2014 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, 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 options. 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 deliverable and outcome measurable programs that leverage the research base of the University and the world to address primary and timely issues in ways that lead to economic development as well as personal, family, and environmental wellbeing. The synergy provided by connecting the problem-solving skills of the research community with the Extension experience gained from working with individuals who sometimes represent different perspectives can be quite powerful and can make valuable contributions to our citizens and society.

Although there are historical differences in how Research and Extension view their missions, 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. 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 the food systems of Washington, through both conventional and organic agricultural production systems, by supporting research and extension programs that emphasize economic and environmental sustainability. We have also taken a lead in exploring alternative sources of energy and raw materials. 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; 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 the College of Agricultural, Human and Natural Resource Sciences (CAHNRS); the 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 William D. Ruckelshaus Center (a joint program with the University of Washington). Additionally, through close partnerships and collaborative agreements, our Extension faculty also extends 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. For a number of reasons, our agricultural systems are among the most diverse in the nation and the state produces over 300 different crops that are sold domestically or exported, largely to countries in the Pacific Rim. Washington is especially known for its apples, wheat, potatoes, livestock, milk and milk products, and it produces a major share of many specialty crops, like small fruits (e.g. grapes, berries), seeds (e.g., vegetables, alfalfa), pulse legumes and hops. 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 a 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 less diverse, and is characterized by larger farming operations, especially in the cultivation of wheat, potatoes, and orchard crops. Our forested lands are 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. There has been almost a tripling of the Latino 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 of time. Adding to this overall cultural diversity are the large refugee populations that now call Washington State home; the Seattle metro area is the 5th most popular resettlement area for refugees nationally. 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 25% 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.

There is often a temptation to think of agriculture as a stable and settled industry, but it is more useful to think of agriculture as metastable and continually evolving, with many destabilizing commercial, biotic, and abiotic challenges that must continually be addressed by a changing and evolving research emphasis. New varieties of crops, both domestically and internationally developed, compete for "our" 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 wheat 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 and where the grass is "greener". As we examine how to adapt to these changes and challenges, we hope that many also represent potential opportunities. Examples of relatively newly created opportunities include the possibility of using hybrid poplars to develop aviation fuels, a rapidly expanding Washington State viticulture and enology enterprise and the increasing importance of niche legumes in crop rotations. Growing hybrid poplar trees on plantations is relatively new to the state of Washington and brought with it new sets of pests, diseases, and resource use challenges. 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 universe are truly outstanding and a model for future endeavors. Rapid consumer acceptance of hummus has generated a significant market for high quality chickpeas and this has had a major effect on wheat crop rotations in areas where Ascochyta resistant chickpea lines can be grown. Our commercial tree fruit industry is funding several endowed faculty positions that will continue to keep us at the cutting edge of research. We also continue to explore avenues where we have traditionally been a world leader. For example, we are exploring the possibility of using perennial wheat varieties and new crops like camelina and quinoa in low rainfall areas of the state to decrease input costs and secure erosion prone soil. Not only would this benefit Washington State, but new strategies for low rainfall production would also have immediate ramifications on world agriculture and food production.

There are many other challenges. Our natural resources are at risk from land conversion, wildfires, and pollution. Weather variability and climate change will have significant impacts on water availability and facilitate migration of new plant and animal diseases and pests into the state. Furthermore, our human populations and communities are undergoing unprecedented changes. However, we optimistically and probably naively believe that all of these changes and challenges represent new possibilities.

Our role in dealing with these issues continues to be in developing and delivering an excellent empirical and theoretical knowledge base, which can be queried to offer information and assistance to our constituents. We use cutting edge technology to test new ways of doing things and then make the best data, ideas and potential solutions available to our stakeholders. We have particular skills in the areas of plant biotechnology and genomics and are leading in several efforts to apply these areas of expertise to issues like cropping systems research and cultivar development for specialty markets. 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. 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 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.

It has become increasingly obvious that the shrinking direct state investments are not sufficient to support the same level and diversity of research programs unless significant additional funds could be obtained by competing harder for grants given by local, regional, federal and international agencies, and by foundations that had an interest in the research and outreach being conducted. This has resulted in an increased emphasis throughout the university on obtaining external support and on establishing the true value of the work being conducted at WSU through publications and participation at local, regional, national, and international venues. External funding awards to Research and Extension has been uneven over the past several years after an initial surge from $80 million in 2010 to over $105 million in 2011. More recently the total external funding awards were $91 million in 2012; $80 million in 2013; and $85 million in 2014. Not included in these figures is future endowment income anticipated as a result of activities of organizations that benefit from and support WSU research and Extension. An outstanding example of support is from the Washington Tree Fruit Commission, which approved check-off increases worth an estimated $32 million over the 8 years of the increased assessment for support of apple, cherry and pear research and extension. Other support is available from organizations like the Washington Grain Alliance, the Washington Potato Commission, the Washington Hops Commission and the Washington Wine Commission. 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.

The ability to leverage internal University funds by engaging externally generated funds has become even more integral to our operating philosophy and, more and more, a relatively small number of positions at WSU anchor larger efforts that are funded through external grants and endowments. We are generally reporting here on the total effort since the synergy between these components is important in the larger picture and the formula fund contribution is not easily assignable. For example, the Washington State University Extension Energy program (www.energy.wsu.edu) is an important state and regional resource that functions in some ways like the state's Energy Department and is also supported by large grants from the U.S. Department of Energy. It has only a few WSU employees but these individuals play a key role in its operation and the entire activity is managed under WSU personnel rules. Similar relationships exist in areas such as food safety, nutrition, and child and community relations. Most of the operations money for research, including support for personnel and students, is obtained through external grants but federal formula funds are a key part of the larger picture since they help support infrastructure and provide continuity. For this reason, we have altered how we are reporting FTE effort in Extension, using a more comprehensive definition that includes the leveraging of FTEs through the Extension programs. These changes in reporting are a continuation of our previous combined ARC and Extension annual reports.

While overall beneficial, these changes in our operating philosophy have some associated costs. Some aspects of this set of changes are especially challenging in the context of Washington agriculture. While we celebrate the diversity of our cropping systems and geography, it is obvious that, if WSU Research and Extension are to be able to continue to serve all of our constituencies over the long term, we cannot just target those industries, like wheat and tree fruit that are large enough to contract directly for our expertise. Moreover, as the mix of crops and where they are grown shifts, levels of production can change very rapidly and this means that we must be positioned to adapt to these changes. Defining how Research and Extension should operate under these conditions has been difficult but the historical value of Research and Extension activities has led to a very high level of expectation for success from all sectors of the citizenry. They expect and often need us to get it right, right now. We think their ideal is an excellent endorsement but that they may also be asking for more than we can deliver at a level of support they are willing to provide.

As we analyzed information for this report, we realized that our activities were continuing to be affected not only by financial constraints but also by many changes that are occurring outside of our control. For instance, both long- and short-term climate change are forcing us to adjust how we plan for the range of conditions that our agricultural and resource management communities will need to be able to cope with. Invasive pest species can force significant changes in agricultural and crop management practices. We are seeing this with the recent introductions of two insect pests, spotted-wing Drosophila and brown marmorated stink bug, and the reemergence of wireworms as a problem in wheat as effective insecticides are phased out or as pests become resistant. State and federal allocations will continue to be problematic and we will need to define very sharply how our ability to solve problems can have impact at the local, regional and national levels if we are to get the resources to make the attempts needed to work on them. These patterns are affecting not just the type of work we can do but also how we do it and affect the career patterns we are likely to see in our faculty members as we move forward. We are working to develop a definition of success that is meaningful to our stakeholders both within and outside of the land- grant university context. We believe that it is getting harder for faculty get promoted as external funding becomes more important to establishing research programs and as the requirements for national and international recognition increase. It is also harder to maintain research and extension program productivity and this represents a major challenge for managing and sustaining the coverage and quality of our research and extension portfolio.

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. The two benchmark numbers that are especially affected by this are publications and graduate students. For publications, we 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 money 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. We carefully prioritize our efforts to ensure the greatest impact is derived from both our research and extension programs. As a result, we will be 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: 2014	Extension		Research	
	1862	1890	1862	1890
Plan	500.0	0.0	440.0	0.0
Actual	520.0	0.0	540.0	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 items have driven the college and university review process. The first was an institutional goal to bring WSU to a level of equivalency with AAU (Association of American Universities)

universities. Within CAHNRS (College of Agricultural, Human, and Natural Resource Sciences), which is home to most of the programs supported by formula 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 came with decreasing state funding. In 2008, the college participated in a university wide evaluation and prioritization process termed A2P2 (Academic Affairs Program Prioritization). Within the A2P2 framework, units were evaluated based on a set of specific productivity measures and their fit to college and university designated benchmarks and priorities. This was followed by a university initiative titled "Big Ideas," which began in 2010 and is still being used to guide prioritization. These initiatives became the guiding university philosophy and basis for merit ratings at all levels from the individual unit to the college. Additionally, the continuing decline in state general revenues sent to WSU and a significant increase in revenues based on tuition has resulted in 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. Support for research projects generally begins with discussions between stakeholders, administrators, and researchers. Agricultural Research Center (ARC) project proposals that address these high priority areas are then written by individual faculty members or by faculty teams. These proposals are submitted to the chair of an appropriate academic department, who reviews the proposal, and ascertains that the topic of the research is consistent with the previous discussions. If so, the project proposal is 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 chair assembles the commentary and discusses it with the faculty member who proposed the project. If necessary, the faculty member then revises the project proposal. After examining these changes, the chair submits the project proposal to the ARC where it is proposal 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 database called 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 Land 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 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 Survey Monkey or through Microsoft SharePoint 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 the Division of Governmental Studies and Services to assess public attitudes. 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 numerous 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 identify potential partners, identify emerging issues, and evaluate the effectiveness of our research and extension programs in addressing these issues and needs as we proceed.

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 sustainabilty. 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.

IV. Expenditure Summary

1. Total Actual Formula dollars Allocated (prepopulated from C-REEMS)			
Extension		Research	
Smith-Lever 3b & 3c	1890 Extension	Hatch	Evans-Allen
4374004	0	4381876	0

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	4823789	0	3597271	0
Actual Matching	4823789	0	3597271	0
Actual All Other	47637346	0	52188972	0
Total Actual Expended	57284924	0	59383514	0

3. Amount of Above Actual Formula Dollars Expended which comes from Carryover funds from previous				
Carryover	0	0	786405	0

V. Planned Program Table of Content

S. No.	PROGRAM NAME
1	Natural Resources Stewardship
2	Agricultural Productivity and Food Security
3	Sustainable Energy
4	Climate Change
5	Childhood Obesity
6	Food Safety
7	Youth and Family Development
8	Community and Economic Development

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%		5%	
121	Management of Range Resources	10%		5%	
122	Management and Control of Forest and Range Fires	5%		0%	
123	Management and Sustainability of Forest Resources	10%		10%	
124	Urban Forestry	5%		5%	
125	Agroforestry	2%		2%	
133	Pollution Prevention and Mitigation	14%		5%	
135	Aquatic and Terrestrial Wildlife	10%		15%	
136	Conservation of Biological Diversity	0%		6%	
213	Weeds Affecting Plants	5%		10%	
214	Vertebrates, Mollusks, and Other Pests Affecting Plants	2%		5%	
215	Biological Control of Pests Affecting Plants	5%		12%	
302	Nutrient Utilization in Animals	0%		3%	
403	Waste Disposal, Recycling, and Reuse	5%		5%	
605	Natural Resource and Environmental Economics	2%		7%	
610	Domestic Policy Analysis	5%		0%	
	Total	100%		100%	

V(C). Planned Program (Inputs)

1. Actual amount of FTE/SYs expended this Program

Year: 2014	Extension		Research	
	1862	1890	1862	1890
Plan	75.0	0.0	25.0	0.0
Actual Paid	79.0	0.0	71.0	0.0

Actual Volunteer	3631.0	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**
905755	0	167501	0
1862 Matching	**1890 Matching**	**1862 Matching**	**1890 Matching**
905755	0	167501	0
1862 All Other	**1890 All Other**	**1862 All Other**	**1890 All Other**
6312999	0	8424874	0

V(D). Planned Program (Activity)

1. Brief description of the Activity

WSU scientists will conduct research leading to better understanding of the interaction between human development and terrestrial, aquatic, and atmospheric conditions; genetically improve poplar and black cottonwood species to more effectively sequester carbon, 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 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 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

2014	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Actual	283122	512154	27730	34963

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

Patent Applications Submitted

Year:	2014
Actual:	0

Patents listed

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

2014	Extension	Research	Total
Actual	33	55	83

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
2014	861

Output #2

Output Measure

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

Year	Actual
2014	21

Output #3

Output Measure

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

Year	Actual
2014	46

Output #4

Output Measure

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

Year	Actual
2014	3868

Output #5

Output Measure

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

Year	Actual
2014	12119

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
2014	96

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. Improper pesticide and fertilizer applications; inefficient irrigation systems and water use; and the selection of poorly adapted plants to local climates are also issues. Conversion of private forestlands for development continue with little regard for wildlife, water quality and climate change.

What has been done
Water quality education and IPM were core components of the Master Gardener program. Other taught residents how to improve water quality through routine practices including: rain garden installation, fencing to improve grazing management, integrated pest management to reduce the use of pesticides, and proper fertilizer applications to avoid water contamination. Low impact development certification workshops were held to present the newest methods of green infrastructure. A new website: Gardening in Washington State: (http://gardening.wsu.edu/) was developed.

Results
Program volunteers, home gardeners, ranchers, crop producers and environmental agency representatives are gaining a greater understanding of natural resources, stewardship of resources, and protection of water quality. This has led to better interactions between ranchers and regulators. Ranchers find economic, workable solutions to maintaining water quality while regulators find softer approaches to meeting the spirit of state and federal regulations. Removal of culverts and dams have opened new areas for fish migration and improved year round flow of streams.

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
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
2014	86

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

The demand for water continues to increase as the population and industry expand. 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 resources, residents must learn about and implement water saving methods.

What has been done
Fields days, workshops, demonstration gardens, applied research, fact sheets and web sites were used to teach and demonstrate proven water conservation methods. 100 outreach events were conducted across the state. 200 Master Gardeners throughout the Puget Sound region were trained as Rain Garden mentors. These educational opportunities demonstrated 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. Rain Garden mentors and demonstration sites demonstrated proper stormwater handling and use of gray water for landscape sustainability. A water quality regional specialist was assigned to lead the state Extension Water Quality Team effort.

Results
In addition to almost 3,900 Master Gardeners, they in turn taught 5,813 residents how conserve water and protect water quality. Another 3,500 residents and landscape maintenance personnel learned how to conserve water and protect water quality. One county held an extensive micro-irrigation workshop, including irrigation demonstrations and video production. Over 95% of program participants learned new information about water use and management. Selective follow-up evaluations showed that over 71% of program participants used one or more water conserving methods, including mulches they produced through home composting, using highly efficient irrigation methods, especially drip hoses, and adjusting watering times to take advantage of precipitation and reducing evapotranspiration.

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
2014	130611

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Washington State 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 and lack a written management plan which provides the biological, physical, and agency information necessary to make sound decisions to execute best management practices in logical and feasible manner. 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
75 forestry events were held, including ten eight-week Coach Forest Stewardship workshop series (152 families) and two major regional field days to 3,684 people. Five social media sites and three comprehensive websites were maintained. Approximately 70,359 direct contacts were made to assist clients through various means. Forestry specialists collaborated with personnel from other natural resource agencies to address the aftermath of the Carlton Wildfire Complex in North Central Washington, the largest wildfire in state history.

Results
Eight-nine percent, or 2,990 of survey respondents have executed at least two new management practices over 15,595 acres. As a result of the Coached Forest Stewardship Planning Shortcourse, 92 Forest Stewardship Plans were prepared. An estimated 83,700 of these clients benefited from increased awareness of the information. Additionally, 64,753 web clients actively sought information from our statewide website http://forestry.wsu.edu, which contains contact information for educators, downloadable publications, streaming videos for online viewing, resource directories, on-line new letters, and a calendar of events.

4. Associated Knowledge Areas

KA Code	Knowledge Area
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
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
2014	86

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 use can result in crop and ornamental plant damage, illegal pesticide residues, contamination of water, and possible human and animal poisonings. The introduction of invasive species, including Spotted Wing Drosophila and Brown Marmorated Stink Bug, have resulted in increase awareness of insects and appropriate measures for their control.

What has been done
Incorporation of pesticide use and safety in Master Gardener training; introduction of integrated pest management concepts; major revisions of the PestSense and the HortSense programs; pesticide pre-training; pesticide recertification classes; online pesticide recertification modules; demonstration garden classes on safe use of pesticides; and demonstration garden classes on integrated pest management.

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 obtain new knowledge and apply 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
2014	95

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
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 wildlife and fish species 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 grazing in riparian zone; hiring a new LID Stormwater Management specialist that will start August 1, 2015; further development of the Washington Stormwater Center to increase its outreach capabilities.

Results

Rain Garden Mentors were trained and extending outreach to homeowners. Over 1967 rain gardens were installed in homeowner?s yards to collect roof and sidewalk runoff and officially registered on the rain garden website. Over 95% of program participants enhanced their knowledge of water quality protection and over 90% planned to implement at least one yard or garden practice that would protect water quality. Riparian cattle grazing field research and presentations to Washington policy makers and enforces have resulted in a changed mindset about rangeland grazing, a huge breakthrough for the state.

4. Associated Knowledge Areas

KA Code	Knowledge Area
112	Watershed Protection and Management
121	Management of Range Resources
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

Government regulations:New rules restrict the use of traditional fertilizers and pesticides in urban and riparian areas.Alternatives are recommended to maintain or improve water quality.
Natural disasters: Time was redirected to address post-wildfire areas in North Central Washington, including timber salvage, soil erosion prevention, grass planting, and tree planting. This effort will continue in 2015 as landowners rebuild buildings, fences, and livestock herds.
Economic: Home gardening continues to increase due to the economy; families interested in having fresh fruits and vegetables, and to know where their produce came from and how they were raised; and increased interest in obesity reduction initiatives.

V(I). Planned Program (Evaluation Studies)

Evaluation Results

Program participants have a greater awareness, increased knowledge, and application of knowledge for management of their yards, forests and ranches. The target audience 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 overall. Forest owners are implement practices to improve forest health and secure the future of their forest with future generations in mind.

Key Items of Evaluation

Pre- and Post-tests of volunteer-based programs to determine knowledge gain. Follow-up evaluations (telephone call or online surveys) were used for six-month to one year evaluations. Online modules contain tests to determine knowledge gain. End of meeting forms were used for workshops, conferences and demonstration garden events.Regional forest field days were evaluated through personal interview or follow-up online surveys. Pesticide test results are obtained from the Washington State Department of Agriculture.

V(A). Planned Program (Summary)

Program # 2

1. Name of the Planned Program

Agricultural Productivity and Food Security

☑ Reporting on this Program

V(B). Program Knowledge Area(s)

1. Program Knowledge Areas and Percentage

KA Code	Knowledge Area	%1862 Extension	%1890 Extension	%1862 Research	%1890 Research
102	Soil, Plant, Water, Nutrient Relationships	5%		3%	
104	Protect Soil from Harmful Effects of Natural Elements	5%		5%	
111	Conservation and Efficient Use of Water	5%		3%	
112	Watershed Protection and Management	5%		3%	
121	Management of Range Resources	2%		3%	
201	Plant Genome, Genetics, and Genetic Mechanisms	0%		9%	
202	Plant Genetic Resources	5%		8%	
203	Plant Biological Efficiency and Abiotic Stresses Affecting Plants	0%		9%	
205	Plant Management Systems	5%		6%	
211	Insects, Mites, and Other Arthropods Affecting Plants	0%		5%	
212	Diseases and Nematodes Affecting Plants	12%		9%	
213	Weeds Affecting Plants	10%		3%	
215	Biological Control of Pests Affecting Plants	8%		5%	
216	Integrated Pest Management Systems	10%		9%	
301	Reproductive Performance of Animals	5%		3%	
302	Nutrient Utilization in Animals	5%		3%	
303	Genetic Improvement of Animals	3%		2%	
304	Animal Genome	0%		2%	
307	Animal Management Systems	10%		5%	
604	Marketing and Distribution Practices	5%		5%	
	Total	100%		100%	

V(C). Planned Program (Inputs)

1. Actual amount of FTE/SYs expended this Program

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

2. Institution Name: Washington State University

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

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

V(D). Planned Program (Activity)

1. Brief description of the Activity

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

2. Brief description of the target audience

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

3. How was eXtension used?

eXtension was not used in this program

V(E). Planned Program (Outputs)

1. Standard output measures

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

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

Patent Applications Submitted

Year: 2014

Actual: 10

Patents listed

These patents were issued in 2014:
0487-U2RF-OC to John Browse: Desaturases and methods of using them for synthesis of polyunsaturated fatty acids.
0854-OIPA-OCJan BusboomDIRECT METHOD AND REAGENT KITS FOR FATTY ACID ESTER SYNTHESIS
0931-OIPA-OCKimberlee (Kim) KidwellGlyphosate-Tolerant Wheat Genotypes
0979-U2RF-OCClarence (Bud) RyanAdditional Defense Peptide and Plant Defense
1027-U2RF-OCWendy Hoashi-Erhardt'Puget Crimson' Patent Application
1112-OIPA-OCMatthew WhitingMethods for Improving Fruit Production and Fruit Quality
1175-U2RF-OCAmit DhingraUse of Photosynthetic Pigment Stabilizing Agents to Regulate Ripening and Quality in Fruits and Vegetables
1205-OCBruce BarrittApple Tree Named 'WA 38', Cosmic Crisp
1231-U2RF-OCStephen JonesWA8092 ('Otto') Soft White Winter Wheat
1328-CAHNRS-OCArron CarterWA8118 ('Sprinter') Hard Red Winter Wheat

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

2014	Extension	Research	Total
Actual	62	479	491

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

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

Year	Actual
2014	1701

Output #2

Output Measure

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

Year	Actual
2014	38

Output #3

Output Measure

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

Year	Actual
2014	199

Output #4

Output Measure

- 2014 Farm Bill Outreach Education Training Workshops

Year	Actual
2014	26

V(G). State Defined Outcomes

V. State Defined Outcomes Table of Content

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

Outcome #1

1. Outcome Measures

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

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2014	67

3c. Qualitative Outcome or Impact Statement

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

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

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

4. Associated Knowledge Areas

KA Code	Knowledge Area
102	Soil, Plant, Water, Nutrient Relationships

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

Outcome #2

1. Outcome Measures

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

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2014	50

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

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

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

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

4. Associated Knowledge Areas

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

Outcome #3

1. Outcome Measures

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

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Actual
2014	10538374

3c. Qualitative Outcome or Impact Statement

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

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

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

4. Associated Knowledge Areas

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

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

Outcome #4

1. Outcome Measures

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

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Actual
2014	7662898

3c. Qualitative Outcome or Impact Statement

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

What has been done
Program implementation utilized local, regional, state-wide, and multistate efforts in a coordinated effort that involved workshops, clinics, seminars, field days, field demonstrations, print and electronic publications, mass media, social networks, and other methods to disseminate research-

based knowledge and other relevant information to targeted audiences.

Results
This planned program directly impacted the management of over 7 million food production animals, 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
121	Management of Range Resources
301	Reproductive Performance of Animals
302	Nutrient Utilization in Animals
303	Genetic Improvement of Animals
304	Animal Genome
307	Animal Management Systems
604	Marketing and Distribution Practices

Outcome #5

1. Outcome Measures

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

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Actual
2014	2080

3c. Qualitative Outcome or Impact Statement

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

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

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

4. Associated Knowledge Areas

KA Code	Knowledge Area
604	Marketing and Distribution Practices

Outcome #6

1. Outcome Measures

2014 Farm Bill Outreach Education

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2014	100

3c. Qualitative Outcome or Impact Statement

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

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

Results

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

4. Associated Knowledge Areas

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

V(H). Planned Program (External Factors)

External factors which affected outcomes

- Natural Disasters (drought, weather extremes, etc.)
- Economy
- Appropriations changes
- Public Policy changes
- Government Regulations
- Competing Public priorities
- Competing Programmatic Challenges

Brief Explanation

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

V(I). Planned Program (Evaluation Studies)

Evaluation Results

This program encompassed a wide array agricultural enterprises including irrigated and dry-land agronomic crops, high value horticultural crops, fruit orchards, vine crops, grazing lands, livestock and poultry operations, and dairy farms. The overall program evaluation for all events and projects under this program theme was evaluated in terms of "knowledge gained by participants" and "application of this knowledge" to address agricultural productivity and food security. Additionally, we collected data on the acreage of agricultural land and livestock numbers that directly benefited from our work. We also reported the number food processing facilities, direct marketing enterprises, and food banks that enhanced efficiency of food processing and distribution. Collectively, the results

indicate positive impacts to agricultural productivity through the dissemination of research-based information and the application of this knowledge for sustaining agricultural enterprises and food production. Results were collected through a variety of methods including pre and post event evaluations, surveys, agricultural statistics, feedback from stakeholder groups, and other assessments of program participants. The analysis provided the aggregate results indicated below under key items of evaluation.

Key Items of Evaluation

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

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: 2014	Extension		Research	
	1862	1890	1862	1890

Plan	80.0	0.0	45.0	0.0
Actual Paid	48.0	0.0	48.0	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**
120596	0	161509	0
1862 Matching	**1890 Matching**	**1862 Matching**	**1890 Matching**
120596	0	161509	0
1862 All Other	**1890 All Other**	**1862 All Other**	**1890 All Other**
11557607	0	3277018	0

V(D). Planned Program (Activity)

1. Brief description of the Activity

Research will be conducted on energy-related yield and production and processing efficiency of using agricultural and woody biomass, algae and oil seeds. Economic analyses will be conducted on these various energy systems to assess thresholds for local and regional application of these technologies. Extension programs will be 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.

2. Brief description of the target audience

The target audiences will include 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

2014	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Actual	4214	6619	63	0

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

Patent Applications Submitted

Year:	2014
Actual:	0

Patents listed

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

2014	Extension	Research	Total
Actual	0	49	49

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
2014	17

Output #2

Output Measure

- Number of peer reviewed (official) WSU Extension publications related to sustainable energy that are published annually.
  Not reporting on this Output for this Annual Report

Output #3

Output Measure

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

Year	Actual
2014	54

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 households and enterprises reporting reduced energy consumption as a result of WSU programs.
4	The number of forest and woodland owners who applied information from this program in the production of wood for biofuels.
5	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
2014	95

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 the Advanced Hardwood Biofuels (AHB)project, 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
2014	0

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
205	Plant Management Systems
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 households and enterprises reporting reduced energy consumption as a result of WSU programs.

Not Reporting on this Outcome Measure

Outcome #4

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 Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2014	80

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Northwest Advanced Renewables Alliance (NARA) is a five-year, $40 million project supported by USDA to explore woody biomass as a source of aviation biofuels. The focus is overcoming key obstacles that prevent wood-based jet fuel and petrochemical substitutes from being economically viable. NARA takes a holistic approach to building a supply chain for aviation biofuel with the goal of increasing efficiency in everything from forestry operations to conversion processes. The project includes a broad alliance of private industry and educational institutions from throughout the Northwest.

What has been done
NARA units, 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 team 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
NARA Outreach and Education Team engaged in western Montana, Northern Idaho panhandle, and Northeast Washington to create a broad forest stakeholder group investigating aviation biofuels development in the region. 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 as a result of NARA Outreach Team engagement

4. Associated Knowledge Areas

KA Code	Knowledge Area
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
403	Waste Disposal, Recycling, and Reuse
511	New and Improved Non-Food Products and Processes
605	Natural Resource and Environmental Economics

Outcome #5

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 steady decrease in fuel prices during 2014 and the high cost of manufacturing of hardwood biofuels has currently made hardwood biofuels not economical to produce. At the current rate, farmers would have to give their poplar production away for free. 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	Diseases 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: 2014	Extension		Research	
	1862	1890	1862	1890

Plan	18.0	0.0	65.0	0.0
Actual Paid	20.0	0.0	88.0	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**
153798	0	388697	0
1862 Matching	**1890 Matching**	**1862 Matching**	**1890 Matching**
153798	0	388697	0
1862 All Other	**1890 All Other**	**1862 All Other**	**1890 All Other**
2983575	0	7957171	0

V(D). Planned Program (Activity)

1. Brief description of the Activity

Research and outreach will be 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 will continue to be a high priority.

Our plant breeding and molecular biology programs will continue to develop new crop varieties that are able to withstand emerging disease and pest threats associated with climate change. We will investigate the possibilities that changed climatic conditions might present opportunities for growing new crops or growing traditional crops in new ways or new areas.

We will 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 livestock and crop farms, 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

2014	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Actual	12685	5615	115	35

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

Patent Applications Submitted

Year:	2014
Actual:	0

Patents listed

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

2014	Extension	Research	Total
Actual	10	33	43

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
2014	35

Output #2

Output Measure

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

Year	Actual
2014	2

Output #3

Output Measure

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

Year	Actual
2014	39

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
2014	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; 35 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	Diseases and Nematodes Affecting Plants
213	Weeds Affecting Plants
216	Integrated Pest Management Systems
404	Instrumentation and Control Systems
605	Natural Resource and Environmental Economics
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
2014	29

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; 35 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
Twenty-nine percent of program participants indicated and intent to apply the knowledge gained from one or more of the 35 educational events delivered in this program area. This application assessment was significantly lower than the previous year's evaluation showing a 55% application of knowledge gained. While the metric for knowledge gained increased from the previous year, it is unclear why the application of this knowledge declined 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	Diseases and Nematodes Affecting Plants
213	Weeds Affecting Plants
216	Integrated Pest Management Systems
404	Instrumentation and Control Systems
605	Natural Resource and Environmental Economics
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
2014	67

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

Sixty-seven 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. There is some resistance to the idea of climate change and some of our stakeholders are unwilling to accept this type of research and outreach as valuable or needed. Additionally, as in many of our programs, there were reduced baseline appropriations from the state to support our work. However, the concept of "climate change" as applied to marginal growing conditions has always been important in Washington State and we have traditionally and much more so recently, sought grants and outside investments that have allowed this program to move forward, in spite of political opposition to the issue of climate change.

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. Audiences were receptive to procedures and materials that will allow them to adapt to changing conditions, even as some reject the concept that some of the practice changes are motivated by an evolving climate. Self-reported knowledge increase by 75% of program participants and the intent to apply that knowledge by 29 % of participants were the metrics selected to evaluate

outcomes achieved through 35 educational events in this planned program. Deployment of anaerobic digesters and other GHG mitigation strategies on 67 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.
Twenty-nine percent of program participants indicated an intention to use or apply one or more principles gained from 35 educational events delivered in this program area.
Sixty-seven 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: 2014	Extension		Research	
	1862	1890	1862	1890
Plan	40.0	0.0	2.0	0.0
Actual Paid	83.0	0.0	0.4	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**
301408	0	13644	0
1862 Matching	**1890 Matching**	**1862 Matching**	**1890 Matching**
301408	0	13644	0
1862 All Other	**1890 All Other**	**1862 All Other**	**1890 All Other**
5570136	0	7355	0

V(D). Planned Program (Activity)

1. Brief description of the Activity

Educational programming will be 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 will be 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

2014	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Actual	46649	65051	142809	265961

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

Patent Applications Submitted

Year:	2014
Actual:	0

Patents listed

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

2014	Extension	Research	Total
Actual	11	8	19

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
2014	10632

Output #2

Output Measure

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

Year	Actual
2014	5

Output #3

Output Measure

- Number of graduate students with a significant professional orientation in the area of childhood obesity.

Year	Actual
2014	13

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
2014	92

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. In 2012, approximately 23% of the Washington State 10th graders were overweight or obese and approximately 27% of Washington State adults are obese.

What has been done
During 2014, the Washington State University Extension 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 new 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

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
2014	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
The applied research grant ?A Family-Based Media Literacy Approach to Improving Youth and Family Nutrition? (marketed as the Food Mania Program) was implemented to focus on interventions that increase nutrition-related knowledge. SNAP-Ed expanded education outreach included environmental supports and policy actions to promote access and availability of healthy foods and physical activity in communities in which SNAP-eligible families live, learn, work and play.

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. Demographic data was collected during a pilot reaching 52 youth and a parent or guardian. Due to the recently completed pilot, results were not available for reporting.

4. Associated Knowledge Areas

KA Code	Knowledge Area
134	Outdoor Recreation
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
2014	64

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
Eight communities participated in the Generating Rural Options for Weight Healthy Kids and Communities (GROW HKC) program. SNAP-Ed educators work with school personnel and community organizations to increase the opportunities for youth to be more physically active.

Results
GROW HKC, focuses on six dimensions: community knowledge about the issue; community efforts; community knowledge of the efforts; local leadership; community climate; and local resources related to the issue. Questions representing each dimension were asked during the Community Conversation and the participants shared their perception of readiness and preparedness for change. Each then scored by two independent evaluators and combined to

identify the overall stage of readiness. Each community report was presented to community stakeholders in late 2014. Further impacts will be measured in 2015.

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
2014	325

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
?Growing Groceries? program 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

In 2014, the program donated 13,000 pounds of produce. We formed a volunteer steering committee and have changed from training volunteers to providing direct training and workshops to the community. 44 % of the limited resource families indicated they consumed fresh fruits and vegetables 5-7 times a week, 39% 3-4 times a week and 16% 1 to 2 times a week. 83% of the booth visitors reported that the information they learned was helpful and 89% said they planned on using the given recipe.

4. Associated Knowledge Areas

KA Code	Knowledge Area
601	Economics of Agricultural Production and Farm Management
604	Marketing and Distribution Practices
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. 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%		10%	
712	Protect Food from Contamination by Pathogenic Microorganisms, Parasites, and Naturally Occurring Toxins	25%		50%	
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: 2014	Extension		Research	
	1862	1890	1862	1890
Plan	45.0	0.0	13.0	0.0
Actual Paid	25.0	0.0	42.0	0.0
Actual Volunteer	20.0	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**
217912	0	165809	0
1862 Matching	**1890 Matching**	**1862 Matching**	**1890 Matching**
217912	0	165809	0
1862 All Other	**1890 All Other**	**1862 All Other**	**1890 All Other**
1766777	0	2952967	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 will be conducted. In some counties, volunteers will be trained to engage with the general public to provide training on home food preparation and preservation. Publications and websites will also be 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

2014	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Actual	41385	103463	180184	368860

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

Patent Applications Submitted

Year:	2014
Actual:	0

Patents listed

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

2014	Extension	Research	Total
Actual	10	56	66

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
2014	483

Output #2

Output Measure

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

Year	Actual
2014	5

Output #3

Output Measure

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

Year	Actual
2014	48

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
2014	92

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 was conducted and 52 FSIA?s worked across 27 counties. During 2014, regional trainings were held for the 52 FSIA?s to increase their 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 1628 food service workers.

Results
After training, 92% 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
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
2014	89

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
An outbreak of a food borne illness can cost that food establishment 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 economic health of the business and general community?s health. 89% of program participants adopted at least one practice learned from the programs.

4. Associated Knowledge Areas

KA Code	Knowledge Area
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
2014	51

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 recordkeeping (37-67%), performance of a risk assessment (33-50%), increased employee training (29%), and agricultural

water testing (15%). Fifty-one 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
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. During 2014, 215 participants registered for the Preserve the Taste of Summer online course. Ninety-five adults have completed the course. Statewide, 52 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 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: 2014	Extension		Research	
	1862	1890	1862	1890
Plan	48.0	0.0	1.0	0.0
Actual Paid	71.0	0.0	0.7	0.0
Actual Volunteer	5824.0	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**
840793	0	72182	0
1862 Matching	**1890 Matching**	**1862 Matching**	**1890 Matching**
840793	0	72182	0
1862 All Other	**1890 All Other**	**1862 All Other**	**1890 All Other**
5233228	0	104618	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 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

2014	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Actual	58019	98832	66565	97911

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

Patent Applications Submitted

Year:	2014
Actual:	0

Patents listed

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

2014	Extension	Research	Total
Actual	17	19	36

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
2014	154566

Output #2

Output Measure

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

Year	Actual
2014	2

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
2014	71

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. There were over 150,000 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 : State 4-H Teen Leadership Conference, 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 71% 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 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
2014	86

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 gathering, most recently updated in the fall of 2014.

What has been done
In 2014, 54 facilitators were trained, and participants represented diverse groups including Latino and African American communities in 2014, 37 SFP programs were offered across the state, serving 187 families in 8 counties. We produced 37 impact reports for agencies that completed the program and submitted evaluation data. Approximately $120,000 in grant money from NIFA supported the CYFAR project which is explored cultural adaptation strategies for SFP content, delivery and evaluation.

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 86% 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 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
2014	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
2014	96

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 the past four 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. To date data has been collected from 1701 former 4-H members with 75% of all Washington Counties reporting.

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
2014	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 in 2014 implemented 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
802	Human Development and Family Well-Being
803	Sociological and Technological Change Affecting Individuals, Families, and Communities
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. In 2014, 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: 2014	Extension		Research	
	1862	1890	1862	1890
Plan	21.0	0.0	0.0	0.0
Actual Paid	44.0	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**
512552	0	0	0
1862 Matching	**1890 Matching**	**1862 Matching**	**1890 Matching**
512552	0	0	0
1862 All Other	**1890 All Other**	**1862 All Other**	**1890 All Other**
3190201	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, 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 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

2014	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Actual	39044	199000	2406	3508

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

Patent Applications Submitted

Year:	2014
Actual:	0

Patents listed

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

2014	Extension	Research	Total
Actual	17	6	23

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

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

Year	Actual
2014	74

Output #2

Output Measure

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

Year	Actual
2014	1883

Output #3

Output Measure

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

Year	Actual
2014	2741

Output #4

Output Measure

- The number of people receiving family asset building education.

Year	Actual
2014	968

Output #5

Output Measure

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

Year	Actual
2014	1471

Output #6

Output Measure

- The number of scholarly products produced by CED educators.

Year	Actual
2014	63

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
2014	140

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
President Obama stated earlier this year, "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; launching a tribal technology training initiative; and providing technical assistance for Washington State FirstNet?s public safety communications outreach.

Results
Forty-six communities and two tribes identified and developed investments in new telecommunication infrastructure (over 100 miles of fiber-options in one region alone). Establish a model for community engagement that is the basis for FirstNet?s http://www.firstnet.gov/ outreach in Washington State. An impact assessment of broadband efforts in the Columbia Gorge over the last 7 years are found at: http://ext100.wsu.edu/impact/broadband-deployment-in-klickitat-and-skamania-counties/.

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
2014	1434

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
One can argue 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 (?Center?) and the Division of Governmental Studies and Services (?DGSS?). The work included training and technical assistance to government agencies and non-profit groups to optimize grant development, board training, and organizational development.

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
2014	2741

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
During 2014, over 2,700 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
2014	968

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. During this same time period, Washington state government all but eliminated its investment in these activities. The result, 2014 constitutes the last year we will be carrying up these activities, without direct support of grants from foundations.

Results
In 2014, Extension engaged with 968 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, 6 public entities and their staff went through ?poverty simulations? to help their organization 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 continues 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 2014, we continued to see the positive result of WSU Extension's restructuring into three program units. 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)	
7304	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)	
4500	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)	
171600	Tons of feedstocks delivered.