportunities for youth to be more physically active.

Results

Community engagement and participant awareness, followed by change in behavior, continue to increase.

4. Associated Knowledge Areas

KA Code	Knowledge Area
134	Outdoor Recreation
703	Nutrition Education and Behavior
724	Healthy Lifestyle
806	Youth Development

Outcome #4

1. Outcome Measures

Number of communities cooperating with WSU program with farmers' markets and community gardens producing and/or selling locally grown fruits and vegetables.

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Actual
2017	330

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
One of the main risk factors for obesity is a poor diet, which could be related to a low consumption of fruits and vegetables. One reason people may not eat many fruits and a vegetable is due to cost. For those who do not have the ability to garden, then buying fresh, locally produced foods can also assure improvements in individual's diets while strengthening the local economy and helping to preserve farms.

What has been done
Our programs continued to expand with the Volunteer Mentors Program. This year additional volunteers were trained to mentor community, youth detention and school garden development. WSU Extension partnered with Public Health, the Farmer's Markets and New Seasons Grocery to increase the amount of dollars spent for locally produced foods, with the goal of improving the access to healthy food while strengthening the local economy and helping to preserve local

farms.

Results
Our programs and participants generated and donated tens of thousands of pounds of produce to food banks and school lunch programs. Participant families continue to report increased consumption of healthy alternatives and of fruits and vegetables.

4. Associated Knowledge Areas

KA Code	Knowledge Area
601	Economics of Agricultural Production and Farm Management
604	Marketing and Distribution Practices
607	Consumer Economics
701	Nutrient Composition of Food
704	Nutrition and Hunger in the Population

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
- Populations changes (immigration, new cultural groupings, etc.)

Brief Explanation

The Snap-Ed program was significantly affected by congressional budget cuts and breaks in funding, and by a significant change in the way the program was administered by the State of Washington in 2016 and 17. This negatively impacted our outputs, relationships with partners relying on our programs and our high quality essential employees who had to find alternative work.
The reason WSU Extension has been able to increase our outreach and delivery in the Childhood Obesity program are is due to the acquisition of numerous competitive grants and contracts. Sustainability of these programs will be challenging especially in our rural communities.

V(I). Planned Program (Evaluation Studies)

Evaluation Results

The Childhood obesity prevention program measures the percentage of participants who demonstrated increased knowledge and skills relative to key learning objectives; percentage of participants who applied acquired knowledge to improve their diet quality, level of physical activity, or production of locally-grown produce; percentage of participants

reporting increased physical activity; and the number of communities cooperating with WSU program with farmers' markets and community gardens producing and/or selling locally grown fruits and vegetables.

Key Items of Evaluation

Our evaluation methodologies were designed to assess the amount of acquired learning, degree of application of learning and the social, environmental and economic value of this application. We used post-program, retrospective and before and after assessments to document changes in knowledge. We used survey methods after an appropriate time lag to assess how much of the new knowledge was actually applied.
For the work with Childhood Obesity and overall health and wellness programs, the Socio-Ecological Model (SEM) provides the overall program and evaluation framework. Educators

address individual's attitudes, beliefs, behaviors and choices in addition the environmental conditions in which our participants live.
Through the vast offering of WSU Extension foods and nutrition programs, Washington school age youth gain life skills in selecting healthy foods and learn to increase physical activity. Behavior changes that youth and their families are implementing will improve their health now and into the future.

V(A). Planned Program (Summary)

Program # 6

1. Name of the Planned Program

Food Safety

☑ 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
307	Animal Management Systems	0%		20%	
315	Animal Welfare/Well-Being and Protection	0%		5%	
504	Home and Commercial Food Service	25%		5%	
711	Ensure Food Products Free of Harmful Chemicals, Including Residues from Agricultural and Other Sources	15%		15%	
712	Protect Food from Contamination by Pathogenic Microorganisms, Parasites, and Naturally Occurring Toxins	25%		45%	
723	Hazards to Human Health and Safety	35%		10%	
	Total	100%		100%	

V(C). Planned Program (Inputs)

1. Actual amount of FTE/SYs expended this Program

Year: 2017	Extension		Research	
	1862	1890	1862	1890
Plan	25.0	0.0	13.0	0.0
Actual Paid	0.0	0.0	0.0	0.0
Actual Volunteer	0.0	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**
212670	0	156098	0
1862 Matching	**1890 Matching**	**1862 Matching**	**1890 Matching**
212670	0	156098	0
1862 All Other	**1890 All Other**	**1862 All Other**	**1890 All Other**
2177695	0	791720	0

V(D). Planned Program (Activity)

1. Brief description of the Activity

Research into epidemiology of foodborne diseases, especially in animal herds, and in mechanisms whereby pathogenic organisms reach the consumer. Conferences, workshops, and onsite visits are conducted. In some counties, volunteers are trained to engage with the general public to provide training on home food preparation and preservation. Publications and websites are maintained as outreach instruments to the food industry and to consumers. A major continuing effort involves the transfer of microwave sterilization technology, which has achieved FDA approval at two levels, into commercial applications.

2. Brief description of the target audience

Food processors, food purveyors, food producers 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

2017	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Actual	42000	100000	180000	360000

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

Patent Applications Submitted

Year:	2017
Actual:	0

Patents listed

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

2017	Extension	Research	Total
Actual	5	90	0

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

- Number of conferences, workshops or other training sessions conducted by WSU Extension educators related to food safety.

Year	Actual
2017	475

Output #2

Output Measure

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

Year	Actual
2017	5

Output #3

Output Measure

- Number of graduate students with a significant professional orientation in the area of Food Safety.

Year	Actual
2017	30

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 key learning objectives.
2	Percentage of evaluated participants who applied at least one practice learned from WSU Extension workshops, conferences, or training sessions.
3	Percentage of participants who will institute a HACCP or GAP plan as a result of attending WSU workshops.

Outcome #1

1. Outcome Measures

Percentage of evaluated participants who demonstrated increased knowledge and skills relative to key learning objectives.

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2017	90

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Knowledge of the current food safety standards is critical to maintain the safety of the food supply. Of special concern are individuals who process food at home, whether by canning, freezing or drying. Processing foods at home is completely unregulated. Research on home food preservation practices finds consumers continue to engage in practices that put them at risk.

What has been done
WSU Extension Statewide Food Safety Information Assistant (FSIA) training program conducted regional trainings to increase both safe handling and instructor teaching skills and reinforce proper food safety techniques through hands-on experiences. The program ServSafe was taught to people involved in the food business, including casinos, tribal stores, day care providers, jails and senior meal preparation. We also partnered with the WA Health Department in training food service workers.

Results
After training, more than 90% of participants indicated increased knowledge and would implement at least one policy or procedure change. as changed that improved their inspection scores, and prevented an outbreak. All participants indicated that they would pay closer attention to their handling practices and those of workers around them. 90% indicated that they would be helping educate other food workers on the small details in practices that could make a difference in serving safe and unsafe food.

4. Associated Knowledge Areas

KA Code	Knowledge Area
307	Animal Management Systems
315	Animal Welfare/Well-Being and Protection
504	Home and Commercial Food Service
711	Ensure Food Products Free of Harmful Chemicals, Including Residues from Agricultural and Other Sources
712	Protect Food from Contamination by Pathogenic Microorganisms, Parasites, and Naturally Occurring Toxins
723	Hazards to Human Health and Safety

Outcome #2

1. Outcome Measures

Percentage of evaluated participants who applied at least one practice learned from WSU Extension workshops, conferences, or training sessions.

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2017	90

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
The costs of one case of foodborne illness to a consumer are up to $100,000 or more in health costs. An outbreak of food borne illness can cost a facility upwards of $250,000 or more in lost revenue. Therefore safe food handling practices are important to the physical health of the community members, but also the health economic or business. community's health.

What has been done
Food Safety Information Advisors (FSIA) provided educational outreach focused on assisting community members to adopt safe food handling and preservation practices. Volunteers and faculty provide on-site educational outreach at Farmer's Markets, County Fairs, and community celebrations. In addition, to answering phone calls and electronic media (blogs, list-serves, e-communities) questions. WSU Extension also offered a 4-hour food safety course for food service workers to meet the new PIC educational requirements.

Results
With the vast majority of program participants reporting having adopted at least one food safety practice learned from the program(s), and also reporting that they will pass the practice on to others, this program is substantially increasing food safety in the State.

4. Associated Knowledge Areas

KA Code	Knowledge Area
307	Animal Management Systems
315	Animal Welfare/Well-Being and Protection
504	Home and Commercial Food Service
711	Ensure Food Products Free of Harmful Chemicals, Including Residues from Agricultural and Other Sources
712	Protect Food from Contamination by Pathogenic Microorganisms, Parasites, and Naturally Occurring Toxins
723	Hazards to Human Health and Safety

Outcome #3

1. Outcome Measures

Percentage of participants who will institute a HACCP or GAP plan as a result of attending WSU workshops.

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2017	50

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Food borne pathogens cause an estimated 9.4 million illnesses, 55,962 hospitalizations and 1,351 deaths yearly in the U.S. Maintaining a safe food supply requires vigilance from farm to table. Foodborne outbreaks have decreased consumer confidence and increased buyer demand for third-party certification. The Food Safety modernization Act impacts produce growers as well as food packers and processors.

What has been done

WSU Extension Food Safety Specialists participated in service activities related to curriculum development for the Produce and Preventive Controls for Human Food proposed FSMA rules and serve on national and regional committees. Outreach programs included 2 workshops reaching over 500 participants with associated training.

Results

Workshop participants increased knowledge (50-100%), improved record keeping (37-67%), performance of a risk assessment (33-50%), increased employee training (29%), and agricultural water testing (15%). Approximately fifty percent implemented HACCP or GAP plans as a result of attending the WSU programs.

4. Associated Knowledge Areas

KA Code	Knowledge Area
307	Animal Management Systems
315	Animal Welfare/Well-Being and Protection
504	Home and Commercial Food Service
711	Ensure Food Products Free of Harmful Chemicals, Including Residues from Agricultural and Other Sources
712	Protect Food from Contamination by Pathogenic Microorganisms, Parasites, and Naturally Occurring Toxins
723	Hazards to Human Health and Safety

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
- Populations changes (immigration, new cultural groupings, etc.)

Brief Explanation

Numerous external factors can impact the success of our extension and research programs.Based on surveys and pre-testing prior to the Extension program, most participants are not aware of the food safety rules for purchasing, preparing and serving food. Unless the restaurant or establishment is a national chain they have little preparation for handling food emergencies, training employees who work for them and have done very little to prepare for crisis intervention for terrorist or other activist activity. They also are not up-to-date with the new Food Code requirements. This increases the need for expanded Food Safety Education programs.

V(I). Planned Program (Evaluation Studies)

Evaluation Results

WSU Extension continued to increase it's capacity to meet the ever growing and important area of home, consumer and commercial food safety education through an additional online education program. Statewide, Extension educators, staff and volunteers have passed a comprehensive test and hands-on training to prepare them to answer questions, test canner gauges and teach community food preservation classes. Through a content analysis on a random sample of program contacts this past year, 20% of the volunteer contacts focused on a quality concern and 80% were a food safety question. Of those food safety concerns, 50% concern safety to the degree it could cause severe disability or death.

The Food Safety program measures the percentage of participants who demonstrated increased knowledge and skills relative to key learning objectives; percentage of participants who applied at least one practice learned from a WSU Extension workshop, conference or training session; percentage of participants who will institute a HACCP or GAP plan as a result of attending WSU workshops.

Faculty, staff, volunteers and specialist continues to expand their educational programming through increased use of social media and online educational methods to minimize the risk of food borne illness and promote a safe food supply for Washington residents.

Key Items of Evaluation

Our evaluation methodologies were designed to assess the amount of acquired learning, degree of application of learning and the social, environmental and economic value of this application. We used post-program, retrospective and before and after assessments to document changes in knowledge. We used survey methods after an appropriate time lag to assess how much of the new knowledge was actually applied.

V(A). Planned Program (Summary)

Program # 7

1. Name of the Planned Program

Youth and Family Development

☑ 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
801	Individual and Family Resource Management	5%		0%	
802	Human Development and Family Well-Being	25%		10%	
803	Sociological and Technological Change Affecting Individuals, Families, and Communities	15%		30%	
805	Community Institutions, Health, and Social Services	5%		50%	
806	Youth Development	50%		10%	
	Total	100%		100%	

V(C). Planned Program (Inputs)

1. Actual amount of FTE/SYs expended this Program

Year: 2017	Extension		Research	
	1862	1890	1862	1890
Plan	71.0	0.0	1.0	0.0
Actual Paid	0.0	0.0	0.0	0.0
Actual Volunteer	0.0	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**
622049	0	7980	0
1862 Matching	**1890 Matching**	**1862 Matching**	**1890 Matching**
622049	0	7980	0
1862 All Other	**1890 All Other**	**1862 All Other**	**1890 All Other**
5183347	0	147948	0

V(D). Planned Program (Activity)

1. Brief description of the Activity

Research-based programs will be delivered by extension professionals and supervised volunteers. These programs include 4-H club programs, and school and after school youth and family-based programs, such as Strengthening Families, that focus on enhancing preventive mechanisms.

2. Brief description of the target audience

Youth (K-12) throughout the state; military and minority families; urban and rural communities; current and future community and organization leaders; families; and volunteers, teachers and other educators.

3. How was eXtension used?

eXtension was not used in this program

V(E). Planned Program (Outputs)

1. Standard output measures

2017	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Actual	57500	90000	64000	95000

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

Patent Applications Submitted

Year: 2017

Actual: 0

Patents listed

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

2017	Extension	Research	Total
Actual	12	8	0

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

- Number of workshops, demonstrations, and projects developed to foster positive youth, family and community development.

Year	Actual
2017	105932

Output #2

Output Measure

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

Year	Actual
2017	0

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 key learning objectives.
2	Percentage of participants evaluated who applied knowledge or skills from WSU programs.
3	Difference in grade point average between former 4-H members and peer students at WSU when they enter as university freshman.
4	High School graduation rates for 4-H members compared to their Peers.
5	Number of participants that reported an increase in family protective factors as a result of WSU programs.

Outcome #1

1. Outcome Measures

Percentage of evaluated participants who demonstrated increased knowledge and skills relative to key learning objectives.

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2017	70

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Washington State University Extension?s 4-H Youth Development programs create opportunities and deliver educational programs that advance life skills for young people, families and their communities. Educational efforts build not only the capabilities of youth but also build the skills of the adult volunteers who mentor them.

What has been done
4-H education was conducted in all of Washington?s 39 counties and on the Colville Tribal reservations. There were over 100,000 distinct 4-H life skill events/activities/programs reaching over 66,000 youth with educational outreach efforts in our three mission mandate areas: STEM, Citizenship, and Healthy Living. Selected events included but were not limited to : S District Teen Rallies, 4-H Know Your Government Conference, club work, school enrichment, camping and special focus/emphasis methodologies were employed.

Results
Over this broad range of life skill education efforts, of the evaluated events/activities/programs the youth participants self-identified a 70% increase in skills and abilities. These results were collected through our Life Skills Assessment System. These outcomes and impacts strongly demonstrate that Washington 4-H delivers high quality youth programming that measurably contributes to positive youth development.

4. Associated Knowledge Areas

KA Code	Knowledge Area
801	Individual and Family Resource Management

802	Human Development and Family Well-Being
803	Sociological and Technological Change Affecting Individuals, Families, and Communities
805	Community Institutions, Health, and Social Services
806	Youth Development

Outcome #2

1. Outcome Measures

Percentage of participants evaluated who applied knowledge or skills from WSU programs.

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2017	85

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Youth across the state are at risk of problem behavior as measured by alcohol and drug arrests, property crime arrests, and vandalism arrests in 10-14 year olds. Other risk factors that are prominent across the state are family history of substance abuse, low school achievement in 6th grade, alcohol arrests in 10-17 year olds and substance use in 10-17 year olds. Each of these indicators of risk are compilations of five years of data.

What has been done
WE continue to maintain a cadre of trained facilitators, to conduct outreach and engage with Latino and African American communities, and to serve families across Washington's counties and reservations.

Results
The WSU Strengthening Families Program clearly demonstrates the efficacy of providing education for youth and their parents together in an environment of self-directed discovery. The SFP has demonstrated that it is culturally adaptable and works equally with diverse families and its cultural validity is affirmed with 85% of participants applying the knowledge and skills gained.

4. Associated Knowledge Areas

KA Code	Knowledge Area
801	Individual and Family Resource Management
802	Human Development and Family Well-Being
803	Sociological and Technological Change Affecting Individuals, Families, and Communities
805	Community Institutions, Health, and Social Services
806	Youth Development

Outcome #3

1. Outcome Measures

Difference in grade point average between former 4-H members and peer students at WSU when they enter as university freshman.

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Actual
2017	31

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Positive youth development is a process of mental, physical, social and emotional growth during which young people prepare to live a productive and satisfying life within the customs and regulations of their society. Improved academic performance is linked with youth participation in 4-H Youth Development programs.

What has been done
The 4-H Youth Development Program provided a series of planned, diverse educational experiences that foster innovation, creativity and inquiry. The experiential educational adventures included club based long term cooperative learning experiences to focused STEM out-reach efforts such as Rockets to the Rescue.

Results
Washington State 4-H members outperformed their peers at WSU as university freshman by an average grade point that was .31 higher (4.0 scale) than peers, and demonstrated a college-level readiness to learn. They were heavily recruited students.

4. Associated Knowledge Areas

KA Code	Knowledge Area
803	Sociological and Technological Change Affecting Individuals, Families, and Communities
806	Youth Development

Outcome #4

1. Outcome Measures

High School graduation rates for 4-H members compared to their Peers.

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Actual
2017	18

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Young adults who are not in school or working cost taxpayers $93 billion annually and $1.6 trillion over their lifetimes in lost revenues and increased social services. Students who attain an associate?s degree earn nearly one-third more over the course of their lifetimes than those with just a high school diploma. And students who earn a bachelor?s degree earn ¾ more over their lifetimes.

What has been done
For seeral years, Washington State 4-H has been conducting an impact survey of 4-H participation reflected as youth engagement in post-secondary education and training called the Graduation Impact Survey. A simple protocol was developed, a series of five questions to be answered by 4-H volunteers for data related to 4-Hers who have 'aged-out' of 4-H.

Results
Washington 4-H members who have aged-out of the 4-H Program continued to outmatch their non-4-H peers in academic competence in grades as well as graduation rates. Washington State 4-H members graduate from high school at the 96% rate while their Washington State peers graduate at the 78% level.

4. Associated Knowledge Areas

KA Code	Knowledge Area
803	Sociological and Technological Change Affecting Individuals, Families, and Communities
806	Youth Development

Outcome #5

1. Outcome Measures

Number of participants that reported an increase in family protective factors as a result of WSU programs.

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Actual
2017	85

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Washington State University 4-H Youth Development program, the largest youth development program in Washington State, has engaged in promoting healthy living for our state?s youth with the implementation of Youth Advocates for Health (YA4-H!). This program was designed to positively influence behavior for health and well being.

What has been done
To promote increased health and healthy lifestyles, WSU 4-H continues to support the Youth Advocates for Health (YA4-H!); multi-site pilot program in four Washington state counties to improve children and adolescents? knowledge about and behaviors around healthy eating. An additional overarching objective of the program included increasing positive youth development skills among the participating teen teachers.

Results
The YA4-H! Pilot Program has demonstrated initial success in achieving its mission to increase children and youth's knowledge, awareness, and understanding of health/nutrition in order to establish early life-long patterns of healthy eating behaviors/choices. 85% reported an increase in decisions and behaviors related to family protective factors.

4. Associated Knowledge Areas

KA Code	Knowledge Area
801	Individual and Family Resource Management
802	Human Development and Family Well-Being
803	Sociological and Technological Change Affecting Individuals, Families, and Communities
805	Community Institutions, Health, and Social Services
806	Youth Development

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
- Populations changes (immigration, new cultural groupings, etc.)

Brief Explanation

Numerous external factors can potentially impact the success of our programs. Reduced availability of funding has most recently damaged our ability to achieve previous targets, especially because there are fewer peopled employed by Extension than our historical average and of those Extension workers remaining there are fewer faculty members hence we struggle against being activity driven without adequate visionary leadership for over-arching educational outcomes and achievements. We have partially compensated through the use of technology to increase per person efficiency. However, this sort of increased output per professional FTE cannot be expected to rise at current rates. Changes in political priorities also impact the effectiveness of our work either by changing the availability of resources supporting our programs or by altering the available options for target audiences. The instability in the Snap Education Funding eliminated a number of youth summer camping/food and nutrition program partnerships with youth and family colleagues.And finally, the long-term depression of the economy has had a stable volunteer pool more difficult to recruit and retain.

V(I). Planned Program (Evaluation Studies)

Evaluation Results

Our evaluation methodologies are designed to assess the amount of acquired learning; degree of application of that learning; and the social, environmental and economic value of this application. We will used post-program, retrospective, and before and after assessments to document changes in knowledge. We used survey methodologies after an appropriate time lag to assess how much of the new knowledge was actually applied. Finally, we will use research methodologies, industry assessments, and survey responses to

determine the social economic and environmental values derived from the application of new techniques.

Key Items of Evaluation

Key items of evaluation include all major statewide adult leadership training events and the statewide teen program outreach efforts. Additionally, all age-out 4-H youth were reviewed for their high school graduation attainment and their post-secondary education and training engagement.

V(A). Planned Program (Summary)

Program # 8

1. Name of the Planned Program

Community and Economic Development

☑ 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
604	Marketing and Distribution Practices	10%		0%	
608	Community Resource Planning and Development	50%		0%	
610	Domestic Policy Analysis	20%		0%	
803	Sociological and Technological Change Affecting Individuals, Families, and Communities	20%		0%	
	Total	100%		0%	

V(C). Planned Program (Inputs)

1. Actual amount of FTE/SYs expended this Program

Year: 2017	Extension		Research	
	1862	1890	1862	1890
Plan	44.0	0.0	0.0	0.0
Actual Paid	0.0	0.0	0.0	0.0
Actual Volunteer	0.0	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**
550537	0	0	0
1862 Matching	**1890 Matching**	**1862 Matching**	**1890 Matching**
550537	0	0	0
1862 All Other	**1890 All Other**	**1862 All Other**	**1890 All Other**
4574548	0	0	0

V(D). Planned Program (Activity)

1. Brief description of the Activity

Research-based programs will be delivered by extension professionals. Communities, local/state government agencies, and non-profits will be engaged to collectively analyze situations and recommend mechanisms to enhance public services. CED applied research and education programs will be customized based upon community need and delivered by programs such as Food Processing, the WSU Division of Governmental Studies and Services, the William D. Ruckelshaus Center, the new Metropolitan Center for Applied Research and Extension, and the Composite Materials and Engineering Center. Finally, county-based programs will be delivered that lead to enhanced non-profit capacity.

2. Brief description of the target audience

Community leaders
Local/state government officials, policy-makers and staff
Non-profit leaders and staff
Latino and other small business owners
Special interest groups
Economic development professionals
Private sector leaders in the composite materials and food processing industries
Limited income families

3. How was eXtension used?

eXtension was not used in this program

V(E). Planned Program (Outputs)

1. Standard output measures

2017	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Actual	39000	195000	2200	3500

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

Patent Applications Submitted

Year:	2017
Actual:	0

Patents listed

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

2017	Extension	Research	Total
Actual	39	20	0

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

- The number of communities increasing their use of digital technologies.

Year	Actual
2017	70

Output #2

Output Measure

- The number of local governments, state agencies and non-profits assisted.

Year	Actual
2017	1750

Output #3

Output Measure

- The number of existing or new businesses and entrepreneurs assisted.

Year	Actual
2017	2200

Output #4

Output Measure

- The number of people receiving family asset building education.

Year	Actual
2017	900

Output #5

Output Measure

- The number of people/agencies provided information that promote export of Washington products.

Year	Actual
2017	1200

Output #6

Output Measure

- The number of scholarly products produced by CED educators.

Year	Actual
2017	45

V(G). State Defined Outcomes

V. State Defined Outcomes Table of Content

O. No.	OUTCOME NAME
1	Number of communities enacting processes to increase economic development or the use of digital technologies.
2	Number of local, state, or non-profit entities increasing their capacity to function more effectively.
3	Number of existing or new businesses and entrepreneurs assisted through increased knowledge, including good business practices, food processing safety, composite manufacturing, and exporting.
4	Number of people who initiate family wealth building activities.

Outcome #1

1. Outcome Measures

Number of communities enacting processes to increase economic development or the use of digital technologies.

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2017	100

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Today high-speed broadband is not a luxury, it's a
necessity. Without it, many residents and businesses are being left behind in our every increasingly digital world. This is especially true in Washington?s rural regions where small, dispersed populations, distance, rugged terrain and weather often make it near impossible for private sector telecommunications providers to be able to justify the business case and invest in this critical infrastructure.

What has been done
Activities included conducting extramural fund development, surveys, focus groups, community forums, presentations, training, applied research, and providing information to the public. Implementation of an EDA grant to develop a strategic plan to support manufacturing businesses in the five-county area. Assisted rural communities and tribes by advancing three broadband planning and adoption programs; supporting a tribal technology training initiative; and providing technical assistance for Washington State FirstNet's public safety communications outreach.

Results
Extension personnel have been actively engaged in the formulation of policy at the state and national level, and continue to work with agencies, entities, communities and tribes on broadband expansion and adoption to support community development. A new initiative this year was the pursuit of broadband connectivity at the location of pre-planned Fire Camps to support emergency response to these disasters.

4. Associated Knowledge Areas

KA Code	Knowledge Area
604	Marketing and Distribution Practices
608	Community Resource Planning and Development
610	Domestic Policy Analysis
803	Sociological and Technological Change Affecting Individuals, Families, and Communities

Outcome #2

1. Outcome Measures

Number of local, state, or non-profit entities increasing their capacity to function more effectively.

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Actual
2017	1200

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
While a significant portion of the United States' success is the result of its strength in the private enterprise, good governance, and a healthy non-profit sector --It is through government that we meet the majority of our collective basic needs for safety, a healthy environment, education. In addition, it is through a vigorous non-profit sector that we undertake actions that benefit community and/or contribute to our quality of life.

What has been done
WSU Extension?s efforts in local and state government assistance primarily took place through the William D. Ruckelshaus Center, the Division of Governmental Studies and Services (DGSS) and the new Metropolitan Center for Applied Research and Extension. The work included training and technical assistance to government agencies and non-profit groups to optimize grant development, board training, and organizational development, as well as direct project work on research and policy issues.

Results
The Ripple Effect Mapping tool allowed organizations to identify and evaluate their programming outcomes. The Law Enforcement Mountain Operations School, The Montana Highway Patrol Traffic Stop Data Analysis Project (for evidence of biased policing), and the Oso Mudslide Joint

Commission were all examples of our work. Current and past projects can be found at http://ruckelshauscenter.wsu.edu/projects/index.html.

4. Associated Knowledge Areas

KA Code	Knowledge Area
604	Marketing and Distribution Practices
608	Community Resource Planning and Development
610	Domestic Policy Analysis
803	Sociological and Technological Change Affecting Individuals, Families, and Communities

Outcome #3

1. Outcome Measures

Number of existing or new businesses and entrepreneurs assisted through increased knowledge, including good business practices, food processing safety, composite manufacturing, and exporting.

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2017	2500

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
The small business sector remains a vital component of most local economies. This sector of the economy suffered greatly during the last recession and has been slow to recover. Additionally, the supply chain businesses of Washington?s local food systems remain a substantial part of the State's economy. Lastly, Washington remains both a substantial hub for both exports and imports of goods from Asian markets.

What has been done
Program offerings included "Cultivating Success" programs for small enterprises; "Ready Set Grow a Business" for small towns; Composite Materials and Engineering Center for developing building materials from recycled and virgin resources; Food Processing training for small and mid size businesses; and training for Latino small business entrepreneurs.

Results
Individuals, entrepreneurs and/or businesses were provided information, training and/or technical assistance. Outcomes included improved food safety and processing; entrepreneurship training for improved management skills; and the advancement of small business development among minorities.

4. Associated Knowledge Areas

KA Code	Knowledge Area
604	Marketing and Distribution Practices
608	Community Resource Planning and Development
610	Domestic Policy Analysis
803	Sociological and Technological Change Affecting Individuals, Families, and Communities

Outcome #4

1. Outcome Measures

Number of people who initiate family wealth building activities.

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2017	750

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
In the United States, wealth distribution across income classes is increasing disparity with more wealth continuing to concentrate at the top. The increasing disparity is also true in Washington. Some of the causes may be inherent to the structure of our economy; others can be addressed through decisions and actions of the individual.

What has been done
Extension has undertaken financial literacy education, micro-enterprise development, debt counseling, and capacity-building activities for regional non-profits serving low-income populations.

Results

Extension engaged with individuals in support of family wealth building. This included limited income people who received educational offering aimed at family wealth building (e.g., financial and debt management education). In addition, as part of a new Extension initiative, public entities and their staff went through poverty simulations to help their organizations understand the day-to-day financial difficulties of their limited income clients

4. Associated Knowledge Areas

KA Code	Knowledge Area
604	Marketing and Distribution Practices
608	Community Resource Planning and Development
610	Domestic Policy Analysis
803	Sociological and Technological Change Affecting Individuals, Families, and Communities

V(H). Planned Program (External Factors)

External factors which affected outcomes

- Economy
- Appropriations changes
- Public Policy changes
- Competing Public priorities
- Competing Programmatic Challenges
- Populations changes (immigration, new cultural groupings, etc.)

Brief Explanation

The national economy and Federal policy continue to negatively impact higher education funding at all levels. At the same time, private foundations in the West seemly are remaining on the sideline and not investing in intermediary organizations such as Extension. While we have excellent staff and well-structured programs with innovative approaches, the lack of available and consistent funding to implement and continue our efforts remains an obstacle.

V(I). Planned Program (Evaluation Studies)

Evaluation Results

In the Community & Economic Development arena, we once again increased the number of communities, non-profits, and public agencies served. We did this through multi-disciplinary project teams that drew upon faculty from seven WSU colleges/schools plus the University of Idaho, Portland State University and the University of Washington. And once again, the outcomes of the CED faculty's work included both helping decision-makers formulate state policy as well as assisting local communities strengthen their governmental, non-profit, and private sectors.

Key Items of Evaluation

The metrics chosen for WSU Extension's Community & Economic Development work reflects an orientation towards supporting local economic development, better governance, and

support for select industrial sectors. A premium is placed on activities that simultaneously move multiple program agendas forward, i.e., our Latino business development work that supports the establishment of community level organizations that assist small businesses, and director assistance to small business owners increase the success of their business which in turn contributes to the vitality of the community.

The metrics utilized to evaluate our work consist of the recognized key metrics for success formulated by the communities we serve. Primarily, our economic development assistance is aimed at creating new business and entrepreneurs. These metrics are at the top of list of our community, state, federal, and private sector partners as well. With regards to our community capacity building efforts, the metrics chosen are indicators that act as surrogates for evaluations, measuring increases in social capital. These include better governance work through informed public policy development (e.g., work done through the William D. Ruckelshaus Center), improved local and state agencies processes (e.g., work done through the Division of Governmental Studies and Services).

VI. National Outcomes and Indicators

1. NIFA Selected Outcomes and Indicators

Childhood Obesity (Outcome 1, Indicator 1.c)	
0	Number of children and youth who reported eating more of healthy foods.
Climate Change (Outcome 1, Indicator 4)	
0	Number of new crop varieties, animal breeds, and genotypes whit climate adaptive traits.
Global Food Security and Hunger (Outcome 1, Indicator 4.a)	
0	Number of participants adopting best practices and technologies resulting in increased yield, reduced inputs, increased efficiency, increased economic return, and/or conservation of resources.
Global Food Security and Hunger (Outcome 2, Indicator 1)	
0	Number of new or improved innovations developed for food enterprises.
Food Safety (Outcome 1, Indicator 1)	
0	Number of viable technologies developed or modified for the detection and
Sustainable Energy (Outcome 3, Indicator 2)	
0	Number of farmers who adopted a dedicated bioenergy crop
Sustainable Energy (Outcome 3, Indicator 4)	
0	Tons of feedstocks delivered.