

2013 Washington State University Combined Research and Extension Annual Report of Accomplishments and Results

Status: Accepted

Date Accepted: 07/22/2014

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 many aspects of the lives of Washingtonians, Americans and humanity.

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 energy security, natural resource stewardship, health and wellness, and youth, family, and community and 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 educators also extend the research conducted by faculty at other regional centers of expertise, including the University of Washington, Oregon State University, and the University of Idaho. For these and other reasons, we believe that a 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.

In 2011, WSU Extension was merged into the College of Agricultural, Human, and Natural Resource Sciences. Partially a matter of financial exigency, the fusion has prompted needed changes, especially in Extension. Prior to 2011, Extension had a matrix form of management, with individuals imbedded in both a geographically organized structure (East, West, South...) and a subject area (Family, Natural Resources...). The geographic structure has been phased out and only the subject area structure remains. The new structure places more emphasis on what Extension faculty members do and less on where they do it. This change, while simplifying the guidance given to individual faculty members, has not eliminated local considerations in appointments and responsibilities since many Extension faculty work closely with county-based operations and often are partly supported by this relationship. This change in structure appears to be working well, as indicated by more direct communication within the system and positive stakeholder feedback.

Concurrent changes have also taken place in the ARC. It became increasingly obvious that the shrinking direct state investments would not be 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. The

faculty has responded to this challenge and total new awards to Research and Extension rose from approximately \$80 million in 2010 to over \$105 million in 2011 and over \$91 million in 2012 but declined back to \$80 million in 2013. The decline in 2013 is partly due to decreases in federal and state funds available but is worrisome. The changes have been broadly distributed over all of our programs. 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 that will be worth \$32 million over the 8 years of the increased assessment and will support apple, cherry and pear research. 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's 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 2013.

Total Actual Amount of professional FTEs/SYs for this State

Year: 2013	Extension		Research	
	1862	1890	1862	1890
Plan	535.0	0.0	440.0	0.0
Actual	492.9	0.0	528.0	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

It is important to place our merit review process into a historical perspective because of the very significant changes that have taken place over the last decade at Washington State University. During the last ten years, two items have driven a more thorough 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. Our intentions to create a "world class" research institution, continue our exceptional outreach, and create an outstanding research-based learning experience for students, were solidified in the College and University strategic plans. 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 began to stabilize in 2013 and was relatively flat, this represented a significant improvement over the previous five years. In January, 2014 faculty got their first systematic raise in six years. Of necessity, 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

reviewed by either the Director or the Associate Director. If they approve the project and proposal, the 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.

The process in Extension is somewhat different. Beginning in 2011, the structure of Extension was changed to increase the programmatic focus across larger geographic areas and decrease the limitations of county boundaries on Extension appointments. The opportunity/necessity for restructuring was motivated by the smaller number of appointments in Extension as a result of decreased funding, vacancies in key positions, and the need for more efficient program delivery across the state. Currently, a core committee of faculty and administrators evaluate WSU Extension programs for their fit into the general Extension portfolio. This discussion includes the work to be done and the context in which the work will be funded. Discussions with county representatives have often been a major part of these discussions since many Extension appointments have a component of county-level support and responsibility. Individual WSU Extension faculty program plans are developed through statewide planning processes informed by the WSU Extension Strategic Plan, 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. These performance expectations are also key elements of consideration 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.

Washington State University has a long and close relationship with its many stakeholders. Not only do we maintain relationships with them through our WSU Extension network of county offices, but we also maintain a network of Research and Extension Centers (R&E Centers) throughout the state. These are not just farms or research sites; they typically have significant permanently based Research and Extension faculty and staff. They are also centers for graduate student training. Thus, we are literally "in the backyards" of many of our primary stakeholders on a daily basis and they develop both personal and professional relationships with WSU personnel. Major R&E Centers are located in all geographic regions of the state and include stations in Prosser, Wenatchee, Mt. Vernon, and Puyallup. Other, smaller centers are also maintained. Additionally, many stakeholder groups have research and administrative personnel that attended WSU. In many instances, commodity commissioners or commodity research directors serve as adjunct faculty in appropriate academic units. The general agricultural community of Washington is heavily populated with individuals that are former WSU students.

Stakeholders in Washington have long recognized WSU as a major asset for their industries and activities and are often very forthcoming with suggestions and critiques. Our stakeholders are familiar with our web page outreach (see, for example, <http://cahnrs.wsu.edu/>) and our phone numbers and are not reluctant to give both formal and informal input to the administrators and scientists in the ARC and WSU Extension. We make use of all information avenues to reach the broadest array of stakeholders. We prepare and distribute WSU project-related information through our Marketing and Information personnel. While electronic media (email, websites, and blogs) are used to solicit information, we also recognize that some individuals do not have access to these media so more traditional approaches are also used. These latter methods include the use of radio, direct mail, telephone contacts, and personal visits, including Spanish language radio (especially in Latino communities), local access television, newspapers (English and other languages), electronic media (web site, email lists, and targeted emails), newsletters, posted announcements in high volume areas (often in multiple languages), group meetings, and targeted direct mail. As indicated by the target audience, we develop materials that are both culturally sensitive and are designed to engage a variety of stakeholder groups and populations. For example, multiple language materials are produced for the nutrition education program. 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. These permit rapid assessments that are extremely valuable since their response rates are generally much higher and the 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.

Many Departments within the College of Agricultural, Human, and Natural Resource Sciences have an advisory board, as do the higher levels of both ARC and Extension administration. These advisory councils and committees are kept abreast of activities within their respective units through newsletters (some weekly), telephone calls, emails, blogs, and direct meetings. These advisory groups meet at regular intervals both as a unit and with their primary departments. During these meetings, they are briefed about new initiatives, on-going work, and issues related to the College and WSU Extension. Feedback from stakeholders is an extremely important aspect of these events.

This feedback is important in developing new initiatives and outreach programs. One of the primary objectives of these meetings over the past year has been a program from the academic section of CAHNRS called "Ready on Day One." Through this initiative, we are working with stakeholders to improve the fraction of graduates that are ready to take on the responsibilities of their profession and do not require extensive additional training. Another major mechanism of interaction is through various State Commodity Commissions, which support research and extension at WSU through competitive processes that tend to be biased toward projects that address relatively immediate concerns. In addition to researchers, the ARC Director or his representative are often present at these sessions to help the groups understand the context of the WSU activity and to get their input into the strategic planning done at WSU related to their industry. As indicated above, stakeholder input is also received by using various advisory committees to advise departments, centers, and programs. There is a College level advisory committee as well as a college level Agricultural Kitchen Cabinet. Both of these interact with the Dean, the ARC Director, the Director of Extension, and other Associate Deans in helping to define priorities, identify emerging research issues, and provide feedback on the quality and relevance of our research and extension activities. Individuals who serve on these advisory panels are frequently identified through our various formal and informal networks. These individuals typically represent specific knowledge about target audience needs or about specific subject matter that we believe will help advance program design, delivery, and impacts. These individuals are contacted directly by the appropriate party (County Director, Program Director, Associate Dean, Dean, etc.) to invite their participation.

Finally, web content delivery (webinars) and web conferencing are being increasingly used to both communicate with the public and to present research results. WSU Extension continues to adapt its web capabilities to enabled greater ease of use and access to information. Web conferencing is generally delivered via applications like Adobe Connect, Skype, JoinMe or GoToMeeting. This allows ARC scientists and Extension educators to communicate broadly with dispersed groups and simultaneously collect feedback from these audiences through online chats and polls.

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.

We often use established relationships with formal partners (e.g., a commodity commission) that designate individuals to serve on an advisory panel with the expertise and interest that they believe will be appropriate to represent their constituents. The ARC and WSU Extension use local and statewide advisory committees that are gender balanced, with ethnic and cultural diversity, to provide input to College leadership, faculty, and staff. These include the College of Agricultural, Human and Natural Resource Sciences (CAHNRS) Advisory Council, the Dean's "Kitchen Cabinet," the Center for Sustaining Agriculture and Natural Resources Advisory Committee, advisory committees at the four major Research and Extension Centers, and county, departmental, and program-specific advisory committees. For example, the ARC and some parts of Extension work

closely with the numerous commodity commissions in the state to clearly understand their needs. These interactions are with a combination of staff and volunteers who are engaged in the process and accountable to their membership. Joint work with the commissions often involves collaborative project design and follow-up presentation of results. Our county-based programs are closely aligned with the needs of county government and their constituencies, and we confer with local officials frequently to understand their needs and to effectively define WSU Extension's role within key local partnerships. 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.

The situation is more complex in interacting with emerging issues, especially social issues. We seek to identify emerging needs by in depth discussions with local or industry decision makers, with the process extending to the state or regional level as needed. Often, the contacts with these groups are made through our discussions of specific needs such as land use issues, resource management, or community needs. While these are often phrased initially in terms of a particular locale, we attempt to assess the general scope of the problem and find appropriate individuals on our staff or in the groups who are affected by the problem to help define the issues and determine a plan of action for dealing with them. Once a problem and the groups affected are broadly defined, we take care to consider the most effective mechanisms of engagement. 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 or the Social and Economic Sciences Research Center (<http://www.sesrc.wsu.edu/sesrcsite/>) to assess public attitudes. Needs assessment is an expectation of all WSU Extension faculty members. These processes are deeply engrained in program development and are integral to our mission. Language and culture also are critical to program design as solutions need to be seen as locally appropriate and meaningful. Culture and language issues often determine how we staff for future programming. This has led Extension to employ individuals from various cultural and ethnic groups to help frame problems and explain potential solutions to stakeholders.

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.

Stakeholder input is gathered through numerous formal and informal processes, as described previously. Our faculty, staff, and administrators are members of many key organizations at local, statewide, and national levels. We strive to be stakeholder friendly by answering our phones, reading our emails (and answering them) and going to meetings. Additionally, our membership is legislatively required on many boards and committees, including some that were created and maintained specifically for the purpose of garnering stakeholder input. We strive to make it possible for these groups to reach out through surveys or studies to help define those stakeholders who, it would be important to consult concerning specific issues. Our formal advisory structures include the College of Agricultural, Human and Natural Resources Dean's "Kitchen Cabinet," the Center for Sustaining Agriculture and Natural Resources advisory committee, statewide and local Master Gardener Leadership Council, State 4-H Advisory Council, and local leader organizations, county advisory committees, and advisory committees for research and extension centers and individual units. Those who serve on these groups are chosen in part for their networking, ability to speak for unique stakeholder groups, and ability to gather further input as needed. In addition, each WSU Research and Extension faculty member and administrator is encouraged to develop and maintain informal networks that permit them to garner input from key officials, industry representatives, and advocacy groups. In addition to personal contact, surveys are frequently used to gather input about the effectiveness of individual programs and focus groups are used to test new approaches, web site designs, and other communication materials. Most hiring also includes extensive stakeholder input. This is accomplished by seeking stakeholders' advice on position descriptions and by asking them to serve on search and screening committees.

Annual assessments are undertaken to determine general population characteristics, agricultural trends, natural resource-related issues, human health trends, and business dynamics. These assessments are largely based on analysis of data for the US Census Bureau, National Agriculture Statistics Service, Washington Department of Natural Resources, Washington Department of Health, and the Washington Department of Commerce but can be supplemented by internally or stakeholder commissioned studies that go into greater depth concerning any issue. These data help WSU faculty and staff identify target audiences and to develop appropriate research and outreach to address critical needs.

Stakeholder input from groups and individuals identified by these means is collected through a multitude of processes that includes personal meetings with individuals and groups, surveys, and other forums. Information from these venues is generally summarized and shared broadly. Additionally, key WSU personnel are invited to participate in these meetings and surveys 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.

Stakeholder input has been critical to the development of long-range plans involving research and extension, project design, program delivery, and the expenditure of limited resources. Virtually every program we deliver involves engagement with both program participants and stakeholders to guide our priorities. This helps ensure that we reach the appropriate audiences; that these individuals are able to achieve their goals; and that we are able to achieve the desired outcomes for any given program. With the Washington State Association of Counties, Extension used information gained from an online survey and taskforce to begin the reconfiguration described elsewhere and refine the delivery of programs and the geographic distribution of faculty and staff. This major restructuring of Extension used significant input obtained from stakeholders and has convinced them that they have input into university processes.

Input from stakeholders enters our research programs at several levels. Stakeholder priorities are expressed through their direct funding decisions (e.g., commodity commissions) as they allocate their money to research at WSU and elsewhere. This often takes place with the participation of ARC administrators or their delegates. Sometimes, a project may be structured in order to separate objectives that are more easily supported by the ARC from those that are better supported by the stakeholders. The ARC takes stakeholder prioritization into account in allocating resources, such as space or faculty and technical positions, and we communicate our limitations to groups that often are better placed to obtain additional resources. As an example, in 2006, ARC began to strengthen its tree fruit horticulture programs at the encouragement and with the support of the industries involved. This led to filling several positions and to a significantly increased profile for WSU tree fruit research and extension. In 2011 the apple and pear growers voted a new, increased assessment of \$27 million to support additional strengthening of the program over the next 8 years. In 2012, the cherry growers added another \$5 million to the commitment. As another example, to expand the wheat breeding greenhouse space, the Washington Wheat Growers donated \$5 million to the ARC and agreed to a wheat royalty on WSU varieties that should raise another \$5 million over the next 10 years. These contributions are important in themselves and are tangible evidence that the relevant industries are both willing and able to support activities relevant to their interests.

In 2007, we also began an internal grants program to direct resources toward Emerging Issues in Agriculture and, after several years of using these funds to buffer budget cuts, the grant program was reinstated in 2012, with funding in 2013 and 2014(<http://arc.wsu.edu/info/eri/index.html>). The priorities of this program were articulated with stakeholder input and stakeholders participated in the proposal review process. In addition to the research accomplishments of the teams that are funded, the team building and preliminary data generated through this process has been able to leverage considerable (>10X) external funding, a development that was supported enthusiastically by the stakeholders.

Brief Explanation of what you learned from your Stakeholders

Stakeholder input is routinely used in numerous decision processes. With major changes in university and college prioritization as described above, many stakeholder recommendations and views on major issues were incorporated into our planning processes and guided our priorities for both extension and research activities. We learned that the highest priority for agricultural stakeholders was to support innovative research and extension outreach that addresses important production issues that are critical to their profitability and sustainability. This was especially true concerning efforts enabling stakeholders to adjust to new pests, diseases, and other changing production and market conditions. Other stakeholders prioritized natural resources concerns related to water quality, water quantity, forest health, rangeland health, and stewardship. Local food

systems and the desire for community connections with our food supply was another reoccurring 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.

When significant budget challenges confronted WSU Research and Extension, it was our stakeholders that helped us to evaluate the feasibility of various reduction scenarios and their input proved extremely valuable in helping us understand the potential impacts of our decisions. One overwhelming message was that stakeholders want more help in research and extension. The problem is that they have trouble figuring out how to pay for it. Obviously, problems arise when broad stakeholder needs meet the limited resources available but stakeholders continued to be extremely supportive. With regard to programs like the USDA-SCRI, our stakeholders were able to contribute to funding through the SCRI matching mechanism and were pleased with us leveraging their investments to buy more research and extension. To some extent they have changed how they allocate their own dollars to fund more general and broad-reaching research that can benefit their industries and make us more competitive for federal and other extramural support. Over the last several years, we have seen various groups, including the Washington Grain Alliance, the Washington Tree Fruit Research Commission, the Washington wine industry and others vote to support specific enhancements of their programs or create new mechanisms, like implementing royalties or a wine auction, to provide research funding. This is extremely significant, in particular by showing their recognition of the importance of our activities in a way that can be used as evidence of support in other arenas. However, if we are to be most effective, this type of support must also come from other groups and be used to increase support at the state and federal levels. This will be a major part of the funding formula of the future and, in this, stakeholder involvement will be critical.

IV. Expenditure Summary

1. Total Actual Formula dollars Allocated (prepopulated from C-REEMS)			
Extension		Research	
Smith-Lever 3b & 3c	1890 Extension	Hatch	Evans-Allen
3867352	0	3947964	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	4802297	0	3111529	0
Actual Matching	4802297	0	3111529	0
Actual All Other	58719319	0	64902388	0
Total Actual Expended	68323913	0	71125446	0

3. Amount of Above Actual Formula Dollars Expended which comes from Carryover funds from previous				
Carryover	1261882	0	222485	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
Reason for not reporting
{No Data Entered}

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	9%		0%	
123	Management and Sustainability of Forest Resources	10%		0%	
124	Urban Forestry	5%		0%	
125	Agroforestry	2%		0%	
133	Pollution Prevention and Mitigation	5%		20%	
135	Aquatic and Terrestrial Wildlife	5%		15%	
136	Conservation of Biological Diversity	10%		10%	
213	Weeds Affecting Plants	5%		15%	
214	Vertebrates, Mollusks, and Other Pests Affecting Plants	2%		5%	
215	Biological Control of Pests Affecting Plants	5%		10%	
403	Waste Disposal, Recycling, and Reuse	5%		5%	
605	Natural Resource and Environmental Economics	2%		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: 2013	Extension		Research	
	1862	1890	1862	1890

Plan	75.0	0.0	25.0	0.0
Actual Paid Professional	70.0	0.0	32.8	0.0
Actual Volunteer	3527.0	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
947581	0	168848	0
1862 Matching	1890 Matching	1862 Matching	1890 Matching
947581	0	168848	0
1862 All Other	1890 All Other	1862 All Other	1890 All Other
6282618	0	4424530	0

V(D). Planned Program (Activity)

1. Brief description of the Activity

Our work in natural resource stewardship was focused in the following areas: Developing innovative applied research and outreach for storm water management, including Low Impact Development techniques to reduce the level of pollutants in storm water runoff; proper planning and management of nonindustrial private forestlands; decreasing the threat of wildfire to property and people; increasing upland water quality; and increasing the production of hardwood biofuels in the Pacific Northwest. Numerous studies are examining habitat and environmental requirements of native and introduced species in relation to habitat conservation and agricultural practices. We are examining the interactions between native and agricultural predator and prey populations as they relate to biological stabilization mechanisms in insect and weed populations.

Research into the ecology and dynamics of forest ecosystems is providing (i) improved understanding of the importance of early- and mid-seral forests for threatened and endangered species, with implications for forest management of interest to the Bureau of Land Management in several areas of the Northwest; (ii) improved data on forest fuel distribution with application to fire management and assessment of community adaptive capacity to wildfire risk at the wilderness-urban interface; (iii) improved hybrid poplar management and resultant product quality; and (iv) quantification of changes in the diets of grizzly and black bears in Yellowstone National Park, showing a large decrease in the amount of cutthroat trout consumed by bears in recent years.

A major study of cougar population, community and landscape ecology has been completed. This research thrust has been replaced by a new project, supported by direct allocation from the Legislature, focused on the reestablishment of the wolves in the State of Washington as a result of the natural migration of breeding pairs from adjacent populations both within the state and from adjacent states. This project will combine research on the population dynamics of the rapidly increasing wolf population in the state as well as extension efforts focused on working with ranchers to minimize stock losses due to predation.

Numerous studies of rangeland and wetland ecology were continued during 2013, involving various species including Bighorn sheep, black-tailed deer, mule deer, jackrabbit, pygmy rabbit, sage grouse, sharp-tailed grouse, long-billed curlew, leopard frogs and other amphibians. Additional new research was focused on global climate change and the resulting biological and ecological dynamics challenges faced by selected species such as salamanders and other amphibians. This work is integrated with documentation of land management needs and strategies for conservation of biodiversity in agricultural and urban landscapes. Land management agencies and private landowners will use results from these studies to help improve conservation of rare, endangered and vulnerable species in the Pacific Northwest. Another study continued research on the effects of direct oxygenation as a viable remediation strategy for hypolimnetic anoxia in deep lakes and consequent restoration of lake fish habitat.

Extension educators worked 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 lead to behavior change and ultimately to an improved condition of the natural resource base. Additional information on some of these programs can found at the following websites: <http://snohomish.wsu.edu/forestry> ; <http://raingarden.wsu.edu> ; <http://www.shorestewards.wsu.edu> ; <http://county.wsu.edu/jefferson/nrs/water/courses/Pages/default.aspx;/resources.html>; <http://raingarden.wsu.edu>; and <http://www.beachwatchers.wsu.edu/regional/index.php>

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 citizens interested in natural resource issues and the scientific disciplines that relate to them.

3. How was eXtension used?

Five faculty members participated in an eXtension Community of Practice.

V(E). Planned Program (Outputs)

1. Standard output measures

2013	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Actual	224135	483255	12124	28411

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

Patent Applications Submitted

Year: 2013
 Actual: 0

Patents listed

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

2013	Extension	Research	Total
Actual	12	35	47

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

- Number of extension workshops, demonstrations, and conferences conducted with a natural resources focus.

Year	Actual
2013	814

Output #2

Output Measure

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

Year	Actual
2013	12

Output #3

Output Measure

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

Year	Actual
2013	43

Output #4

Output Measure

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

Year	Actual
2013	3527

Output #5

Output Measure

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

Year	Actual
2013	5650

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 acquired from WSU scientists or extension educators.
3	Number of acres of rangelands and forests exhibiting improved condition 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 and conserve water resources.

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
2013	96

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Washington 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 are also an issue.

What has been done

Program efforts included water quality education, proper pesticide use, riparian grazing, and proper fertilizer use. The WSU Master Gardener program was a major component of this work along with other programs including Beach Watchers, Stream Stewards, Native Plant Advisors, and Rain Garden Mentors, which provided training and education to improve water quality, install rain gardens, and maintain a buffer in riparian areas. The Shore Stewards program trained shoreline landowners on best management practices to improve water quality, while Low Impact Development workshops were held to present the newest methods of green infrastructure to planners, engineers, and agency personnel.

Results

Ninety-six percent of program participants who completed evaluations indicated increased knowledge and skill related to one or more learning objectives related to natural resource stewardship and protecting water quality.

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 knowledge acquired from WSU scientists or extension educators.

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2013	70

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 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

Field days, workshops, demonstration gardens, applied research, fact sheets and web sites were used to teach and demonstrate proven water conservation methods. These education 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.

Results

Over 24,000 residents, grounds keepers and landscape maintenance personnel learned how to conserve water and protect water quality. Over 85% of program participants learned new information about water use and management. Follow-up evaluations showed that over 70% 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
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 #3

1. Outcome Measures

Number of acres of rangelands and forests exhibiting improved condition 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
2013	160109

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Small-scale forest and rangeland owners manage millions of acres of land throughout the state. This land contributes significantly to environmental, economic, and social well-being. Much of this land is at risk due to land-use conversion, landscape fragmentation, poor health, degraded habitat, and invasive species. This results in increased water pollution, stormwater management problems, elevated wildfire risk, species and biodiversity loss, destabilized hillsides, economic losses to landowners, degraded aesthetics, as well as reduced quality of life for landowners and communities.

What has been done

Multiple series of coached forest stewardship training workshops with extensive collaboration with the Department of Natural Resources; Ties to the Land; eastern and western Washington forest field days; workshops; online coached forest stewardship interactive modules; webinars; e-newsletters; eXtension; television and radio ads; applied field research; biocontrol releases; and websites.

Results

Over 160,000 acres of forest and rangeland were positively impacted by recommended management practices that improved function and condition of the resource. 96% of evaluated participants demonstrated increased knowledge and 93% are likely to implement new practices; 78% will be more likely to retain their land as forestland; 91% have increased enjoyment of their land; and 90% will be more likely to employ a professional forester when harvesting timber. In addition, they will share knowledge with an average of seven other people per year. For field days, 96% reported learning something new that was applicable to their property with 85% reporting an intention to implement new or different practices.

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 #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
2013	88

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Pesticide use is controversial in commercial agriculture, the home garden and around the home. Improper use can result in crop and ornamental plant damage, illegal pesticide residues, contamination of water, and possible human and animal poisonings.

What has been done

Incorporation of pesticide use and safety in Master Gardener training; introduction of integrated pest management concepts; revision of the HortSense program; pesticide pre-training; pesticide recertification classes; online pesticide recertification modules; demonstration garden classes on safe use of pesticides; demonstration garden classes on integrated pest management.

Results

Eighty-eight percent of participants indicated intent to apply knowledge gained to improve the safe and appropriate use of pesticides. Participants in the pre-license pesticide training have a 99% test passing rate, and over 88% of participants in the pesticide recertification training obtain new knowledge and apply this information to their job, business, or consulting practice. Gardeners reported implementation of practices such as mulches to reduce weed germination (65%), and 92% reported using at least one integrated pest management technique instead of just using a pesticide.

4. Associated Knowledge Areas

KA Code	Knowledge Area
112	Watershed Protection and Management
133	Pollution Prevention and Mitigation
136	Conservation of Biological Diversity
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 and conserve water resources.

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2013	90

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Washington rivers, lakes and groundwater sources provide water for agricultural, residential and recreational uses and provide wildlife habitat. Safe, reliable sources of water must be maintained to meet the needs of our growing population. Water-conserving garden practice 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

Master Gardener new applicant training; Rain Garden Mentor training; Stream Steward Training; Master Gardener continuing education; 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. Development and release of the new Rain Garden Manual for Western Washington.

Results

Over 1000 rain gardens were installed in homeowner's yards to collect roof and sidewalk runoff. 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. The top choices were: eliminate all pesticides use; pull weeds instead of spray; use a slow release fertilizer, and mulch to reduce weed germination and growth.

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
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

V(H). Planned Program (External Factors)

External factors which affected outcomes

- Economy
- Appropriations changes
- Public Policy changes
- Government Regulations

Brief Explanation

Rules continue to tighten the use of fertilizers and pesticides in urban areas and riparian areas. Alternatives are recommended to maintain or improve water quality.

Until recently, ongoing concerns and limitations with the state and university budgets have impacted our hiring and deployment of human and financial resources, resulting in the loss of faculty and administrative leadership. However, we appear to have reached a stable, albeit much lower, level of funding. The uncertainty with state policy and funding for higher education clearly impacted our ability to take bold initiatives, given contingencies required for additional budget cuts from state and local governments. These "cuts" have created new funding models that have moved our work in research and extension increasingly to more dependence on securing competitive grants to support our system and drive our programs forward. Although we are moving forward with our hiring and additional program development, competing priorities for limited funds and financial resources were still a significant factor in 2013.

V(I). Planned Program (Evaluation Studies)

Evaluation Results

Overall, program participants have a greater awareness, increased knowledge, and application of knowledge in their gardens and ranches. Overall pesticide use is reduced in our target audience and better choices are being made regarding alternative options. Home gardeners are using more efficient irrigation methods and are using less water overall.

Key Items of Evaluation

Pre- and Post-tests of Master Gardeners, Rain Garden Mentors, Beach Watchers and Stream Stewards are used to determine knowledge gain. Follow-up evaluations (telephone call or online surveys) are used for six-month to one year evaluations. End of meeting forms are used for workshops, conferences and demonstration garden events. Major, regional field days are evaluated through personal interview or follow-up online surveys. Continued participation by volunteers is itself evidence of impact.

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

V(C). Planned Program (Inputs)**1. Actual amount of FTE/SYs expended this Program**

Year: 2013	Extension		Research	
	1862	1890	1862	1890
Plan	145.0	0.0	290.0	0.0
Actual Paid Professional	98.0	0.0	345.3	0.0
Actual Volunteer	27.0	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
1666157	0	2157767	0
1862 Matching	1890 Matching	1862 Matching	1890 Matching
1666157	0	2157767	0
1862 All Other	1890 All Other	1862 All Other	1890 All Other
8894072	0	42622179	0

V(D). Planned Program (Activity)

1. Brief description of the Activity

Production agriculture is one of the primary Research and Extension areas of emphasis at Washington State University. We view the ability to maintain a safe, high quality, and growing food supply as our most diverse and active of the planned programs. Virtually everything that we do under the heading of production agriculture and farm to table programs has some component included in this program. This rationale is based on the idea that knowledge gained about plant and animal production systems contributes to the world food supply and often can be adapted to increase food availability and stability in areas far from Washington state. Thus work in Departments like Crop Science, Horticulture, the Institute of Biological Chemistry and Animal Science are included, as are research and extension programs in areas such as Entomology and Plant Pathology. Since having production systems that are economically viable is essential, we also include Agricultural Economics in this Planned Program and research and extension that is related to food processing and distribution. We also include efforts that directly relate to issues such as the availability of labor and the dynamics of communities that are not covered by other Planned Programs.

To accomplish the work included in this Planned Program, fundamental, translational, and applied research is conducted in laboratories on our main campus, at Research and Extension centers, and in collaboration with growers, ranchers, food processors, and other related individuals and entities. Extension programs serve many roles in this Program. Through the outreach and survey activities of Extension, many of the issues are defined and articulated in a form that allows us to take direct action. We strive to identify the scope of a problem, define and identify solutions, determine the resources available, and decide on a course of action. Action plans could range from an investigation of the literature to carrying out primary research that would identify and validate solutions. Extension is almost always involved in testing the application of partial solutions and ultimately is charged with developing their mechanisms for

implementing potential solutions if it appears that something suitable has been found to deal with the identified problem. Detailed information about the WSU projects is available through the CRIS reporting system. As an index of external grant funding competitiveness, the ARC obtained ~\$43 million in new award commitments in CY 2013, a large fraction of which was in areas covered in this Program.

As is implied in the above description, the dynamics of problem solving in this area is complex. There are many different targets for specific solutions but they can generally be characterized by the boundary conditions of trying to improve the efficiency or cost effectiveness of production, processing or distribution, trying to increase consumer and stakeholder satisfaction, and trying to anticipate issues that might arise in the future that would keep the new ideas from being sustainable, in the sense that they can be applied indefinitely without adverse consequences. This latter issue often leads to parts of a project being assigned to another Program. If, for example, a specific constraint on production is related to weather or changing climate, some fraction of the effort will be assigned to the Program on Climate Change.

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?

Three faculty members were engaged in Communities of Practice to advance collaborative efforts and facilitate research-based information sharing through the eXtension system.

V(E). Planned Program (Outputs)

1. Standard output measures

2013	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Actual	125179	3487425	5026	16627

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

Patent Applications Submitted

Year: 2013
 Actual: 3

Patents listed

WA8074 ('Glee') Hard Red Spring Wheat. Michael Pumphrey. Hard red spring wheat. Awned, semi-dwarf, white straw, white glumes, and early to mid-season maturity. Broadly adapted to a wide range of production regions across eastern Washington, northern Idaho and northern Oregon. Performs particularly well in areas receiving >500mm average annual precipitation and/or subject to moderate or severe stripe rust pressure. Superior high-temperature adult-plant resistance to stripe rust, and resistance to local biotypes of Hessian fly. Milling and baking properties are equivalent to Tara 2002, Scarlet, and Hank. 1259-U2RF-OC United States 201300129 2013-01-30

WA8092 ('Otto') Soft White Winter Wheat. Stephen Jones and Arron Carter. Semi-dwarf, soft white winter wheat with late-season maturity, common head type, and white straw and glumes, Adapted for production in the semi -arid region (<12 inches average annual precipitation) of eastern Washington as a replacement/ complement for 'Eltan' and 'Xerpha', Otto inherited the Pchl gene for foot rot resistance, based on the SSR markers Xorw1, Xorw5 and Xorw11'6, from the parent 'Madsen', Otto also has snowmold and dwarf bunt resistance similar to that of the parent Eltan, Otto has non-race specific HT AP stripe rust resistance at a level equal to that of the variety Madsen and higher than that of Eltan, End-use quality performance is a significant improvement compared to Eltan, Madsen and Xerpha. 1231-U2RF-OC United States 201300360 2013-05-14

WA8123 ('Dayn') Hard White Spring Wheat. Michael Pumphrey. Semi-dwarf, hard white spring wheat with early-medium maturity, white straw and white glumes. Broadly adapted with superior high-temperature adult-plant resistance to stripe rust, good test weight, above average protein content, and excellent yield potential in high rainfall and irrigated production areas. Susceptible to local biotypes of the Hessian fly. Milling and baking qualities are equivalent to Otis and superior to that of BR7030. 1316-U2RF-OC United States 201300130 2013-01-30

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

2013	Extension	Research	Total
Actual	43	277	320

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

- Number of workshops, demonstrations, and field days conducted annually

Year	Actual
2013	1620

Output #2

Output Measure

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

Year	Actual
2013	43

Output #3

Output Measure

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

Year	Actual
2013	175

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
3	Percentage increase in yield realized among program participants as a result of application of WSU-recommended practices.
4	Increase in profitability resulting from practices developed by or recommended by WSU Extension personnel and/or ARC scientists.
5	Increased number of acres managed with "Best Management Practices" designed to yield improved environmental quality.
6	Number of acres impacted by WSU research and extension programs that enhanced productivity, efficiency, or sustainability of crop production enterprises
7	Number of food production animals impacted by WSU research and extension programs that enhanced productivity, efficiency, or sustainability of livestock and dairy production enterprises.
8	Number of food processing facilities or direct marketing enterprises that enhanced processing, marketing, or overall efficiency of food distribution.

Outcome #1

1. Outcome Measures

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

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2013	69

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

This outcome documents that 69% of program participants increased their knowledge and skill through participation in one or more of over 1,600 educational events focused on enhancing agricultural productivity and food security for the benefit of producers and consumers alike.

4. Associated Knowledge Areas

KA Code	Knowledge Area
101	Appraisal of Soil Resources
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
- 202 Plant Genetic Resources
- 205 Plant Management Systems
- 211 Insects, Mites, and Other Arthropods Affecting Plants
- 212 Pathogens and Nematodes Affecting Plants
- 213 Weeds Affecting Plants
- 215 Biological Control of Pests Affecting Plants
- 216 Integrated Pest Management Systems
- 301 Reproductive Performance of Animals
- 303 Genetic Improvement of Animals

Outcome #2

1. Outcome Measures

Percentage of participants evaluated who applied acquired knowledge

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2013	57

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 1620 workshops, clinics, seminars, field days, field demonstrations, and educational events. These events were supplemented with 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 outcome documents that 57% 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
101	Appraisal of Soil Resources
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
202	Plant Genetic Resources
205	Plant Management Systems
211	Insects, Mites, and Other Arthropods Affecting Plants
212	Pathogens and Nematodes Affecting Plants
213	Weeds Affecting Plants
215	Biological Control of Pests Affecting Plants
216	Integrated Pest Management Systems
301	Reproductive Performance of Animals
303	Genetic Improvement of Animals

Outcome #3

1. Outcome Measures

Percentage increase in yield realized among program participants as a result of application of WSU-recommended practices.

Not Reporting on this Outcome Measure

Outcome #4

1. Outcome Measures

Increase in profitability resulting from practices developed by or recommended by WSU Extension personnel and/or ARC scientists.

Not Reporting on this Outcome Measure

Outcome #5

1. Outcome Measures

Increased number of acres managed with "Best Management Practices" designed to yield improved environmental quality.

Not Reporting on this Outcome Measure

Outcome #6

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
2013	7164989

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 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 directly contributed to enhanced productivity, efficiency, and sustainability of food production on 7,164,989 acres of the 15,000,000 acres of agricultural land in the state.

4. Associated Knowledge Areas

KA Code	Knowledge Area
101	Appraisal of Soil Resources
102	Soil, Plant, Water, Nutrient Relationships
104	Protect Soil from Harmful Effects of Natural Elements
111	Conservation and Efficient Use of Water
121	Management of Range Resources
202	Plant Genetic Resources
205	Plant Management Systems
211	Insects, Mites, and Other Arthropods Affecting Plants
212	Pathogens and Nematodes Affecting Plants
213	Weeds Affecting Plants
215	Biological Control of Pests Affecting Plants
216	Integrated Pest Management Systems
301	Reproductive Performance of Animals
302	Nutrient Utilization in Animals
303	Genetic Improvement of Animals

Outcome #7

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
2013	2803111

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, and goat enterprises. These enterprises range from small farms to very large cooperative 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 2,803,111 food animals, through dissemination of research information and training for producers to enhance risk management strategies, herd 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

Outcome #8

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

3a. Outcome Type:

Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Actual
2013	288

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Food processing and marketing are essential components of a food system that provides 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, field days, field demonstrations, 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

288 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
121	Management of Range Resources
203	Plant Biological Efficiency and Abiotic Stresses Affecting Plants
212	Pathogens and Nematodes Affecting Plants
604	Marketing and Distribution Practices

V(H). Planned Program (External Factors)

External factors which affected outcomes

- Economy
- Appropriations changes
- Public Policy changes
- Government Regulations
- Competing Public priorities

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 was primarily impacted by reduced or uncertain funding from federal, state, and local sources. State funding support for the university and Extension was stable in 2013; but federal capacity funding was reduced and uncertainty of future funding levels during the year impacted 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. 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 operations, and dairy farms. The overall program evaluation for all events and projects under this program theme was evaluated in terms of "knowledge gained by participants" and "application of this knowledge" to address agricultural productivity and food security. Additionally, we collected data on the acreage of agricultural land and livestock numbers that directly benefited from our work. We also reported the number food processing facilities, direct marketing enterprises, and food banks that enhanced efficiency of food processing and distribution. Collectively, the results indicate positive impacts to agricultural productivity through the dissemination of research-based information and the application of this knowledge for sustaining agricultural enterprises and food production. Results were collected through a variety of methods including pre and post event evaluations, surveys, agricultural statistics, feedback from stakeholder groups, and other assessments of program participants. The analysis provided the aggregate results indicated below under key items of evaluation.

Key Items of Evaluation

This planned program focused on increasing agricultural productivity, food processing efficiency, and food distribution as a means of enhancing food security through a sustainable system. Our assessments indicated that 69% of program participants increased their knowledge relative to the knowledge areas covered, and 57% indicated application of one or more principles or practices learned from their participation. The aggregate outcomes of this work impacted 7,164,989 acres for farm land, and 2,803,111 head of livestock. This work also supported enhancements to 288 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	10%		5%	
131	Alternative Uses of Land	5%		4%	
133	Pollution Prevention and Mitigation	10%		2%	
141	Air Resource Protection and Management	5%		3%	
201	Plant Genome, Genetics, and Genetic Mechanisms	0%		15%	
203	Plant Biological Efficiency and Abiotic Stresses Affecting Plants	0%		15%	
204	Plant Product Quality and Utility (Preharvest)	0%		6%	
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	30%		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	10%		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: 2013	Extension		Research	
	1862	1890	1862	1890

Plan	80.0	0.0	45.0	0.0
Actual Paid Professional	59.0	0.0	50.2	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
133210	0	153399	0
1862 Matching	1890 Matching	1862 Matching	1890 Matching
133210	0	153399	0
1862 All Other	1890 All Other	1862 All Other	1890 All Other
20300854	0	5727707	0

V(D). Planned Program (Activity)

1. Brief description of the Activity

Research efforts have been especially strong in sustainable energy. The conditions that contribute to our crop diversity make it unlikely that we will be able to specialize with a highly uniform biomass feedstock, except possibly for plantation poplars. Washington's most likely biomass supply will be mixed softwoods and hardwoods, food processing and urban wastes and mixed crop residues. We have a strong basic science foundation for developing processes related to yeast, bacterial and algal fermentation and production, to pyrolysis and other types of biomass conversion, and to modifying crops to make them more amenable for fuel and bioproducts generation. Camelina shows some promise as a crop that might fit a production niche in wheat-fallow cropping Eastern Washington and switchgrass and *Arundo donax* have some potential in irrigated regions of the state because of their high production levels.

Feedstock production, especially of aromatic and aliphatic carbon compounds is a major focus of research, where the targets are generally of higher value than ethanol or biodiesel. Research with *Arabidopsis* and other model oilseeds suggests that there are active mechanisms that resist substantial changes to oil content and quality and that overcoming these will be an important part of increasing biological oil production. Pathways more separated from primary metabolism may be more mutable, as the work with mint oils referred to above suggests.

Supported by a major USDA CAP grant, NARA (Northwest Advanced Renewables Alliance, nararenewables.org) is developing methods for softwood conversion into jet fuels. Supply chain coalitions have or are being developed in Montana, Oregon, and Washington. These coalitions consist of private, tribal, and non-federal public lands forest owners, and include conversion, distribution, and procurement agencies along with state and federal agency representatives. It is estimated that there are sufficient forest residues in the Pacific Northwest to provide the biomass needed to satisfy the civilian and military aircraft fuel needs in the region with a 50% blend.

The portfolio of projects is broad and includes developing of hardwood species (poplar and alder)

that grow well in the region; screening heterotrophic algae and oleaginous yeasts that may take advantage of various feedstocks and carbon dioxide waste streams to generate production streams with relatively high value; and developing oilseed and vegetation crops with a high lipid content that can generate higher levels of lipids that have relatively little conversion cost. WSU has considerable expertise in catalysis that has been augmented by the appointment of several Chemical Engineers to the ARC and the expansion of a program in pyrolysis that is adding the ability to deoxygenate pyrolysis oils in order to evaluate the entire conversion cycle of lignocellulose via heat and pressure treatment. Transportation and LCA related economic considerations are being evaluated through the efforts of research and Extension programs agricultural economics. In work related to the original NARA goals, it has been shown that poplar can be modified to produce phenylethylalcohol (PEA) glycoside at a level of about 1% of total mass. Future work is targeting an increase in PEA-glycoside levels and developing efficient technology for converting PEA-glycoside to PEA, a specialty chemical.

2. Brief description of the target audience

The target audiences included farmers, business owners, homeowners, industry technology providers, project developers, and public agencies and utilities. Two significant targets for some of these applications are the US Department of Defense, through its Green Navy Initiative, and Boeing and other aerospace related companies.

3. How was eXtension used?

eXtension was not used in this program

V(E). Planned Program (Outputs)

1. Standard output measures

2013	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Actual	4500	3600	25	0

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

Patent Applications Submitted

Year: 2013
 Actual: 0

Patents listed

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

2013	Extension	Research	Total
Actual	5	32	37

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
2013	72

Output #2

Output Measure

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

Year	Actual
2013	4

Output #3

Output Measure

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

Year	Actual
2013	59

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 who demonstrate application of new knowledge resulting from WSU energy workshops, demonstrations, or symposia.
3	Number of households and enterprises reporting reduced energy consumption as a result of WSU programs.
4	Amount of new sustainable energy (MW/YR) produced 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
2013	96

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 and understand the opportunities and constraints, and receive technical assistance based on up-to-date research results.

What has been done

Over 200 people have attended field tours and over 900 attended symposia or presentations. The hardwood biofuel webinar series launched had over 100 participants, and 332 others viewed the subsequent recordings. The project videos have been viewed more than 300 times on YouTube, and the newsletter reached over 300 people. The Facebook page reached over 1,900, and the new website launched in August had over 1,200 visitors and 600 of these have been first time visitors.

Results

At this stage of the project, short-term impacts include increased awareness of the biofuels project and increased energy literacy around biomass and biofuels. Extension personnel in the target four-state region are more aware of the potential of hybrid poplar as a feedstock for biofuels and have been specifically targeted in outreach efforts. In post-event evaluations, an average of 96% of surveyed field tour 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

Percentage of participants who demonstrate application of new knowledge resulting from WSU energy workshops, demonstrations, or symposia.

Not Reporting on this Outcome Measure

Outcome #3

1. Outcome Measures

Number of households and enterprises reporting reduced energy consumption as a result of WSU programs.

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Actual
2013	8500

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Many homes, business, and public buildings were built at a time when wood heat was utilized and inadequate insulation was used along with lax weatherization, as fresh air needed to enter the building. Many families, businesses, and public entities cannot afford to upgrade insulation and

weatherization in the whole structure, so the work goes undone and electrical and other energy continues to be wasted.

What has been done

Outputs include energy assessment requests; kilowatt meter checkouts; radon tests conducted to alleviate fears of weatherization; carbon monoxide tests; and compact fluorescent bulbs distributed.

Results

Energy assessments and educational consultations were completed pinpointing energy losses in residential, commercial and government buildings. Compact fluorescent lights were installed with an estimated energy savings of \$15,000. Clientele conducted self- assessments of appliance kilowatt usage over extended periods to identify unnecessary energy usage.

4. Associated Knowledge Areas

KA Code	Knowledge Area
133	Pollution Prevention and Mitigation
141	Air Resource Protection and Management
402	Engineering Systems and Equipment

Outcome #4

1. Outcome Measures

Amount of new sustainable energy (MW/YR) produced as a result of WSU programs.

Not Reporting on this Outcome Measure

V(H). Planned Program (External Factors)

External factors which affected outcomes

- Economy
- Appropriations changes
- Public Policy changes
- Competing Public priorities
- Competing Programmatic Challenges

Brief Explanation

The steady decrease in fuel prices during 2013 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 have also reduced the time that Extension personnel can dedicate to energy audits and improving the energy efficiency of homes and commercial buildings.

While we have several programs doing research into biomass energy conversion, the decrease of price pressure on fuel usage as the result of changes in production practices in

the oil and gas industries are moving the bar in a way that is familiar to those who remember the 1980's.

V(I). Planned Program (Evaluation Studies)

Evaluation Results

Overall, program participants have a greater awareness, increased knowledge, and application of knowledge in their homes and businesses. Overall, energy is being used more efficiently. Farmers have a greater 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 survey.

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
111	Conservation and Efficient Use of Water	0%		5%	
112	Watershed Protection and Management	0%		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	10%		5%	
133	Pollution Prevention and Mitigation	10%		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	5%		10%	
205	Plant Management Systems	0%		5%	
211	Insects, Mites, and Other Arthropods Affecting Plants	10%		10%	
212	Pathogens and Nematodes Affecting Plants	10%		10%	
216	Integrated Pest Management Systems	10%		5%	
402	Engineering Systems and Equipment	20%		8%	
404	Instrumentation and Control Systems	10%		2%	
605	Natural Resource and Environmental Economics	0%		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: 2013	Extension		Research	
	1862	1890	1862	1890

Plan	20.0	0.0	65.0	0.0
Actual Paid Professional	21.0	0.0	79.2	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
169251	0	394215	0
1862 Matching	1890 Matching	1862 Matching	1890 Matching
169251	0	394215	0
1862 All Other	1890 All Other	1862 All Other	1890 All Other
4576558	0	9028020	0

V(D). Planned Program (Activity)

1. Brief description of the Activity

Our work in climate change is focused on several objectives. One is research and outreach to increase stakeholder knowledge, especially related to strategies and technologies for mitigating the effects of anticipated climate change scenarios. Another is the development and application of technology and practices to decrease the release of greenhouse gases or sequester carbon in order to limit drivers of climate change. Our program is multifaceted as the potential outcomes of "normal" weather variation and short and long-term climate change were already and continue to be a major focus of our research and outreach. Washington State is extremely diverse climatically and we have developed specific agricultural efforts to address differences in weather from site to site. These variations in practice are applicable to anticipated changes in climate although perhaps at different locations than they are currently being used. Additionally, Washington is also subject to shorter-term changes that may fluctuate greatly over any given period of time. While this means we might be better prepared for systemic change than we might otherwise be, we still anticipate significant changes may be needed, especially in areas like water management. We are well positioned to address changes that could take place in the state.

We have and continue to monitor for invasive pests including weeds, insects, and pathogens. Our varied and constantly evolving production agriculture has made Washington a target for invasive species and that trend will continue with changing climate. Our plant breeding and molecular biology programs continue to develop new crop varieties that are able to withstand emerging disease and pest threats associated with climate change. We are also in the process of assessing climate change related policies and developing 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

Target audiences for this program are very broad. Anyone involved in production or local agriculture could be affected. This would include everyone from the grower to those involved in end-product

development. This includes owners and managers of crop and rangelands, forest resources, and wood products industries, community leaders, the general public, and numerous public agencies and organization.

3. How was eXtension used?

Five faculty participated in Communities of Practice.

V(E). Planned Program (Outputs)

1. Standard output measures

2013	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Actual	5536	45680	1961	2075

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

Patent Applications Submitted

Year: 2013
 Actual: 0

Patents listed

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

2013	Extension	Research	Total
Actual	1	25	25

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

- Number of workshops and other educational venues delivered.

Year	Actual
2013	43

Output #2

Output Measure

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

Year	Actual
2013	1

Output #3

Output Measure

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

Year	Actual
2013	31

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 program participants who applied knowledge attained from WSU.
3	Acres planted with WSU-developed crop varieties that are more adapted to environmental conditions or more resistant to 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.

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2013	61

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.

What has been done

Program implementation utilized local, regional, and statewide efforts that involved research projects, outreach workshops, clinics, seminars, print and electronic publications, mass media, social networks, and other methods to disseminate research-based knowledge and other relevant information to target audiences.

Results

Program evaluations revealed that an average of 61% 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
111	Conservation and Efficient Use of Water
112	Watershed Protection and Management
122	Management and Control of Forest and Range Fires
123	Management and Sustainability of Forest Resources

132	Weather and Climate
133	Pollution Prevention and Mitigation
201	Plant Genome, Genetics, and Genetic Mechanisms
202	Plant Genetic Resources
203	Plant Biological Efficiency and Abiotic Stresses Affecting Plants
205	Plant Management Systems
211	Insects, Mites, and Other Arthropods Affecting Plants
212	Pathogens and Nematodes Affecting Plants
216	Integrated Pest Management Systems
402	Engineering Systems and Equipment
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 attained from WSU.

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2013	55

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.

What has been done

Program implementation utilized local, regional, and statewide efforts that involved research projects, outreach workshops, clinics, seminars, print and electronic publications, mass media, social networks, and other methods to disseminate research-based knowledge and other relevant

information to target audiences.

Results

Fifty-five percent of program participants indicated and intent to apply the knowledge gained from one or more of the 43 educational events delivered in this program area. This implied a growing willingness among audiences to act on the information and recommendations provided.

4. Associated Knowledge Areas

KA Code	Knowledge Area
111	Conservation and Efficient Use of Water
112	Watershed Protection and Management
122	Management and Control of Forest and Range Fires
123	Management and Sustainability of Forest Resources
132	Weather and Climate
133	Pollution Prevention and Mitigation
201	Plant Genome, Genetics, and Genetic Mechanisms
202	Plant Genetic Resources
203	Plant Biological Efficiency and Abiotic Stresses Affecting Plants
205	Plant Management Systems
211	Insects, Mites, and Other Arthropods Affecting Plants
212	Pathogens and Nematodes Affecting Plants
216	Integrated Pest Management Systems
402	Engineering Systems and Equipment
404	Instrumentation and Control Systems
605	Natural Resource and Environmental Economics
610	Domestic Policy Analysis

Outcome #3

1. Outcome Measures

Acres planted with WSU-developed crop varieties that are more adapted to environmental conditions or more resistant to 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 Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2013	22

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Farm and processor waste lead to major unproductive releases of fixed carbon from the agroecosystems 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

22 commercial farm-based AD projects are now operating in the PNW (WA, OR, ID), processing 7,800+ tons / day of organic wastes (104,000 Wet Cow Equivalents, 161 tons / day food waste) representing ~30 MW electrical capacity installed, mitigating more than 1 MMT CO₂e annually and representing an estimated \$125 million in capital invested. 4 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
402	Engineering Systems and Equipment
404	Instrumentation and Control Systems

V(H). Planned Program (External Factors)

External factors which affected outcomes

- 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 several 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 with research on the margin of weather, even in the face of political opposition to the issue of climate change.

V(I). Planned Program (Evaluation Studies)

Evaluation Results

Our work in Climate Change includes animal and plant production systems and integrates Extension education in disseminating research results. Most of our effort can be classified as mitigation of climate change but is seen by our stakeholders as the type of incremental adaptation that has become routine in breeding and in adapting farm operations to altered economics of inputs and products. While we probably could be more aggressive in pointing out that there may be an underlying motivation for some of these incremental changes, our audiences are often unwilling to acknowledge this, raising the possibility of rejection of all of our related work.

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 61% of program participants and the intent to apply that knowledge by 55% of participants were the metrics selected to evaluate outcomes achieved through 43 educational events in this planned program. Deployment of anaerobic digesters on 22 farms was another measure of evaluation utilized.

Key Items of Evaluation

Approximately 61% 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.

55% of program participants indicated an intention to use or apply one or more principles gained from 43 educational events delivered in this program area. This implied a growing willingness among audiences to act on the information and recommendations provided.

22 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: 2013	Extension		Research	
	1862	1890	1862	1890
Plan	40.0	0.0	2.0	0.0
Actual Paid Professional	91.0	0.0	0.2	0.0
Actual Volunteer	8.0	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
312421	0	17889	0
1862 Matching	1890 Matching	1862 Matching	1890 Matching
312421	0	17889	0
1862 All Other	1890 All Other	1862 All Other	1890 All Other
6268476	0	183569	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 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

Families with limited resources, 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

2013	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Actual	267533	970132	169848	679392

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

Patent Applications Submitted

Year: 2013

Actual: 0

Patents listed

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

2013	Extension	Research	Total
Actual	18	6	24

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
2013	27536

Output #2

Output Measure

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

Year	Actual
2013	18

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
2013	80

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. Despite research showing the benefits of healthy eating, obesity and overweight status in children and adolescence has tripled in the past 30 years. In Washington State, 11.1 % of youth ages 10-17 are obese, and only 27.6% of youth this age participate in vigorous physical activity for 20 minutes on a daily basis (Levi, Segal, Laurent and Kohn, 2012). Fifteen percent of WA high school students reported drinking 2 or more non-diet sodas per day; among youth in 8-12th grades only 25% reported eating five or more fruits or vegetables per day and in grades 6-12 less than one-half of the youth reported 60 minutes of exercise 5 or more days a week (Washington State Healthy Youth Survey, 2008)

What has been done

One new program designed and now in pilot phase is the Eat Together, Eat Better educational materials, which provide opportunities for nutrition, parent and youth educators to teach the importance of family meals. A large number of other educational offerings and training sessions were offered in a variety of venues to reach youth as well as parents with fun and interesting educational activities to promote healthy eating and physical exercise.

Results

This program reported increased knowledge and skills among 80% of program participants, as determined through self-reported surveys. This knowledge focused on healthy eating choices and increased consumption of fruits, vegetables, and low fat protein foods in alignment with dietary guidelines.

4. Associated Knowledge Areas

KA Code	Knowledge Area
134	Outdoor Recreation
701	Nutrient Composition of Food
703	Nutrition Education and Behavior
704	Nutrition and Hunger in the Population
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
2013	65

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 contribute to the obesity issue.

What has been done

In FY13, 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. In collaboration with community partners, over 1,100 environmental support and policy actions were taken to positively affect food and physical activity environments of the target population.

Results

Program outcomes included improved dietary choices and physical exercise among 65% of program participants, which when incorporated into normal routines and lifestyles will improve health and address the growing problem with childhood obesity.

4. Associated Knowledge Areas

KA Code	Knowledge Area
134	Outdoor Recreation
701	Nutrient Composition of Food
703	Nutrition Education and Behavior
704	Nutrition and Hunger in the Population
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 Condition Outcome Measure

3b. Quantitative Outcome

Year	Actual
2013	26

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Physical exercise in addition to proper diet, are essential to improve health and address the growing problem with childhood obesity.

What has been done

Program outputs included a variety of classes and events designed to increase physical activity among young people and influence behavior. GROW HKC examines and models the rural obesogenic environment, then develop, and test an intervention to prevent childhood obesity. The GROW HKC HEAL MAPPS CBPR was conducted four WA counties in 2013. The Community Readiness Assessment Model was also utilized as a tool to gain an understanding of the community's resources and readiness for obesity prevention efforts.

Results

Although this program is ongoing in implementation of educational interventions such as the Community Assessment Model and HEAL MAPPS program, 26% of program participants have increased physical exercise activities thus far.

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
2013	549

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, buying fresh, locally produced foods can also assure improvements in an individual's diet while strengthening the local economy and helping to preserve farms.

What has been done

For community residents in the Puget Sound area that can grow their own vegetables, the "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. Through partner grants, families with limited incomes can receive a bag of featured produce valued at \$4-5 along with the featured recipe. Each week the display included a poster that displayed information about eating fruits and vegetables, nutritional and cost information

about the featured produce of the day, along with activities to encourage youth to learn more about fruits and vegetables.

Results

549 communities were engaged in this effort to reduce barriers to purchase of local produce, and motivate them on ways they can increase their daily consumption of fresh, local, seasonal produce available at farmers' markets.

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
703	Nutrition Education and Behavior
704	Nutrition and Hunger in the Population
724	Healthy Lifestyle

V(H). Planned Program (External Factors)

External factors which affected outcomes

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

Brief Explanation

The Washington Food \$ense program has been significantly affected by budget cuts and breaks in funding. In January 2013, the program received a 28% cut for the last two quarters of FY13; in October funding was stopped until mid-November. This negatively impacted our outputs, relationships with partners relying on our programs and our high quality essential employees who had to find alternative work.

Expansion of Childhood obesity educational programs were 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.

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.

Key Items of Evaluation

"Since I started the Extension nutrition education class I am eating bright fruits and vegetables. I never used to exercise; I am now exercising all the time. When I started the class I weighed 236, now I am at 220 and still losing weight. I am drinking water instead of soda. My kids are healthy and our house is happy." Adult participant, Spokane, WA.

"My oldest daughter who's a freshman in high school this year completed five years of the Food Sense program. Through the nutrition classes she learned about healthy (food) choices. She has lost at least 40 pounds (over 5 years). She now requests and chooses healthy food for her lunch and snack bags . . . the nutrition classes were the most important classes my daughter ever had. . ."
Parent of a HS student, Grays Harbor, WA.

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: 2013	Extension		Research	
	1862	1890	1862	1890
Plan	45.0	0.0	13.0	0.0
Actual Paid Professional	40.0	0.0	20.2	0.0
Actual Volunteer	28.0	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
223126	0	152880	0
1862 Matching	1890 Matching	1862 Matching	1890 Matching
223126	0	152880	0
1862 All Other	1890 All Other	1862 All Other	1890 All Other
1702257	0	2720539	0

V(D). Planned Program (Activity)

1. Brief description of the Activity

Food safety is an important public health issue with foodborne pathogens annually causing an estimated 48 million illnesses, 128,000 hospitalizations and 3,000 deaths in the United States. Maintaining a safe food supply requires vigilance from farm to table, and involves food producers, processors, retailers and consumers. WSU Extension interacts with other state and national agencies, such as the Washington State Department of Health, Washington State Department of Agriculture, USDA, FDA, CDC and EPA to address food safety issues in the Pacific Northwest. Furthermore, food safety educators must communicate with representatives throughout the food chain. Interaction among these groups is vital to address the breadth of food safety issues. Addressing food safety issues requires examination of the farm-to-table continuum in order to understand and solve food safety concerns. Performing educational outreach to promote food safety throughout the farm-to-table continuum in the state can reduce foodborne illness prevalence.

We are conducting significant research into the epidemiology of foodborne diseases, especially in animal herds, and in mechanisms whereby pathogenic organisms reach the consumer. Conferences, workshops, and onsite visits were conducted. In some counties, volunteers were trained to engage with the general public to provide training on home food preservation. Publications and websites were maintained as outreach instruments to the food industry and to consumers. A major effort involved the transfer of microwave sterilization technology, which has achieved FDA approval at two levels, into commercial applications. We are also adapting microwave sterilization technology to the technically less demanding process of pasteurization through a large USDA food safety grant.

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

2013	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Actual	57673	234893	32500	98332

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

Year: 2013
 Actual: 0

Patents listed

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

2013	Extension	Research	Total
Actual	7	19	26

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
2013	730

Output #2

Output Measure

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

Year	Actual
2013	6

Output #3

Output Measure

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

Year	Actual
2013	21

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
2013	90

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Food safety is an important public health issue with foodborne pathogens causing an estimated 48 million illnesses, 128,000 hospitalizations and 3,000 deaths yearly in the United States. Maintaining a safe food supply requires vigilance from farm to table, and involves food producers, processors, retailers and consumers. WSU Extension interacts with other state and national agencies, such as the Washington State Department of Health, Washington State Department of Agriculture, USDA, FDA, CDC and EPA to address food safety issues in the Pacific Northwest.

What has been done

In 2013, a second class of 21 WSU staff and volunteers were trained to be Food Safety Information Assistants, bringing the total increase in two years to 52 FSIA’s across 27 counties. Work with clientele included classes and workshops, along with individual consultations of food safety topics.

Results

Program results, assessed by pre and post surveys of participants indicated 90% of program participants increased their knowledge of food safety practices.

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
2013	75

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 that 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

4-hour food safety courses for food service workers were delivered to meet the new PIC educational requirements. The course addresses the top food rule regulations and procedures and basic food safety practices that prevent foodborne illness outbreaks. Consumer training programs and consultations were also delivered to address food safety in the home.

Results

Program assessment indicated that 75% of program participants applied one or more new practices to reduce risk and increase safety in handling and processing 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 #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
2013	70

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Food safety is an important public health issue with foodborne pathogens causing an estimated 9.4 million illnesses, 55,961 hospitalizations and 1,351 deaths yearly in the United States. Maintaining a safe food supply requires vigilance from farm to table, involving food producers, processors, retailers and consumers.

What has been done

WSU Extension Food Safety Specialists serve on the steering committee for the Produce Safety Alliance, Northwest Food Processors Association Operations and Technical Committee and Northwest Meat Processors Association Board. To provide FSMA outreach 5 workshops in Washington and Oregon were delivered to target audiences. Two follow-up listening sessions were delivered during a FDA visit with participants attending from Washington and Oregon.

Results

FSMA, HACCP and GAPs workshop participants increased knowledge of related topics and anticipated increased employee training, agricultural water testing, economic benefits and improved record keeping. HACCP workshop participants demonstrated increased post-test scores, and 70% indicated intent to institute plans.

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

- 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, including available budget resources. Apart from the general confusion surrounding the sequester and its implementation, these did not substantially impact the plans for this program during this reporting year.

V(I). Planned Program (Evaluation Studies)

Evaluation Results

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. Faculty, staff, and volunteers continue 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

During 2013, WSU Extension continued to increase our capacity to provide consumer food safety and preservation education across the state. After two years of capacity training, we have 52 trained Food Advisory Information Assistants that can locally answer questions, test pressure gauges and teach classes.

In Thurston County, of the 30 pressure gauges brought into the Extension office for testing, 19 did not read accurately. Most of the inaccurate gauges tested high, and low acid foods do not receive proper processing treatment when gauges test high.

80% of the individuals who attended classes and outreach events on home canning reported an increased knowledge of canning foods safely.

An analysis on of Food Preservation calls and questions submitted to the Extension program revealed that 20% are concerned with a food quality issue, 80% concern a food safety issue. Of those that concern food safety, 50% concern safety to the degree it could cause severe disability or death. Each case of food-borne illness is estimated to cost \$1,851. Applied to the number of safety related contacts in just two Southcentral counties in WA, there is a potential economic impact of \$10,139,788. Each case of botulism poisoning is estimated to cost \$726,362.

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	15%		0%	
802	Human Development and Family Well-Being	25%		20%	
803	Sociological and Technological Change Affecting Individuals, Families, and Communities	5%		30%	
805	Community Institutions, Health, and Social Services	5%		40%	
806	Youth Development	50%		10%	
	Total	100%		100%	

V(C). Planned Program (Inputs)

1. Actual amount of FTE/SYs expended this Program

Year: 2013	Extension		Research	
	1862	1890	1862	1890
Plan	130.0	0.0	1.0	0.0
Actual Paid Professional	86.9	0.0	0.1	0.0
Actual Volunteer	6947.0	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
816087	0	66531	0
1862 Matching	1890 Matching	1862 Matching	1890 Matching
816087	0	66531	0
1862 All Other	1890 All Other	1862 All Other	1890 All Other
6098906	0	195844	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. Additionally, communities will be engaged to collectively analyze situations, resolve conflicts, and assess and recommend mechanisms to enhance public services. These programs will be customized based upon community need and delivered by program such as Horizons, the William D. Ruckelshaus Center, and the WSU Division of Governmental Studies and Services. Finally, programs will be delivered that lead to enhanced leadership and facilitation skills of youth, adults, and communities.

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

2013	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Actual	33377	132588	56432	103301

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

Patent Applications Submitted

Year: 2013
 Actual: 0

Patents listed

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

2013	Extension	Research	Total
Actual	66	4	70

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
2013	3016

Output #2

Output Measure

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

Year	Actual
2013	4

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	Number of persons completing a WSU leadership development program who serve in a community, county, state, or agency leadership role.
5	Number of communities enacting processes to increase economic development or to address poverty and its impacts as a result of WSU programs.
6	High School graduation rates for 4-H members compared to their Peers.
7	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
2013	63

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 the situations for young people, families and their communities. Our youth development programs focus on enhancing the capacity of youth in grades K-12. Interventions that these young people receive develop their assets (generally refer to as "life-skills").

What has been done

In 2013, 4-H life skill education was conducted in all of Washington's 39 counties. There were over 100,000 distinct 4-H life skill events/activities/programs reaching nearly 60,000. The life skill events/activities/ programs 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 63% increase in skills and abilities.

4. Associated Knowledge Areas

KA Code	Knowledge Area
801	Individual and Family Resource Management
802	Human Development and Family Well-Being
803	Sociological and Technological Change Affecting Individuals, Families, and Communities

- 805 Community Institutions, Health, and Social Services
- 806 Youth Development

Outcome #2

1. Outcome Measures

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

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2013	45

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. People who develop educational programs and curricula for youth are in the business of providing educational opportunities through which youth can learn information and transform that information into knowledge and develop skills they need for successful adulthood.

What has been done

In 2013, 4-H life skill education was conducted in all of Washington's 39 counties. There were over 100,000 distinct 4-H life skill events/activities/programs reaching nearly 60,000. The life skill events/activities/ programs 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 63% increase in skills and abilities. In observational evaluation efforts, 45% of participants applied the knowledge and skills they gained.

4. Associated Knowledge Areas

KA Code Knowledge Area

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

Outcome #3

1. Outcome Measures

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

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Actual
2013	33

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Youth who engage in post-secondary education and training far exceed their high school graduation only peers in life-long earning capacity and employment capacity. Some studies has indicated that a Bachelor's Degree has a value of \$1.1M over the lifetime earnings of a high school graduate. This obviously contributes to the overall economic stability of families and communities.

What has been done

For the past three 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 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 1337 former 4-H members with 75% of all Washington Counties reporting.

Results

Of these "aged-out" 4-Hers, 84% are engaged in post-secondary education and training; this is a 34% increase over their Washington State high school graduate peers. 13% of incoming freshman at Washington State University were former 4-H members and they entered with a .33 GPA higher than their WSU freshman class peers. (The quantitative box above will not accept fractions but this is what 33 refers to.)

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

Number of persons completing a WSU leadership development program who serve in a community, county, state, or agency leadership role.

Not Reporting on this Outcome Measure

Outcome #5

1. Outcome Measures

Number of communities enacting processes to increase economic development or to address poverty and its impacts as a result of WSU programs.

Not Reporting on this Outcome Measure

Outcome #6

1. Outcome Measures

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

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Actual
2013	96

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Educational attainment for Washington's youth has reached a crisis level with over 25% young people entering 9th grade failing to graduate within five years. The statistics become even more

horrific when examining youth by racial demographics where for example nearly 2/3 (64%) of Hispanic males fail to graduate from high school. Without significant increases in youth academic attainment we are creating and condemning a generation as a permanent underclass.

What has been done

The 4-H Youth Development Program has a strong emphasis on the Essential Elements of Positive Youth Development, which describe the fundamental process for positive youth development undergirding our entire 4-H Program. Over 100,000 different 4-H activities and events were conducted to strengthen the life skills of participating youth through participation in 4-H community clubs, after-school clubs, military clubs, school enrichment, special interest groups and camping programs.

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 a 96% rate while their Washington State peers graduate at a 73% level. (This is the statement that represents the quantitative outcome box.)

4. Associated Knowledge Areas

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

Outcome #7

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

3a. Outcome Type:

Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Actual
2013	6228

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Washington State Department of Social and Health Services has documented high risk behavior among 10-14 year old youth as measured by numbers describing alcohol and drug arrests,

property crime arrests, and vandalism arrests. A family history of substance abuse and low school achievement in 6th grade are clearly associated with risky behavior.

What has been done

The WSU Extension Strengthening Families Program (SFP) Team continues to coordinate Extension delivery to address this issue, as well as to train facilitators from other organizations who implement SFP. A standard evaluation protocol is used both internally and by other agencies. Facilitators are trained to offer both the English and Spanish language versions of the program. In 2013, three community sites implemented multiple SFP programs in English and Spanish and two sites offered tribal programs. Videos were also produced interviewing former SFP parent/youth participants and facilitators.

Results

The evaluation consists of validated measures assessing risk and protective measures in the domain of family functioning (e.g. family conflict, parents' rule setting). For parents, mastery is considered to be a positive change on at least one of 5 parenting behavior scales from beginning to end of program (88%). Youth measures also assess parent behaviors, so positive change from pre- to post- is an indicator that parents are applying concepts learned in the program (87%).

4. Associated Knowledge Areas

KA Code	Knowledge Area
802	Human Development and Family Well-Being
806	Youth Development

V(H). Planned Program (External Factors)

External factors which affected outcomes

- Economy
- Appropriations changes
- Public Policy changes
- Competing Public priorities
- Competing Programmatic Challenges

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 people employed by Extension than our historical average and of those Extension workers remaining there are fewer faculty members. We are struggling against being activity driven without adequate visionary leadership to guide and assess programmatic 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 2013, the instability in the Snap Education Funding caused by the sequester and Congressional delays eliminated a number of youth summer camping/food and nutrition program partnerships with youth and family colleagues. And finally, the weak economy has made 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 use 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%		25%	
608	Community Resource Planning and Development	50%		15%	
610	Domestic Policy Analysis	20%		30%	
803	Sociological and Technological Change Affecting Individuals, Families, and Communities	20%		30%	
	Total	100%		100%	

V(C). Planned Program (Inputs)

1. Actual amount of FTE/SYs expended this Program

Year: 2013	Extension		Research	
	1862	1890	1862	1890
Actual Paid Professional	27.0	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
534464	0	0	0
1862 Matching	1890 Matching	1862 Matching	1890 Matching
534464	0	0	0
1862 All Other	1890 All Other	1862 All Other	1890 All Other
4595578	0	0	0

V(D). Planned Program (Activity)

1. Brief description of the Activity

WSU Extension's Community & Economic Development (CED) Program unit concentrates on building the skills of the people and communities of Washington State and on contributing to sustainable economic development. CED efforts contribute to vibrant communities and a sustainable Washington by assisting non-profit organizations, local government, and state agencies to better serve their constituents. CED economic development programs focus on creating and/or maintaining living wage incomes. This is accomplished through collaboration with local and state economic development professionals to assist with such efforts as food processing, creation of composite products in the industrial sector, export assistance, small business development, and family asset building in our rural communities. Program delivery takes the form of training, applied research, and collaborative policy development.

2. Brief description of the target audience

Target audiences for the program include community leaders, agency personnel, local government officials, non-profit organizations, business entrepreneurs, local business leaders, families, 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

2013	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Actual	35000	173000	7025	11000

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

Year: 2013
 Actual: 0

Patents listed

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

2013	Extension	Research	Total
Actual	10	4	14

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

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

Year	Actual
2013	68

Output #2

Output Measure

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

Year	Actual
2013	410

Output #3

Output Measure

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

Year	Actual
2013	2000

Output #4

Output Measure

- The number of people receiving family asset building education.

Year	Actual
2013	1660

Output #5

Output Measure

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

Year	Actual
2013	1500

Output #6

Output Measure

- The number of educational and scholarly products produced by CED educators.

Year	Actual
2013	151

Output #7

Output Measure

- Number of graduate students with a significant professional orientation in the area of Community and Economic Development.

Year	Actual
2013	21

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
2013	68

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

For Washington, "It's the economy, stupid!" remains a true statement. As Washington recovers from the recession, recovery in our rural areas still lags far behind our metropolitan areas. In addition, Washington's taxing structure is based upon sales taxes and user fees, both of which are greatly impacted by commerce, or the lack there of, within the state. Therefore, local and state economic development remain top priorities for our decision-makers. Lastly, there is growing recognition that an essential element for local economic development is access to broadband and associated digital technologies.

What has been done

In 2013, WSU Extension's Community & Economic Development (CED) activities centered on local economic development, planning, and broadband deployment. Notable activities included all of the following: (1) the successful initiation of a EDA planning grant aimed at fostering food processing and unmanned aerial vehicle industrial clusters in the Columbia Gorge (which includes both south central Washington and north central Oregon); (2) the development of woody biomass aviation fuel; (3) assisting six rural counties address the lack of broadband access by providing digital literacy training, hosting a rural technology expo, and providing training and technical assistance to three urban communities to increase telework; and (4) conducting a statewide rural development conference.

Results

WSU Extension projects in community and economic development are in various degree of completion. Industrial clusters in the Gorge are in the midst of the planning stage. Two task groups have been formed around food processing and composite/civil applications of unmanned aerial vehicles. Leveraging ARRA broadband infrastructure investments, WSU collaborated with economic development organizations, telecommunications providers and community leaders to increase use of broadband as well as identify and work to fill remaining service gaps. These

projects engaged 151 local, state, federal, non-profit and private sector organizations on local planning teams. Telework assistance led to increased use of telework to help meet Commute Trip Reduction requirements as well as the formation of a new state agency telework committee. The statewide rural development conference resulted in the formation of economic development projects in 11 places around Washington.

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
2013	410

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

While there are some in society who feel that government is drag on the economy and intrusive in our lives, the truth is that America depends on effective 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 and the Division of Governmental Studies and Services (DGSS). DGSS is devoted to providing high quality research, training, and technical assistance to

federal, state, and local government agencies throughout Washington State <http://dgss.wsu.edu/>.

Results

There is a vast array of non-profits in Washington. Our Extension work in this arena is varied as well. At the community level outcomes most often center on planning, better governances, funding development and evaluation. An example of this work is our efforts with Northeast Washington Hunger Coalition. Extension faculty conducted a Ripple Effect Map (REM) assessment which allowed the organization to identify and evaluate their programming outcomes. Local decision makers are now actively pursuing a joint branding and marketing strategy aimed at increasing the economic vitality of the region.

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
2013	1900

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

The small business sector remains a vital component of most local economies. The health of this sector is fundamental to the sustainability of our communities. 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

Business development and assistance provided through WSU Extension focuses on agriculture, agribusinesses, business in small rural communities and composite/wood manufacturing. Currently, there is an emphasis on serving small businesses and entrepreneurs in Washington's growing Latino population. In addition, Extension's food processing outreach and applied research takes place through the School of Food Science, a joint effort of WSU and the University of Idaho.

Results

During 2013, over 2000 individuals, entrepreneurs and/or businesses were provide information, training and/or technical assistance. Assisted 9 manufacturers with composite materials production and potential for the reuse of waste materials for composites. Established two Resource and Advising Center (RAC) in partnership with the Hispanic Chamber of Commerce, located in the Tri-Cities and Yakima, WA. Other outcomes for 2013 include assisting 40 Latino small businesses in accessing capital (loans), start-ups and licenses, and markets expansion all as a result of work with the small business owners.

4. Associated Knowledge Areas

KA Code	Knowledge Area
604	Marketing and Distribution Practices
608	Community Resource Planning and Development
610	Domestic Policy Analysis

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
2013	1600

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

In the United States, wealth distribution across income classes is increasing disparate with more wealth continuing to concentrate at the top. The increasing disparity is also true in Washington.

What has been done

In an effort to address wealth creation for limited income families, WSU Extension first collaborated with the Northwest Area Foundation and more recently the Paul G. Allen Family Foundation. Through the support of these Foundations, Extension has undertaken financial literacy education, micro-enterprise development, debt counseling, and capacity-building activities for regional non-profits serving low-income populations.

Results

Almost 850 limited income people and families undertook education or used counseling services: 450 individuals received financial education training; 112 received debt management training; and 255 received income tax assistance. In addition, as part of new set of activities in late 2013, two public entities went through "poverty simulations" to help their staff truly understand the day-to-day financial difficulties of their clients.

4. Associated Knowledge Areas

KA Code	Knowledge Area
608	Community Resource Planning and Development
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
- Government Regulations
- Competing Public priorities
- Competing Programmatic Challenges

Brief Explanation

Numerous external factors can potentially impact the success of WSU Extension programs. The continuation of the recession is resulting in smaller budgets for university outreach. Reduced state and county funding has damaged our ability to meet programming targets, especially because there are now fewer educators employed by WSU Extension. We have partially compensated through the use of technology to increase the efficiency of our outreach and through extramural fund development; however, this type of increased output per professional FTE cannot be expected to continue into the future. Additionally, legislative action can create new pressures on WSU Extension due to unfunded budget proviso mandates and/or negative finance impacts on organizations that have been traditional partners.

county funding has damaged our ability to meet programming targets, especially because

there are now fewer educators employed by WSU Extension. We have partially compensated through the use of technology to increase the efficiency of our outreach and through extramural fund development; however, this type of increased output per professional FTE cannot be expected to continue into the future. Additionally, legislative action can create new pressures on WSU Extension due to unfunded budget proviso mandates and/or negative finance impacts on organizations that have been traditional partners.

V(I). Planned Program (Evaluation Studies)

Evaluation Results

In 2013, we started to see the fruits of WSU Extension's new program oriented structure. In the Community & Economic Development arena, we reached more communities, non-profits, and public agencies than ever before. We did this in a much more multi-disciplinary fashion through project teams that include faculty from 7 WSU colleges and schools. More importantly, the outcomes of our work had more far broader reaching impacts through helping decision-makers formulate state policy as well as local communities strengthen their governmental, non-profit, and private sectors. This is evidenced by our work in deployment of broadband access in rural areas; advancements in the composition and utilization of composite materials across the manufacturing spectrum; and food processing innovations that have helped Washington remain a competitive and increasingly healthy economy.

Key Items of Evaluation

The metrics chosen for WSU Extension's Community & Economic Development work reflect an orientation towards supporting family wealth building, local economic development, better governance, and support for select industrial sectors. A premium is place on activities that simultaneously move multiple program agendas forward, i.e., our Latino small business development work that both builds family wealth and the supports the local economy.

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).

Lastly, our scholarly activities are aimed at contributions to the discipline of extension and focus upon disseminating best practices and new program innovations to those who need it most - citizens of Washington State.