2016 Washington State University Combined Research and Extension Plan of Work

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I. Plan Overview

1. Brief Summary about Plan Of Work

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, to apply relevant research results and to deliver information and training 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 the unique land grant research and outreach missions of providing service to the people of Washington in order to enhance their quality of life. The ARC provides leadership in discovering and accessing knowledge by carrying out high quality research that contributes to a safe and abundant food and fiber 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 and delivers programs that leverage the research base of the University and the nation to address timely issues in ways that lead to enhanced food security, economic development, and environmental benefits, as well as family and community wellbeing. Our planned programs for the year include: Natural Resource Stewardship; Agricultural Productivity and Food Security; Sustainable Energy; Climate Change; Childhood Obesity; Food Safety; Youth and Family Development; and Community and Economic Development. We have carefully prioritized our efforts to ensure that the greatest impacts can be derived from both our research and extension programs. The synergy provided by connecting the problem-solving skills of the research community with Extension's experience and success in working with individuals and groups, ensures valuable contributions to many aspects of the lives of those who live in Washington, the United States of America, and the world.

Financial constraints continue to be a major factor influencing our research and extension work with lower direct state investments in the university. Furthermore, funding support from county partners for our county-based Extension network continues to suffer due to county revenue constraints and competing local priorities for the general funds of county governments. This trend clearly highlights the essential role of securing grants and external funding sources to support our research and extension work. The faculty responded well in recent years to the increasing pressure for success in grants and extramural funding, but such funding is typically uneven. Awards for Research and Extension in 2012 were just over $91 million, but declined to $80 million in 2013 and then rose to $85 million in 2014. Our forward projection of FTEs sees no growth in either Research or Extension over the next five to six years period and this may be an optimistic view when observed from a future date. This trend highlights the essential nature of capacity funding from NIFA through Smith-Lever and Hatch Funding to provide a foundation of permanent faculty and staff that enables the robust grant writing and entrepreneurship that sustains total expenditure levels that support our highest priority work in both research and extension.

While there were some notable grants obtained during the period, the changes in funding levels have been broadly distributed over all of our programs. Not included in these figures are current and future endowment income from organizations that benefit from and support WSU research and Extension. Most notable in this regard is an endowment from the Washington Tree Fruit Commission, which approved a check-off increase providing $32 million over the 8 years of the increased assessment in support of apple, cherry, and pear research. Similar support is also realized from other organizations like the Washington

Grain Alliance and Washington Wine Commission. We view this as a validation of the value placed on our efforts by our constituents and stakeholders.

Estimated Number of Professional FTEs/SYs total in the State.

Year	Extension		Research	
	1862	1890	1862	1890
2016	520.0	0.0	440.0	0.0
2017	520.0	0.0	440.0	0.0
2018	520.0	0.0	440.0	0.0
2019	520.0	0.0	440.0	0.0
2020	520.0	0.0	440.0	0.0

II. Merit Review Process

1. The Merit Review Process that will be Employed during the 5-Year POW Cycle

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

2. Brief Explanation

During the past decade, two items have driven the college and university review process. The first was an institutional goal to bring WSU to a level of equivalency with AAU (Association of American Universities) universities. Within CAHNRS (College of Agricultural, Human, and Natural Resource Sciences), which is home to most of the programs supported by formula funds, this involved each unit performing a self-evaluation, setting benchmarks, and developing assessment tools to evaluate progress made towards those benchmarks. Benchmarking was also instituted at the unit and college levels. The second driving force came with decreasing state funding. In 2008, the college participated in a university wide evaluation and prioritization process termed A2P2 (Academic Affairs Program Prioritization). Within the A2P2 framework, units were evaluated based on a set of specific productivity measures and their fit to college and university designated benchmarks and priorities. This was followed by a university initiative titled "Big Ideas," which began in 2010 and is still being used to guide prioritization. The university is in the midst of a new initiative centered on the "Grand Challenges" facing researchers at WSU to identify and prioritize areas of excellence. CAHNRS and the ARC figure prominently in all

areas of excellence identified so far in this new initiative and are helping to guide this process as it moves into the future. 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, although state funding has stabilized recently, the university, as well as CAHNRS Research and Extension, continue to follow a plan of less reliance on state funding and more reliance on self-generated funding to support its highest priority programs.

Merit evaluation takes place at several levels. Prioritization for specific programs is manifested by allocations of effort and limited funds. Support for research projects generally begins with discussions between stakeholders, administrators, and researchers. Agricultural Research Center (ARC) project proposals that address these high priority areas are then written by individual faculty members or by faculty teams. These proposals are submitted to the chair of an appropriate academic department, who reviews the proposal, and ascertains that the topic of the research is consistent with the previous discussions. If so, the project proposal is circulated to internal and/or external reviewers. These reviewers are asked whether the research represents solid science, is directed to topics of current need, will advance the field of study, and whether the research plan is appropriate. Reviewers are asked to offer written suggestions for improvement and to identify the strongest and weakest points of the proposal. After comments are received from the reviewers, the chair assembles the commentary and discusses it with the faculty member who proposed the project. If necessary, the faculty member then revises the project proposal. After examining these changes, the chair submits the project proposal to the ARC where it is proposal is sent to USDA and reviewed by the appropriate National Program Leader. When approval is final, the approved project is entered into our database and into the REEPort system. We also use this system by entering our state projects as a way of tracking most projects that are funded by external funds to track the majority of our research activity in one database. In addition to review of individual projects prior to their establishment, the programs are evaluated on a yearly basis and may also be reviewed in the context of various university planning and evaluation priorities. In parallel, proposals for funding that may overlap these projects may be submitted to federal or state agencies or to commodity commissions. As appropriate, we also use the NIFA system that arranges for expert external review teams to examine specific departments or activities.

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

publications undergo a double blind peer review. Reviewers include faculty at WSU or other Land Grant Universities, state and federal agencies, or research faculty at non-Land Grant universities.

III. Evaluation of Multis & Joint Activities

1. How will the planned programs address the critical issues of strategic importance, including those identified by the stakeholders?

Washington State University has a long and close relationship with its many stakeholders and maintains affiliations with them through our WSU Extension network of county offices, and our established, large Research and Extension Centers (R&E Centers) located throughout the state. These centers are not just farms or research sites but 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 Pullman, Prosser, Wenatchee, Mt. Vernon, and Puyallup. Additionally, many stakeholder groups have research and administrative personnel who have interacted with WSU for a number of years. In many instances, commodity commissioners or commodity research directors are adjunct faculty in appropriate academic units. The agricultural community of Washington is heavily populated with former WSU students who are proud to claim that experience as part of their identity. They have a stake in us and we have a stake in them.

Stakeholders in Washington have long recognized WSU as a major asset for their industries and activities and are generally very forthcoming with suggestions and critiques. Our stakeholders are familiar with our web pages 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; they often contact public officials in their areas to offer suggestions. We make use of all information avenues to connect with 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/Latina communities), local access television, newspapers (English and other languages), newsletters, posted announcements in high volume areas (often in multiple languages), group meetings, and targeted direct mail. As indicated by the target audience or solicitation, 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 tools permit rapid assessments that are extremely valuable since their response rates are generally high and the data are delivered in a 'pre-analyzed' format. Such 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 or contributing to the analysis of initiatives.

Many departments within CAHNRS have an advisory board, and there are additional groups that advise the College, ARC, and Extension administrations. 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

Research and Extension. Feedback from stakeholders is an extremely important aspect of these events and is especially important in developing new initiatives and outreach programs. For example, input from these groups was instrumental in a CAHNRS initiative called "Ready on Day One," where we are working with stakeholders to make sure that students graduating from WSU have qualities that will make them immediately employable. 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 problems to the commissions. 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 obtain their input into the strategic planning done at WSU related to their industry. There is a College level advisory board as well as a smaller college-level agricultural kitchen cabinet. Both of these interact with the dean, the Experiment Station 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 an appropriate person (County Director, Program Director, Associate Dean, Dean, etc.) in order to invite their participation, often after previous peer contact.

Finally, web content delivery including web conferencing and webinars 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 Adobe Connect or Skype. 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. How will the planned programs address the needs of under-served and under-represented populations of the State(s)?

WSU Extension reviews the civil rights record of each county extension program every five years to assure that faculty and staff are pursuing programs that, in addition to being non-discriminatory, also create a comfortable and productive environment for minority participants. WSU Human Resources routinely sends summaries of the applicant pool to Deans and Directors in order to allow them to have an overview of the profile of the applicants for all faculty and staff positions.

WSU Extension's Indian Reservation Programs receive federal (FRTEP) grant money that is leveraged with state and tribal funds and gifts to support strong Extension programs targeted to tribal audiences. Nutrition programs, including the Expanded Food and Nutrition Education Program (EFNEP and the Supplemental Nutrition Assistance Program Educational Program - SNAP-Ed), along with other programming for families, are focused toward limited-income audiences. Agriculture and natural resource programming designed specifically for Latino, Hmong, Somali, Native American, and other underserved audiences include programs designed to increase minority ownership of farms and ranches, such as our participation in the Beginning Farmer and Rancher Development Program (BFRDP) through a USDA grant. Youth programs are designed to reach Latino, Native American and other minority groups with educational activities that strengthen life skills and life-long achievement. Job oriented programs such as pesticide applicator training and certification are offered in Spanish.

We also actively seek diverse representation on advisory groups at the local and statewide level. This input has led to research and extension programs designed to address the needs of underserved audiences, including research designed to minimize risks to

farm workers; extension programs in Spanish, Hmong, and Russian; culturally and language appropriate publications and videos, and other mechanisms for actively engaging with underserved populations.

3. How will the planned programs describe the expected outcomes and impacts?
The eight planned programs we are currently using are formulated around our major program priorities that we believe are consistent with our stakeholder needs and parameters set forth by NIFA. Research projects are usually approved for five years, and we continue to move towards a system where some related projects are grouped into more team and concept oriented sub programs. We are also trying to figure out how to respond to USDA's wish to treat projects more like grants, without actually understanding some of the conflicts that this leads to at the ground level. For these reasons, we are likely to move to fewer projects that cover a narrower spectrum of our activities and, in particular, will lead to fewer conflicts between USDA structures and those of other federal agencies and a lower administrative burden within the system. Projects are reviewed at least annually to see whether the objectives are worthy and the procedures will lead to results and whether the projects will contribute to meeting benchmarks established by the departments and the College in terms of publications, students trained, success in external funding and other review processes, and program impact. Funded faculty PIs are also reviewed annually by their department or program chairs as part of the WSU management process and their progress reports are reviewed in the ARC by the Director or Associate Director. Some of the focus in the Annual Report document is on specific areas where we list accomplishments where support is at least partially derived from USDA formula funds. These are integrated with state support and external funding but it must be emphasized that, while the formula funds are not a large fraction of total support, they have been a key component of the recurrent funding that supports our baseline commitment to projects related to the Planned Program objectives.
Expected outcomes and impacts of integrated extension/research programs are often quantified in the "planned programs" section through measurement of learning (short-term outcomes); application of learning (intermediate-term outcomes); and social, environmental, and economic benefits derived from the application of learning (long-term outcomes). Outcomes will be documented by surveys, collection and analysis of on-site data, and measurement of progress of sample populations.

4. How will the planned programs result in improved program effectiveness and/or
Unlike the previous organization of Research Planned Programs, which were departmentally based, the current Planned Programs are organized around research objectives. It was hoped that this change would promote integration of the work being done under these new Programs, and that this would lead to better research coordination and effectiveness. Our general feeling is that the way in which the core of the current Planned Programs were implemented has not been very successful in motivating faculty toward the goals implicit in the Programs, at least partly because the USDA core goals were initially very poorly designed and articulated. However, it is probably too soon to reformulate these Programs, given the effort that has been invested in the current set. While the previous goals fell along disciplinary and organizational lines that were synergistic in describing what success looked like, the current goals do not have this kind of unity and we are not yet sure how to rework the Planned Programs to accomplish a target-oriented, interdisciplinary agenda that fits WSU or the region. Changing the way in which metrics are applied through these new Planned Programs has been used to supplement other research overviews, rather than being the primary tool used to evaluate our status.

We think we have given USDA the information requested but we are not sure that our effort (and those of other land-grant universities) is making the contribution toward a national argument for the value of the formula funding that we think could be made. There do not

appear to be good places within the Planned Program boxes to adequately describe specific projects or programs that contribute to a Planned Program. This may be the result of the way we phrased our state objectives but some of the problem is in the way we are being asked by the rubric to describe our programs, outcomes and impacts. The process was frustrating and we anticipate that it may be frustrating for those evaluating our Annual Report. We do not know how much the process could be changed to allow National Leaders to collect information about specific efforts that have had impact, but we would welcome the possibility of discussing alternative ways of reporting on our activities

There does not appear to be a place in this category to report on multi and joint activities so we have included some of that information here.

Multi-state programming helps the ARC and WSU Extension garner efficiencies by collaborating with surrounding states in order to reduce research and extension programming redundancies - in the Pacific Northwest, this is extremely important. The Pacific Northwest Publications series is a long-running effort by Washington, Oregon, and Idaho to produce joint publications that access the knowledge bases of these institutions and eliminate duplication of effort. More recently, formation of the Washington State University and University of Idaho School of Food Science represents another unique example of multi-state collaboration, and was brought about in 2008 by a merger of departments from both universities to form a joint School of Food Science. Because of budget problems at both universities, it is only recently that the School has been able to hire faculty members within the new concept. Many ARC scientists and WSU Extension faculty are members of regional research and/or extension coordinating committees. The extent of collaboration varies from informal relationships to very structured multistate efforts, especially related to agriculture and food science in WA, OR, and ID. An example of a structured interaction is the **Re**gional **A**pproaches to **C**limate **Ch**ange (REACCH) project (https://www.reacchpna.org), which is focused on cereal production in the three Northwest states and has numerous USDA-ARS collaborators and the Northwest Advanced Renewables Alliance (NARA) which is focused on green fuels, chemicals, and environmentally preferred products.

Additionally, WSU has long-standing collaborations with the University of Washington that include co-locating of faculty, jointly funded programs, and coordination of legislative and budgetary processes. Collaborative research occurs between the ARC and WSU Extension, between other WSU research entities and ARC/WSU Extension, and between ARC/WSU Extension and research and extension programs at the University of Washington, Oregon State University, and the University of Idaho. This integration strengthens the research and outreach efforts and helps ensure that the best practices for yielding tangible outcomes are employed by farmers and ranchers, natural resource managers, individuals, communities, and businesses.

IV. Stakeholder Input

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

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

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

Brief explanation.

Stakeholder involvement is sought through a variety of means. Electronic media (email, websites, and blogs) are increasingly used to solicit and deliver information (see, for example, http://news.cahnrs.wsu.edu/) but we recognize that many individuals do not have convenient access to these 'new' media, so more traditional approaches are also used. These include the use of radio, direct mail, telephone contacts, and personal visits. Our many advisory councils and committees are kept abreast of activities within CAHNRS and WSU Extension through newsletters, telephone calls, emails, blogs, and direct meetings. All advisory groups meet at regular intervals. During these meetings, they are briefed about new initiatives, on-going work, and issues related to the College and WSU Extension. Feedback is also solicited at these events. This feedback is key to developing new initiatives and outreach programs. CAHNRS supports a Marketing, News and Educational Communications unit that now includes Extension, which was reorganized into the College three years ago. This unit has been very successful in communicating research and Extension activities through its own publications and links with state newspapers and electronic media. We expect this activity to expand over the next five years through stakeholder-targeted (http://news.cahnrs.wsu.edu/category/voice-of-the-vine/ , http://news.cahnrs.wsu.edu/category/green-times/) and general interest (http://news.cahnrs.wsu.edu/category/on-solid-ground/) communications. 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; we also make use of clicker technology at workshops and training sessions to gather information rapidly. These assessments are extremely valuable in that response rates are generally much higher and data are delivered in a 'pre-analyzed' format. These rapid assessments are often critical in the development of projects with short timelines as is often the case when responding to federal, state, and foundation calls for grant proposals. Finally, web content delivery including web conferencing and webinars are frequently used to both communicate with the public and to present research results. WSU Extension has recently upgraded its web capabilities by employing a content management system. This has enabled greater ease of use and access to information. Key elements are monitored using Google Analytics, which allows assessment of both the size and geographical location of audiences. Web conferencing is generally delivered via Adobe Connect. This allows ARC scientists and Extension educators to communicate broadly and simultaneously

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

1. Method to identify individuals and groups

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

Brief explanation.

The ARC and WSU Extension use local and statewide advisory committees to provide input to the leadership, the faculty, and the staff of Washington State University. These advisory groups include the CAHNRS National Board of Advisors, the Dean's "Kitchen Cabinet," the Center for Sustaining Agriculture and Natural Resources Advisory Committee, advisory committees at each of the four Research and Extension Centers, and county, departmental, and program-specific advisory committees.

When appropriate, feedback is sought through designed focus groups and designed surveys. This form of feedback is critical for evaluating new approaches, technology applications, and new outreach methods. Additionally, technical surveys are often designed by the Division of Governmental Studies and Services to assess public attitudes. Needs assessment is an expectation of all WSU Extension faculty members. These processes are deeply engrained in our program development processes. Alternative mechanisms have been developed to garner input from non-English speaking communities, refugee communities, and from other underserved populations. In these cases, WSU Extension often employs individuals from these communities who understand the cultures and traditions. This improves communication and assessment of need.

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

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

1. Methods for collecting Stakeholder Input

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

Brief explanation.

Annual assessments of general population characteristics, agricultural trends, natural resource-related issues, human health trends, and business dynamics are carried out as needed and are largely based on analysis of data collected by agencies external to the

university, such as the US Census Bureau, National Agriculture Statistics Service, Washington Department of Natural Resources, Washington Department of Health, Washington Department of Agriculture, and the Washington Department of Commerce. To meet specific needs, these are supplemented in some cases by focused internal or stakeholder commissioned studies. These data help WSU faculty and staff and the commissioning stakeholders identify target audiences and define specific needs. We then develop appropriate research and outreach to address these needs. Stakeholder input from groups and individuals identified by these means is collected through a variety of processes that include meetings with individuals and groups, surveys, and other forums. Information from these activities is summarized and shared broadly. Additionally, key WSU personnel are invited to participate in these venues to receive input directly on both on-going and planned research and outreach.

3. A statement of how the input will be considered

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

Brief explanation.

Input is generally solicited in processes such as stakeholder forums and meetings involving application of resources, including developing priorities for research and outreach, project design, and program delivery. Additionally, input from stakeholders strengthens our ability to assess need and identify potential partners, identify emerging issues, and evaluate the effectiveness of our research and extension programs in addressing these issues and needs as we proceed.

V. Planned Program Table of Content

V(A). Planned Program (Summary)

Program # 1

1. Name of the Planned Program

Natural Resources Stewardship

2. Brief summary about Planned Program

A major focus of our Natural Resources Stewardship program is the interface between Natural Resources and managed ecosystems, such as farms, orchards and forests. The proportion of resource under intensive management can vary considerably, nearing 100% in the wheat country of eastern Washington, to a relatively small fraction in the non-agricultural desert and mountain regions of the state. WSU scientists continue to seek a better understanding of how native plants and animals interact with their environments in order to more effectively manage, conserve, and protect these valuable resources. Additionally, they seek to better understand the complex interrelationships among our natural resource systems (e.g., terrestrial, aquatic, and atmospheric), human societies, and our economic systems. An example of this is in some of our integrated pest management research, where the "natural" regions adjacent to cultivation provide refuges for natural pests and predators and can be valuable resources when they are taken into account in designing IPM control strategies and our current pesticide information system lists effects of insecticides on both pest insects and beneficials. Our researchers are also improving the productivity of plants like hybrid poplar, alder and black cottonwood, which hold great promise as carbon sinks, riparian buffers, harvested wood, and energy sources, such as biofuels. Similarly, WSU scientists are developing mechanisms for re-vegetation of mining sites, restoration of watersheds, and reestablishing native prairies. This work is complemented by studies of the habitat requirements and impacts of key large carnivores and herbivores in forest and range ecosystems, with some effort directed toward preservation of endangered mammals and birds. Our extension professionals focus on three major natural resource areas: water, forestry, and range management. Water represents the largest component of our extension natural resources programs because it is a critical, limiting and limited resource in the region. Significant work is underway to apply the research and knowledge bases of the University to address issues related to both water quality and quantity. So, for example, close collaborations of state agencies, the city of Puyallup and on-going research programs at the WSU Puyallup Research and Extension Center are developing strategies and deploying solutions to mitigate the impacts of storm water runoff into upland waters and ultimately into Puget Sound. This work is supported by grants from a variety of agencies, such as the U.S. Environmental Protection Agency, and local governments and various non-governmental agencies. Projects include the installation and testing of permeable paving materials, rain gardens, and other strategies designed to reduce the flow of water across man-made surfaces, a process that rapidly dumps accumulated debris and pollutants into streams and estuaries. Significant efforts are also underway to investigate and ameliorate the impacts of agriculture on water quality through establishment of appropriate buffers, converting animal waste to energy and other useful byproducts, and decreasing pesticide contamination through integrated pest management strategies on farm and ranches. Our Master Gardener volunteers act as a resource for homeowners to heighten awareness of the impacts of lawn and garden chemicals and fertilizers on surface and ground water leading to an increase in the proper use of these materials. Our marine program includes significant volunteer efforts in the Puget Sound area (see, for example, http://www.beachwatchers.wsu.edu/regional/index.php). In addition, other efforts focus on reducing hazards to shipping, improving fisher safety, reducing the impacts of fishing on marine ecosystems, and reducing the impacts of human habitation on costal marine environments. Finally, our range and forestry management programs engage landowners and land managers to increase application of best management practices leading to improved water quality and quantity, reduced development of forestland to other purposes, use of biocontrol agents to control invasive species, reduced risk of wildfires, improved wildlife habitat, increased energy production from woody biomass, increased biodiversity, and improved

In an effort to develop efficiency and more responsive means of addressing critical issues, the Department of Natural Resource Sciences was merged with the School of Earth and Environmental Sciences, which was located in the College of Sciences. The resulting School of the Environment (http://environment.wsu.edu) houses much of the WSU activity in the Natural Resource area and its development will obviously be a crucial component of WSU's Research and Extension activities over the next five years. In discussions with the Director of the School, the Agricultural Research Center has indicated that he will have considerable input into directing ARC resources to be most effective in pursuing Natural Resource Stewardship goals. During the past year, and continuing into the next four or five, we will continue to recruit faculty in order to redirect, consolidate and strengthen the School and the ARC is investing in facilities to house these new programs in order to meet the needs of a changing natural resource environment.

3. Program existence : Mature (More then five years)

4. Program duration : Long-Term (More than five years)

5. Expending formula funds or state-matching funds : Yes

6. Expending other than formula funds or state-matching funds : Yes

V(B). Program Knowledge Area(s)

1. Program Knowledge Areas and Percentage

KA Code	Knowledge Area	%1862 Extension	%1890 Extension	%1862 Research	%1890 Research
111	Conservation and Efficient Use of Water	10%		5%	
112	Watershed Protection and Management	10%		10%	
121	Management of Range Resources	10%		5%	
122	Management and Control of Forest and Range Fires	9%		5%	
123	Management and Sustainability of Forest Resources	10%		10%	
124	Urban Forestry	5%		4%	
125	Agroforestry	2%		3%	
133	Pollution Prevention and Mitigation	5%		5%	
135	Aquatic and Terrestrial Wildlife	5%		15%	
136	Conservation of Biological Diversity	10%		6%	
213	Weeds Affecting Plants	5%		5%	
214	Vertebrates, Mollusks, and Other Pests Affecting Plants	2%		2%	
215	Biological Control of Pests Affecting Plants	5%		12%	
302	Nutrient Utilization in Animals	0%		3%	
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 (Situation and Scope)

1. Situation and priorities

Washington State has a very rich natural resource base that supports the state's economy and contributes greatly to the quality of life in the region. Washington is home to vast mountain ranges, major river systems, forests, agricultural and rangelands, coastal regions, and the Puget Sound. These resources define large parts of our economy and of the lifestyles that many generations have enjoyed. These resources are also under increasing pressure as the population of the state continues to expand, as snowpacks and steam flows are impacted by climate change, and as energy shortages result in increasing reliance on our natural systems for biomass, hydroelectric and wind power production.

Priorities include: 1) Improvement of water quality through reduced soil erosion and movement of pesticides, fertilizers and other non-point source pollutants into streams, waterways and the Puget Sound;

2) Improvement in the condition of our range and forestlands leading to greater biodiversity, reduced risk of wildfire, and improvement in economic returns to landowners and managers; 3) Improved understanding of the habitat needs of the plants and animals of the state, with the goal of maintaining species in a sustainable way.

2. Scope of the Program

- In-State Extension
- In-State Research
- Multistate Research
- Multistate Extension
- Integrated Research and Extension
- Multistate Integrated Research and Extension

V(D). Planned Program (Assumptions and Goals)

1. Assumptions made for the Program

We are assuming that the population of Washington State will continue to increase; that global climate change will impact snowpacks and affect the life histories of plants, pests and pathogens relevant to both agricultural and natural ecosystems, and that the public will increasingly demand good stewardship of our wildlife, watersheds, forests, agricultural and range lands, and coastal regions. We are also assuming that funding will continue to be available to support research and outreach related to natural resources stewardship.

2. Ultimate goal(s) of this Program

The ultimate goals of this planned program are increased water, land and air quality, improved habitat for native aquatic and terrestrial species, effective control of invasive plant and animal species, and increased sustainability and financial returns for natural resource-based industries.

V(E). Planned Program (Inputs)

1. Estimated Number of professional FTE/SYs to be budgeted for this Program

Year	Extension		Research	
	1862	1890	1862	1890
2016	79.0	0.0	25.0	0.0
2017	79.0	0.0	25.0	0.0
2018	79.0	0.0	25.0	0.0
2019	79.0	0.0	25.0	0.0
2020	79.0	0.0	25.0	0.0

V(F). Planned Program (Activity)

1. Activity for the Program

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

2. Type(s) of methods to be used to reach direct and indirect contacts

Extension

Direct Methods	Indirect Methods
● Education Class ● Workshop ● Group Discussion ● One-on-One Intervention ● Demonstrations	● Public Service Announcement ● Newsletters ● TV Media Programs ● Web sites other than eXtension

3. Description of targeted audience

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

V(G). Planned Program (Outputs)

NIFA no longer requires you to report target numbers for standard output measures in the Plan of Work. However, all institutions will report actual numbers for standard output measures in the Annual Report of Accomplishments and Results. The standard outputs for which you must continue to collect data are:

- Number of contacts
  - Direct Adult Contacts
  - Indirect Adult Contacts
  - Direct Youth Contacts
  - Indirect Youth Contact
- Number of patents submitted
- Number of peer reviewed publications

☑ Clicking this box affirms you will continue to collect data on these items and report the data in the Annual Report of Accomplishments and Results.

V(H). State Defined Outputs

1. Output Measure

- Number of extension workshops, demonstrations, field days, and conferences that focus on stewardship of natural resources and environmental protection.
- Number of peer-reviewed (official) WSU Extension publications produced on natural resource stewardship topics.
- Number of graduate students with a significant professional orientation in the area of Natural Resources stewardship.
- The number of WSU Master Gardeners trained during the year to address environmental concerns and natural resource stewardship.
- The number of individuals trained in the safe and proper use of pesticides.

☑ Clicking this box affirms you will continue to collect data on these items and report the data in the Annual Report of Accomplishments and Results.

V(I). State Defined Outcome

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

Outcome # 1

1. Outcome Target

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

2. Outcome Type : Change in Knowledge Outcome Measure

3. Associated Knowledge Area(s)

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

4. Associated Institute Type(s)

- 1862 Extension
- 1862 Research

Outcome # 2

1. Outcome Target

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

2. Outcome Type : Change in Action Outcome Measure

3. Associated Knowledge Area(s)

- 111 - Conservation and Efficient Use of Water

- 112 - Watershed Protection and Management
- 133 - Pollution Prevention and Mitigation

4. Associated Institute Type(s)

- 1862 Extension
- 1862 Research

Outcome # 3

1. Outcome Target

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

2. Outcome Type : Change in Condition Outcome Measure

3. Associated Knowledge Area(s)

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

4. Associated Institute Type(s)

- 1862 Extension
- 1862 Research

Outcome # 4

1. Outcome Target

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

2. Outcome Type : Change in Action Outcome Measure

3. Associated Knowledge Area(s)

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

4. Associated Institute Type(s)

- 1862 Extension

Outcome # 5

1. Outcome Target

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

2. Outcome Type : Change in Action Outcome Measure

3. Associated Knowledge Area(s)

- 112 - Watershed Protection and Management
- 133 - Pollution Prevention and Mitigation
- 403 - Waste Disposal, Recycling, and Reuse

4. Associated Institute Type(s)

- 1862 Extension

V(J). Planned Program (External Factors)

1. External Factors which may affect Outcomes

- Natural Disasters (drought, weather extremes, etc.)
- Economy

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

Description

Numerous external factors can potentially impact the success of our research and extension programs. Although we have been remarkably effective at renewing contracts with counties for Extension activities, reduced availability of funding at several levels, but especially from state sources, has damaged our ability to achieve previous targets. We have to some extent compensated through the use of technology and reprioritization to increase efficiency but this sort of increased output per professional FTE cannot be expected to continue to rise, especially given the competition for good personnel in this area and our fixed state salaries. 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. Additionally, legislative action can create new pressures on researchers and extension educators due to unfunded mandates and changes in organizations that have been our traditional partners. Because of the physical, production, market and population diversity referred to elsewhere, WSU is particularly vulnerable to this type of change--we are not very deep and have become highly collaborative with other organizations in order to maintain the coverage our stakeholders expect. While stakeholders now can "get on the web" to find information, much of the best of that information was generated previously by organizational structures that are severely threatened. To make a five-year plan under these circumstances is fraught with difficulties but serves to reemphasize core priorities and reengage core constituencies. In the past, Washington State has also experienced natural disasters such as earthquakes, storms, landslides, and volcanic eruptions. Each of these has potential impacts on our work and on those that we seek to help with our research and science-based extension programs.

V(K). Planned Program - Planned Evaluation Studies

Description of Planned Evaluation Studies

Our evaluation methodologies are designed to assess the amount of learning acquired during our activities and retained at intervals afterword; the degree of application of that learning; and the social, environmental and economic value of these applications. We will use post-program, retrospective, and before and after assessments to document changes in knowledge. We will use survey methods 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.

V(A). Planned Program (Summary)

Program # 2

1. Name of the Planned Program

Agricultural Productivity and Food Security

2. Brief summary about Planned Program

Washington State's diverse microclimates allows the state to 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 that increase productivity relative to inputs, optimizing the use of nutrients for plant and animal production, improving product quality, enhancing business management and marketing effectiveness, and reducing negative environmental impacts of agricultural production through more effective tillage, integrated pest management, and effective water and waste management.

WSU is a global leader in plant molecular biology and in the application of traditional breeding. Many wheat and barley varieties used in the Pacific Northwest (PNW) are products of these breeding programs; similar efforts are yielding promising new varieties of apple, legumes, potato, hops, and other crops. Crop genetic improvement epitomizes integration of research and extension as innovations from laboratories advance to controlled greenhouse and field studies, to variety comparisons conducted by extension specialists, to ultimate acceptance and application by growers. These dynamic programs are critical for keeping our crops competitive in a global marketplace and in helping farmers stay one step ahead of emerging weeds, pests, and diseases that are becoming even more of a threat as a result of global climate change. One area of development in the next five years will be in the area of commercialization of crop varieties developed at WSU, especially in wheat and apple. With the assistance of stakeholders, WSU is trying to broaden the funding base for the basic science and extension programs that helped develop these crops.

Many areas in the PNW have steep topography, recurrent high winds and seasonal flooding, and these create high erosion potential and risk of runoff into waterways and aquifers. WSU research and extension programs have been leaders in developing and delivering new strategies to help sustain cropping under these conditions. Concerns about input costs have also driven interest in minimum tillage systems and precision agriculture. WSU research and extension programs are delivering approaches that lead to reduced fuel and fertilizer inputs, improved soil stability, and maintenance of high production levels.

Interest in sustainable and organic production in the PNW is high and increasing. WSU responded with new research and extension programs that impact non-traditional farming approaches. Through our research programs located near Pullman (Eastern WA), Wenatchee and Prosser (Central WA) and Mount Vernon and Puyallup (Western WA), new sustainable and organic production methods are being evaluated and disseminated. As a result of a major gift, we are currently developing a model organic farm in Pullman with visitor and outreach facilities. Animal production is a significant portion of our agricultural economy. Dairy production has evolved from small-scale operations in Western Washington to large integrated dairies in the Columbia Basin, which is also home to many commercial feedlots. Waste management is a major concern for both confinement dairies and feedlots. Significant work is underway to reduce waste volume and to convert waste into economically useful materials, such as methane and dry phosphorus fertilizer. Beef cattle graze much of the land that is not appropriate for cropping. Research and extension programs focus on increasing the efficiency of production of these herds while seeking to minimize impacts on range and forest ecosystems and watersheds.

3. Program existence : Mature (More then five years)

4. Program duration : Long-Term (More than five years)

5. Expending formula funds or state-matching funds : Yes

6. Expending other than formula funds or state-matching funds : Yes

V(B). Program Knowledge Area(s)

1. Program Knowledge Areas and Percentage

KA Code	Knowledge Area	%1862 Extension	%1890 Extension	%1862 Research	%1890 Research
102	Soil, Plant, Water, Nutrient Relationships	2%		8%	
104	Protect Soil from Harmful Effects of Natural Elements	5%		3%	
111	Conservation and Efficient Use of Water	8%		7%	
112	Watershed Protection and Management	5%		3%	
121	Management of Range Resources	2%		3%	
201	Plant Genome, Genetics, and Genetic Mechanisms	0%		14%	
202	Plant Genetic Resources	6%		8%	
203	Plant Biological Efficiency and Abiotic Stresses Affecting Plants	0%		9%	
205	Plant Management Systems	5%		6%	
211	Insects, Mites, and Other Arthropods Affecting Plants	12%		8%	
212	Diseases and Nematodes Affecting Plants	6%		9%	
213	Weeds Affecting Plants	10%		3%	
215	Biological Control of Pests Affecting Plants	8%		5%	
216	Integrated Pest Management Systems	10%		4%	
301	Reproductive Performance of Animals	2%		3%	
302	Nutrient Utilization in Animals	2%		3%	
303	Genetic Improvement of Animals	3%		2%	
304	Animal Genome	0%		2%	
307	Animal Management Systems	8%		0%	
604	Marketing and Distribution Practices	6%		0%	
	Total	100%		100%	

V(C). Planned Program (Situation and Scope)

1. Situation and priorities

Washington State is extremely variable in climate and topography, leading to an ability to produce over 300 different agricultural commodities. Much of the agricultural production of the state is exported, primarily to Pacific Rim countries. As a result, Washington producers must be competitive in global markets and have a keen understanding of the demand components from other societies. The state's productivity is also highly dependent upon the application of appropriate technologies for irrigation, farming of lands with high erosion potential, effective control of existing and invasive pests and diseases, and effective transport of agricultural products to distant markets. Our priorities include development and distribution of new genetic materials including new crop varieties designed to increase productivity and production efficiency; improving efficiency in using inputs in plant and animal production; reducing soil erosion from wind and water; improving water quality through appropriate irrigation methods, waste management, and optimal application of pesticides and herbicides; reducing risk to human health by use of appropriate production practices and ensuring that these practices result in a safe and abundant food supply; improving tillage practices to meet environmental and economic benchmarks; and diversifying production methods to respond to emerging consumer preferences.

2. Scope of the Program

- In-State Extension
- In-State Research
- Multistate Research
- Multistate Extension
- Integrated Research and Extension
- Multistate Integrated Research and Extension

V(D). Planned Program (Assumptions and Goals)

1. Assumptions made for the Program

We are assuming that funding (through a variety of sources) will remain at current levels for research and extension programs; that no major crises occur within the state, nationally, or internationally that significantly impact the ability of farmers to apply new technologies; that fuel, fertilizer, and other input costs will continue to rise; that consumers will continue to become more concerned about the type and quality of the food that they eat; that the public will increase their demand for environmental stewardship; and that agriculture will be exposed to new plant and animal pests and diseases due to global climate change and increased international commerce. We have been successful in expanding our external funding base but changes in federal and state priorities, while they offer opportunities, also threaten some of the funding that is needed for long-term cropping systems research needed in many areas of the state. While we assume that some funding for these programs will be available, this is perhaps the weakest area of our portfolio because of the considerable time required to obtain results. However, long-term studies are crucial in evaluating whether a set of agricultural practices can be sustained. Changes at the federal level to emphasize large coordinated programs have also created some issues in allowing effective development of new faculty since this reorganization has made it more difficult for new faculty members to establish independent programs, which we continue to see as desirable.

2. Ultimate goal(s) of this Program

The ultimate goals of this planned program are to increase agricultural productivity, profitability, and production efficiency and to do this in a way that is sustainable. The last criterion requires practices that emphasize reduced soil erosion; improved water quality; reduced energy inputs in agriculture; improved quality and safety of agricultural products; and reduce the carbon footprint of agriculture in the state. They also depend on the economic viability of producers as both inputs and outputs.

V(E). Planned Program (Inputs)

1. Estimated Number of professional FTE/SYs to be budgeted for this Program

Year	Extension		Research	
	1862	1890	1862	1890
2016	150.0	0.0	290.0	0.0
2017	150.0	0.0	290.0	0.0
2018	150.0	0.0	290.0	0.0
2019	150.0	0.0	290.0	0.0
2020	150.0	0.0	290.0	0.0

V(F). Planned Program (Activity)

1. Activity for the Program

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

2. Type(s) of methods to be used to reach direct and indirect contacts

Extension

Direct Methods	Indirect Methods
● Education Class	● Public Service Announcement
● Workshop	● Newsletters
● Group Discussion	● TV Media Programs
● One-on-One Intervention	● Web sites other than eXtension
● Demonstrations	● Other 1 (Social Media)
● Other 1 (Decision Aids)	

3. Description of targeted 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.

V(G). Planned Program (Outputs)

NIFA no longer requires you to report target numbers for standard output measures in the Plan of Work. However, all institutions will report actual numbers for standard output measures in the Annual Report of Accomplishments and Results. The standard outputs for which you must continue to collect data are:

- Number of contacts
  - Direct Adult Contacts
  - Indirect Adult Contacts
  - Direct Youth Contacts
  - Indirect Youth Contact
- Number of patents submitted
- Number of peer reviewed publications

☑ Clicking this box affirms you will continue to collect data on these items and report the data in the Annual Report of Accomplishments and Results.

V(H). State Defined Outputs

1. Output Measure

- Number of seminars, workshops, demonstrations, field days, and educational events conducted annually
- Number of peer reviewed (official) WSU Extension publications published
- Number of graduate students with a significant professional orientation in the area of agricultural productivity and food security.

☑ Clicking this box affirms you will continue to collect data on these items and report the data in the Annual Report of Accomplishments and Results.

V(I). State Defined Outcome

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

Outcome # 1

1. Outcome Target

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

2. Outcome Type : Change in Knowledge Outcome Measure

3. Associated Knowledge Area(s)

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

4. Associated Institute Type(s)

- 1862 Extension
- 1862 Research

Outcome # 2

1. Outcome Target

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

2. Outcome Type : Change in Action Outcome Measure

3. Associated Knowledge Area(s)

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

4. Associated Institute Type(s)

- 1862 Extension
- 1862 Research

Outcome # 3

1. Outcome Target

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

2. Outcome Type : Change in Condition Outcome Measure

3. Associated Knowledge Area(s)

- 102 - Soil, Plant, Water, Nutrient Relationships
- 104 - Protect Soil from Harmful Effects of Natural Elements

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

4. Associated Institute Type(s)

- 1862 Extension
- 1862 Research

Outcome # 4

1. Outcome Target

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. Outcome Type : Change in Condition Outcome Measure

3. Associated Knowledge Area(s)

- 111 - Conservation and Efficient Use of Water
- 121 - Management of Range Resources
- 301 - Reproductive Performance of Animals
- 302 - Nutrient Utilization in Animals
- 303 - Genetic Improvement of Animals
- 304 - Animal Genome
- 307 - Animal Management Systems
- 604 - Marketing and Distribution Practices

4. Associated Institute Type(s)

- 1862 Extension
- 1862 Research

Outcome # 5

1. Outcome Target

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

2. Outcome Type : Change in Condition Outcome Measure

3. Associated Knowledge Area(s)

- 604 - Marketing and Distribution Practices

4. Associated Institute Type(s)

- 1862 Extension
- 1862 Research

V(J). Planned Program (External Factors)

1. External Factors which may affect Outcomes

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

Description

Progress in generating new knowledge is very dependent on funding for research since the number of studies is a function of the number and quality of researchers available and the accessibility of operations funding needed to carry out the research. Progress in increasing knowledge is largely determined by the interest level of the target audiences and the ability of WSU Extension professionals to reach the audience with appropriate information. This process is largely determined by state, county, federal and philanthropic support levels. In our experience, farmers, ranchers, and agricultural professionals are more likely to seek new knowledge when they possess the economic resources or needs to potentially apply what they have learned.

Application of new knowledge and the value of that application are often determined by potential profit or loss and weather conditions. Profit level is determined by the price of the commodity produced, which is in turn determined by supply and demand. Because Washington State is very dependent upon Pacific Rim commodity markets, external factors like currency valuations and transportation costs frequently have very large impacts on prices received at the farm gate.

V(K). Planned Program - Planned Evaluation Studies

Description of Planned Evaluation Studies

Our evaluation methodologies are designed to assess amount of acquired learning; degree of application of 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 will use survey methods, 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.

V(A). Planned Program (Summary)

Program # 3

1. Name of the Planned Program

Sustainable Energy

2. Brief summary about Planned Program

Developing a set of energy alternatives based on sound science, responsible engineering, and accurate economic assessment is an overall goal for this Planned Program. As a northern state, Washington's climate is relatively cool, has a high annual variation of sunlight and a pronounced winter season. There are many areas where available water limits crop alternatives. These factors constrain available strategies for biomass energy production. A focus of the biologically-related energy production research effort at Washington State University has been on basic plant sciences related to metabolite biosynthesis and partitioning, with the goals of developing new energy crops and also in helping regional farmers to find niche crops that can be grown for use as fuels. A major effort is on the conversion of lignocellulose, especially from softwood harvesting operations, that can be converted to aviation biofuels by a combination of improved preprocessing and advanced fermentation techniques. Our research also seeks to create mechanisms by which local waste streams, including those from animal rearing operations and municipal waste, can be converted into power, heat, and stable and useful byproducts using anaerobic digestion. The basic plant science energy research is investigating how various plant metabolites are made and how their synthesis is coordinated. The ultimate goals of this type of research are to increase agricultural production of biofuel and bioproduct related materials by increasing energy yield from photosynthesis, and to develop plants that allocate their productivity into a more useful spectrum of energy molecules. Research and extension programs are assessing potential non-food energy plants including poplar, switchgrass, algae, and Camelina for biomass and bioproduct production. Various small- to medium-scale processing options are being investigated, including various types of fermentation, especially to higher molecular weight fuels, and thermochemical processing, like pyrolysis. Pyrolysis is likely to produce large amounts of biochar as a byproduct and we are investigating how biochar might be used to improve soil, while simultaneously sequestering carbon. Waste streams are also promising energy sources, with the collateral benefits of generating revenue by reducing waste mass and environmental pollution. We are developing technologies for handling forest, animal, and municipal waste, and also potential new uses for the products of these technologies. Having bioenergy and bioproduct options can help improve the sustainability of our agriculture, food systems, and rural communities through diversification (economic and biological); recovery and recycling of carbon, nutrients and energy from organic wastes; reduction of environmental pollutants; and generation of income and investment opportunities for farmers and rural communities. WSU has the ability to carry out life-cycle analyses to estimate under what conditions developing these alternatives might make sense. The WSU Extension Energy Program supports development of renewable solar and wind energy by actively engaging with utilities, workforce training facilities, builders and consumers. Additionally, the WSU Extension Energy Program focuses considerable effort on energy conservation, the most cost effective mechanism for matching energy supply with demand. The WSU Extension Energy Program creates and maintains regional and national clearinghouses for delivering energy information related to energy use and conservation, innovative industrial energy use strategies, energy efficiency, and regional energy development. Much of this activity has been in partnership with the US Department of Energy and other federal agencies and with various state agencies.

3. Program existence : Mature (More then five years)

4. Program duration : Long-Term (More than five years)

5. Expending formula funds or state-matching funds : Yes

6. Expending other than formula funds or state-matching funds : Yes

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

V(C). Planned Program (Situation and Scope)

1. Situation and priorities

Continued national competitiveness, economic growth and quality of life is dependent in large

measure on our ability to find clean, cost effective, and renewable sources of energy. Washington's economy has long relied upon relatively inexpensive energy largely derived from hydropower. Further growth of the hydropower energy sector is virtually impossible given societal resistance to the creation of new dams and to changing allocation priorities for the water. However, other ecosystem conversion sources of energy appear to be viable in the region, including solar, wind, and biomass conversion. Among these, solar and biomass technologies are still evolving while relatively large wind energy farms have been constructed in several regions of the state. Though economic analyses are helping to unravel these complex systems, there are still gaps in our knowledge about the economic viability of these strategies. Our priorities are: 1) to develop locally applicable biomass and bioenergy alternatives; 2) to increase energy efficiency on farms, in industrial settings, and within residential dwellings and; 3) to increase understanding and appropriate application of new alternative energy resources including biomass conversion and wind applications.

2. Scope of the Program

- In-State Extension
- In-State Research
- Multistate Research
- Multistate Extension
- Integrated Research and Extension
- Multistate Integrated Research and Extension

V(D). Planned Program (Assumptions and Goals)

1. Assumptions made for the Program

The cost of energy produced from oil and gas is in a state of flux, although this has become an increasingly complicated issue regionally because of the interplay of new extraction technology and processing and distribution issues. Regional reliance on coal is likely to be phased out because of environmental concerns although transshipment of coal to Pacific ports is becoming a significant political issue. In many areas, the mixed signals contained in federal and state energy policies are creating difficulties in integrating planning for the short, medium and long term. While we believe that understanding the links between human action and climate change will become more widely accepted and lead to increased regulation and societal pressures to expand the use of alternative clean energy systems, the obvious reluctance to remodel energy markets in response to the projected consequences of fossil fuel use mean that many efforts in the alternate energy area are limited to testing prototype strategies and retrofitting advanced solutions only where the immediate economic return is already documented and substantial. While it seems likely that cost structures will evolve to make alternative energy systems more cost effective and competitive, the degree to which operators at a number of levels are interfering in the markets for energy and energy related commodities makes the five year future very unclear.

2. Ultimate goal(s) of this Program

The goals for our sustainable energy program are two-fold in promoting energy efficiency in homes, manufacturing processes, and commercial buildings; and also engaging in research and extension work to provide new opportunities for the production and consumption of biofuels in the Pacific Northwest that are derived from oilseed crops, agroforestry materials, and other biomass sources.

V(E). Planned Program (Inputs)

1. Estimated Number of professional FTE/SYs to be budgeted for this Program

Year	Extension		Research	
	1862	1890	1862	1890
2016	48.0	0.0	45.0	0.0
2017	48.0	0.0	45.0	0.0
2018	48.0	0.0	45.0	0.0
2019	48.0	0.0	45.0	0.0
2020	48.0	0.0	0.0	0.0

V(F). Planned Program (Activity)

1. Activity for the Program

Research will be conducted on energy-related yield and production and processing efficiency of using agricultural and woody biomass, algae and oil seeds. Economic analyses will be conducted on these various energy systems to assess thresholds for local and regional application of these technologies. Extension programs will be developed to teach and demonstrate alternative energy systems such as anaerobic digestion, biomass production, oil seed production, increasing energy efficiency, and utilization of wind and solar energy systems.

2. Type(s) of methods to be used to reach direct and indirect contacts

Extension

Direct Methods	Indirect Methods
● Education Class ● Workshop ● Group Discussion ● One-on-One Intervention ● Demonstrations	● Public Service Announcement ● Newsletters ● Web sites other than eXtension

3. Description of targeted audience

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

V(G). Planned Program (Outputs)

NIFA no longer requires you to report target numbers for standard output measures in the Plan of Work. However, all institutions will report actual numbers for standard output measures in the Annual Report of Accomplishments and Results. The standard outputs for which you must continue to collect data are:

- Number of contacts
  - Direct Adult Contacts
  - Indirect Adult Contacts
  - Direct Youth Contacts
  - Indirect Youth Contact
- Number of patents submitted
- Number of peer reviewed publications

☑ Clicking this box affirms you will continue to collect data on these items and report the data in the Annual Report of Accomplishments and Results.

V(H). State Defined Outputs

1. Output Measure

- Number of workshops, demonstrations, and symposia conducted related to alternative energy and energy efficiency.
- Number of peer reviewed (official) WSU Extension publications related to sustainable energy that are published annually.
- Number of graduate students with a significant professional orientation in the area of Sustainable Energy.

☑ Clicking this box affirms you will continue to collect data on these items and report the data in the Annual Report of Accomplishments and Results.

V(I). State Defined Outcome

O. No	Outcome Name
1	Percentage of evaluated participants who demonstrated increased knowledge and skills relative to biofuels, energy efficiency, and alternative energy sources.
2	The number of farmers that applied information provided by this program to produce biofuel crops.
3	The number of forest and woodland owners who applied information from this program in the production of wood for biofuels.
4	The acres of forestland and cropland impacted by our programs to advance the production of biofuel feedstocks.

Outcome # 1

1. Outcome Target

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

2. Outcome Type : Change in Knowledge Outcome Measure

3. Associated Knowledge Area(s)

- 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

4. Associated Institute Type(s)

- 1862 Extension
- 1862 Research

Outcome # 2

1. Outcome Target

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

2. Outcome Type : Change in Action Outcome Measure

3. Associated Knowledge Area(s)

- 102 - Soil, Plant, Water, Nutrient Relationships
- 123 - Management and Sustainability of Forest Resources
- 131 - Alternative Uses of Land
- 133 - Pollution Prevention and Mitigation
- 141 - Air Resource Protection and Management
- 201 - Plant Genome, Genetics, and Genetic Mechanisms
- 203 - Plant Biological Efficiency and Abiotic Stresses Affecting Plants
- 204 - Plant Product Quality and Utility (Preharvest)
- 205 - Plant Management Systems
- 206 - Basic Plant Biology

- 402 - Engineering Systems and Equipment
- 403 - Waste Disposal, Recycling, and Reuse
- 601 - Economics of Agricultural Production and Farm Management
- 603 - Market Economics
- 605 - Natural Resource and Environmental Economics

4. Associated Institute Type(s)

- 1862 Extension
- 1862 Research

Outcome # 3

1. Outcome Target

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

2. Outcome Type : Change in Action Outcome Measure

3. Associated Knowledge Area(s)

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

4. Associated Institute Type(s)

- 1862 Extension
- 1862 Research

Outcome # 4

1. Outcome Target

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

2. Outcome Type : Change in Condition Outcome Measure

3. Associated Knowledge Area(s)

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

4. Associated Institute Type(s)

- 1862 Extension
- 1862 Research

V(J). Planned Program (External Factors)

1. External Factors which may affect Outcomes

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

Description

Numerous external factors can potentially impact the success of our research and extension programs. National energy policy remains confused and has been difficult to track from a research perspective. Reduced availability of local funding has most recently damaged our ability to achieve previous targets and, although we have been successful in competing for large federal grants related to energy, it is difficult to argue that we have a coherent, integrated strategy that is properly resourced in order to deal with the various aspects of energy change in the state. We have, to some extent, compensated for shifts in the funding pattern through the use of technology to increase per person efficiency but this sort of increased output per professional FTE cannot be expected to continue to rise at current rates. Changes in political priorities 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. Additionally, legislative action creates new pressures on researchers and extension educators due to unfunded but mandated changes in priorities and as a result of changes in organizations that have been our traditional partners. In the past, Washington State has also

experienced natural disasters such as earthquakes, storms, landslides, and volcanic eruptions. Each of these has potential impacts on our work and on those that we seek to help with our research and science-based extension programs.

V(K). Planned Program - Planned Evaluation Studies

Description of Planned Evaluation Studies

Our evaluation methodologies are designed to assess the amount of acquired learning; degree of application of 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 will use survey methods, 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.

V(A). Planned Program (Summary)

Program # 4

1. Name of the Planned Program

Climate Change

2. Brief summary about Planned Program

The impact of global climate change will be important to the Pacific Northwest especially because the region's climate is expected to change in diverse ways that will preclude a single type of response. Of major concern is the annual retention of snowpacks in the Cascade Range and in the upper Columbia River watershed in southern Canada. As winters become warmer, less snow pack and thus moisture will be retained in the mountains, stream flows will peak (and may end) earlier, and flooding will likely be more severe. To a great extent, these impacts are already being felt, with almost the entire Cascade and Olympic Ranges in Washington State exhibiting a downward trend in April 1 snowpack since 1916. However, short- term trends in precipitation have been more variable with some regions of eastern Washington receiving greater annual precipitation while western Washington and the Cascade Range have witnessed generally lower precipitation levels. If these trends continue, winter temperatures will likely increase in the Columbia Basin and much of northeastern Washington whereas summer temperatures will likely decrease in much of eastern Washington. In addition to change in stream flows, shifts in mean and extreme temperatures will likely create opportunities for invasive pests, diseases, and weeds to become established in the region. New disease and pest resistant crop varieties will be needed and integrated pest management strategies will need to be continually modified to become more dynamic.

WSU research and extension programs will focus on two areas related to climate change, adaptation/mitigation and to a lesser extent, reducing greenhouse gas emissions. We will strive to help Washington agriculture adapt by producing new varieties that resist new pests and diseases, that can withstand changes in minimum and maximum temperatures, and that might take advantage of the longer growing season. We will monitor for invasive species and develop a more thorough understanding of invasives. Our cutting-edge plant molecular biology and variety development programs along with effective integrated pest management strategies and general crop management will help remediate changes in the range of plant pests and diseases associated with climate change. Both farms and forests are large potential carbon sinks. Therefore, we will seek new opportunities for agricultural producers and forest landowners and managers by evaluating policies and implementation alternatives related to greenhouse gas emission and carbon sequestration. Farmers and foresters will need to be able to assess their options in comparing the value of reduced greenhouse gas emissions associated with change in operational practices to the potential loss of productivity. WSU research will also develop new tillage and soil management practices to ensure that productivity can be maintained while maximizing carbon sequestration effects. Finally, WSU faculty will support creation of sound policy relating to climate change by providing science-based information to key decision-making groups and individuals at the local, state and national levels.

3. Program existence : Mature (More then five years)

4. Program duration : Long-Term (More than five years)

5. Expending formula funds or state-matching funds : Yes

6. Expending other than formula funds or state-matching funds : Yes

V(B). Program Knowledge Area(s)

1. Program Knowledge Areas and Percentage

KA Code	Knowledge Area	%1862 Extension	%1890 Extension	%1862 Research	%1890 Research
102	Soil, Plant, Water, Nutrient Relationships	0%		5%	
111	Conservation and Efficient Use of Water	10%		5%	
112	Watershed Protection and Management	10%		5%	
122	Management and Control of Forest and Range Fires	10%		5%	
123	Management and Sustainability of Forest Resources	5%		5%	
132	Weather and Climate	5%		5%	
133	Pollution Prevention and Mitigation	5%		5%	
201	Plant Genome, Genetics, and Genetic Mechanisms	0%		10%	
202	Plant Genetic Resources	0%		5%	
203	Plant Biological Efficiency and Abiotic Stresses Affecting Plants	0%		10%	
205	Plant Management Systems	20%		5%	
211	Insects, Mites, and Other Arthropods Affecting Plants	10%		10%	
212	Diseases and Nematodes Affecting Plants	10%		10%	
213	Weeds Affecting Plants	0%		3%	
216	Integrated Pest Management Systems	10%		5%	
404	Instrumentation and Control Systems	0%		2%	
605	Natural Resource and Environmental Economics	0%		5%	
610	Domestic Policy Analysis	5%		0%	
	Total	100%		100%	

V(C). Planned Program (Situation and Scope)

1. Situation and priorities

We anticipate that overall snow fall and high-elevation accumulation will be reduced and snow melt will occur earlier in the season, resulting in spring flooding and low or interrupted stream flow during the late summer and fall. These changes will impact communities, agriculture (especially irrigated agriculture) and natural resource management, navigation, and electrical generation in the Pacific Northwest. Additionally, new plant and animal pests and diseases are likely to emerge in the region because of lower winter mortality and the potential for more generations during the extended warmer months. So, for example, we are seeing the introduction and expansion in range of insects such as spotted winged

Drosophila and brown marmorated stinkbug. These are potentially very serious pests to our tree fruit and small fruit industries and we are currently monitoring the spread of these insects. We expect to see more introduced insects and diseases. Some areas may have longer effective growing seasons, allowing a longer production period and more efficient use of labor and capital equipment. Depending on policy alternatives, new opportunities for farmers and forestland managers may appear as reward systems are established for reducing greenhouse gas emissions. However, adoption of these will probably depend largely on incentives for helping to maintain ecosystem properties and the politics of implementing these will be slow.

Our priorities related to climate change are to: 1) provide technical information and assessments to communities and agencies related to the expected impacts of climate change; 2) develop new crop varieties and crop management strategies to deal with the increased challenges and opportunities presented by altered climate. (We have found that it is most effective to present our activities in this area to our constituents as extending our normal operations with a bias toward anticipated changes rather than as a new initiative. This way of framing the issue is both accurate and much less provocative.); 3) develop and deliver effective strategies to monitor and control plant and animal pests and diseases that may be enhanced by changes in weather; and 4) develop and deliver decision tools to help farmers and foresters evaluate incentive systems for reduced greenhouse gas emission strategies.

2. Scope of the Program

- In-State Extension
- In-State Research
- Multistate Research
- Multistate Extension
- Integrated Research and Extension
- Multistate Integrated Research and Extension

V(D). Planned Program (Assumptions and Goals)

1. Assumptions made for the Program

We assume that new competitive funding will be available to support research and outreach related to climate change through USDA, NSF, NOAA, DOE and other sources. During the last several years, WSU groups were part of successful applications for multiyear funding in the area of climate change monitoring and mitigation research and these efforts will obviously continue. We also assume that base state and federal funding for applied research and extension will continue at a level that allows WSU to effectively engage in this area. Finally, we assume that public skepticism related to the validity of climate change will not reduce the emphasis on addressing this critical issue.

2. Ultimate goal(s) of this Program

Improve the ability of the residents of Washington State, including communities, agriculture, forestry, and the general public, to deal with the impacts of climate change. Increase potential for carbon sequestration and/or reduce production of greenhouse gases by agricultural and natural resources-based industries.

V(E). Planned Program (Inputs)

1. Estimated Number of professional FTE/SYs to be budgeted for this Program

Year	Extension		Research	
	1862	1890	1862	1890
2016	20.0	0.0	65.0	0.0
2017	20.0	0.0	65.0	0.0
2018	20.0	0.0	65.0	0.0
2019	20.0	0.0	65.0	0.0
2020	20.0	0.0	65.0	0.0

V(F). Planned Program (Activity)

1. Activity for the Program

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

Our plant breeding and molecular biology programs will continue to develop new crop varieties that are able to withstand emerging disease and pest threats associated with climate change. Our integrated pest management programs will continue to develop new techniques to mitigate the effects of introduced pests and range expansions of pests already in the region. We will investigate the possibilities that changed climatic conditions might present opportunities for growing new crops or growing traditional crops in new ways or new areas. These represent a form of mitigation to try to stabilize farm based economies in the face of climate-driven pressures to change.

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

2. Type(s) of methods to be used to reach direct and indirect contacts

Extension

Direct Methods	Indirect Methods
● Education Class ● Workshop ● Group Discussion ● One-on-One Intervention ● Demonstrations	● Public Service Announcement ● Newsletters ● eXtension web sites ● Web sites other than eXtension

3. Description of targeted audience

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

V(G). Planned Program (Outputs)

NIFA no longer requires you to report target numbers for standard output measures in the Plan of Work. However, all institutions will report actual numbers for standard output measures in the Annual Report of Accomplishments and Results. The standard outputs for which you must continue to collect data are:

- Number of contacts
  - Direct Adult Contacts
  - Indirect Adult Contacts
  - Direct Youth Contacts
  - Indirect Youth Contact
- Number of patents submitted
- Number of peer reviewed publications

☑ Clicking this box affirms you will continue to collect data on these items and report the data in the Annual Report of Accomplishments and Results.

V(H). State Defined Outputs

1. Output Measure

- Number of workshops and other educational events delivered on mitigation and adaptation to climate change.
- Number of peer reviewed (official) WSU Extension publications referencing climate change mitigation and adaptation published per year.
- Number of graduate students with a significant professional orientation in the area of Climate Change.

☑ Clicking this box affirms you will continue to collect data on these items and report the data in the Annual Report of Accomplishments and Results.

V(I). State Defined Outcome

O. No	Outcome Name
1	Percentage of evaluated participants who demonstrated increased knowledge and skills relative to key learning objectives on mitigating or adapting to climate change.
2	Percentage of evaluated program participants who applied knowledge or technology gained from WSU on mitigating or adapting to climate change.
3	Number of farms utilizing WSU-developed crop varieties and/or other technologies to adapt to evolving environmental conditions or newly emerging plant pests and diseases.
4	Number of farms employing anaerobic digestion or other methods to reduce GHG emissions or to sequester carbon.

Outcome # 1

1. Outcome Target

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

2. Outcome Type : Change in Knowledge Outcome Measure

3. Associated Knowledge Area(s)

- 102 - Soil, Plant, Water, Nutrient Relationships
- 111 - Conservation and Efficient Use of Water
- 112 - Watershed Protection and Management
- 122 - Management and Control of Forest and Range Fires
- 123 - Management and Sustainability of Forest Resources
- 132 - Weather and Climate
- 133 - Pollution Prevention and Mitigation
- 202 - Plant Genetic Resources
- 203 - Plant Biological Efficiency and Abiotic Stresses Affecting Plants
- 205 - Plant Management Systems
- 211 - Insects, Mites, and Other Arthropods Affecting Plants
- 212 - Diseases and Nematodes Affecting Plants
- 213 - Weeds Affecting Plants
- 216 - Integrated Pest Management Systems
- 404 - Instrumentation and Control Systems
- 610 - Domestic Policy Analysis

4. Associated Institute Type(s)

- 1862 Extension
- 1862 Research

Outcome # 2

1. Outcome Target

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

2. Outcome Type : Change in Action Outcome Measure

3. Associated Knowledge Area(s)

- 102 - Soil, Plant, Water, Nutrient Relationships
- 111 - Conservation and Efficient Use of Water

- 112 - Watershed Protection and Management
- 122 - Management and Control of Forest and Range Fires
- 123 - Management and Sustainability of Forest Resources
- 132 - Weather and Climate
- 133 - Pollution Prevention and Mitigation
- 201 - Plant Genome, Genetics, and Genetic Mechanisms
- 202 - Plant Genetic Resources
- 203 - Plant Biological Efficiency and Abiotic Stresses Affecting Plants
- 205 - Plant Management Systems
- 211 - Insects, Mites, and Other Arthropods Affecting Plants
- 212 - Diseases and Nematodes Affecting Plants
- 213 - Weeds Affecting Plants
- 216 - Integrated Pest Management Systems
- 404 - Instrumentation and Control Systems
- 610 - Domestic Policy Analysis

4. Associated Institute Type(s)

- 1862 Extension
- 1862 Research

Outcome # 3

1. Outcome Target

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

2. Outcome Type : Change in Condition Outcome Measure

3. Associated Knowledge Area(s)

- 102 - Soil, Plant, Water, Nutrient Relationships
- 111 - Conservation and Efficient Use of Water
- 112 - Watershed Protection and Management
- 122 - Management and Control of Forest and Range Fires
- 123 - Management and Sustainability of Forest Resources
- 132 - Weather and Climate
- 133 - Pollution Prevention and Mitigation
- 201 - Plant Genome, Genetics, and Genetic Mechanisms
- 202 - Plant Genetic Resources
- 203 - Plant Biological Efficiency and Abiotic Stresses Affecting Plants
- 205 - Plant Management Systems

- 211 - Insects, Mites, and Other Arthropods Affecting Plants
- 212 - Diseases and Nematodes Affecting Plants
- 216 - Integrated Pest Management Systems
- 404 - Instrumentation and Control Systems
- 605 - Natural Resource and Environmental Economics
- 610 - Domestic Policy Analysis

4. Associated Institute Type(s)

- 1862 Extension
- 1862 Research

Outcome # 4

1. Outcome Target

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

2. Outcome Type : Change in Condition Outcome Measure

3. Associated Knowledge Area(s)

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

4. Associated Institute Type(s)

- 1862 Extension
- 1862 Research

V(J). Planned Program (External Factors)

1. External Factors which may affect Outcomes

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

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

Description

Numerous external factors can potentially impact the success of our research and extension programs. Reduced availability of funding has damaged our ability to achieve some previous targets and success in obtaining directed support leads to modification of effort. We have, to some extent, compensated for decreases in flexible budgets by using technology to increase per person efficiency but this kind of increased output per professional FTE cannot be expected to continue. Changes in political priorities 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. Especially in the climate change area, lack of a clear consensus (much less a mandate) makes it difficult to work with many of our constituents if we try to use dealing with climate change or its projected effects as a long-term motivation. Since we already are active in dealing with the short-term problems associated with climate change, like adapting production to local microclimates, this does not alter much of what we are doing now but may alter what we do in the future. Additionally, legislative action can create new dynamics for researchers and extension educators due to unfunded mandates and changes in organizations that have been traditional partners. In the past, Washington State has also experienced natural disasters such as earthquakes, storms, landslides, and volcanic eruptions. Each of these has potential impacts on our work and on those that we seek to help with our research and science-based extension programs.

V(K). Planned Program - Planned Evaluation Studies

Description of Planned Evaluation Studies

Our evaluation methodologies are designed to assess amount of acquired learning; degree of application of 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 will use survey methods, 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.

V(A). Planned Program (Summary)

Program # 5

1. Name of the Planned Program

Childhood Obesity

2. Brief summary about Planned Program

Approximately 25% of children in Washington State are overweight or obese, and the problem is even more severe among Hispanic youth, with over 34% of these youth categorized as overweight or obese. Although others have more serious problems (Washington State is in the fourth quintile of overweight and obese youth), the problem is significant and demands a concerted response. Left unresolved, overweight or obese youth are more likely to have higher risk factors for cardiovascular disease, including high blood pressure, high cholesterol, dyslipidemia, and type 2 diabetes. Other complications include asthma, sleep apnea and liver damage. Additionally, obese youth are more likely to become obese adults and experience greater risk of early death.

Washington State University will undertake three major outreach efforts to reduce the incidence of overweight and obese youth. 1) Through our nutrition education programs supported by USDA SNAP-Ed (Supplemental Nutrition Assistance Program - Education) and the USDA EFNEP (Expanded Food and Nutrition Education Program), we will reach limited resource households with training and support leading to greater awareness of obesity-related problems and behavior and dietary habit changes that can mediate and prevent obesity. 2) Work in our 4-H Youth Development Program highlights increased physical activity for youth. This includes a number of activities such as Adventure Education and Challenge, and Environmental Stewardship programs that actively engage youth in an outdoor environment and include physical activity as a major component of each enterprise. Other programs such as the equestrian and dog obedience projects require both the animal and the handler to engage in significant levels of physical activity. 4-H youth involved in the State 4-H Conference also engage in activities that involve both their minds and bodies. 3) Our Small Farms Team and the Center for Sustaining Agriculture and Natural Resources conduct outreach programming designed to increase availability and consumption of locally produced foods - helping to ensure that healthy foods are available in communities throughout the state. These programs assist farmers in effectively growing and marketing their produce in urban areas. Decision-makers are also engaged to develop policies that support locally grown foods.

3. Program existence : Intermediate (One to five years)

4. Program duration : Long-Term (More than five years)

5. Expending formula funds or state-matching funds : Yes

6. Expending other than formula funds or state-matching funds : Yes

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%		70%	
701	Nutrient Composition of Food	10%		30%	
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 (Situation and Scope)

1. Situation and priorities

Fully one fourth of Washington's youth are either overweight or obese. Left unchecked, these youth will experience greater health challenges, such as increased rates of diabetes, stroke and heart disease and certain types of cancers. Programs that come under this Program definition encourage healthy eating behaviors and increased physical activity and will be delivered by extension educators. Additionally, increased availability of locally-grown produce will be supported through programs delivered by our Small Farms Team and the Center for Sustaining Agriculture and Natural Resources.

Priorities for this planned program include: 1) increasing consumption of healthier diets and more specifically, increasing the number of servings of fruits and vegetables while reducing consumption of high fat and high carbohydrate processed foods; 2) increasing physical activity levels among K-12 youth; and 3) increasing availability of fresh produce by expanding local food systems.

2. Scope of the Program

- In-State Extension
- In-State Research
- Multistate Extension

V(D). Planned Program (Assumptions and Goals)

1. Assumptions made for the Program

We assume that funding for programs such as SNAP-Ed and EFNEP will continue at current or expanded levels. We also assume that base funding supporting our youth development programs will

continue to be available at current or increased levels. Finally, we assume that local food systems will continue to expand and that the interest in these systems on the part of local communities, agencies and institutions will continue to increase. We note that recent Congressional brinksmanship with the budgets that support many of the programs in the area of childhood food consumption has been destabilizing.

2. Ultimate goal(s) of this Program

Reducing the percentage of overweight and obese youth in Washington State.

V(E). Planned Program (Inputs)

1. Estimated Number of professional FTE/SYs to be budgeted for this Program

Year	Extension		Research	
	1862	1890	1862	1890
2016	83.0	0.0	2.0	0.0
2017	83.0	0.0	2.0	0.0
2018	83.0	0.0	2.0	0.0
2019	83.0	0.0	2.0	0.0
2020	83.0	0.0	2.0	0.0

V(F). Planned Program (Activity)

1. Activity for the Program

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

2. Type(s) of methods to be used to reach direct and indirect contacts

Extension

Direct Methods	Indirect Methods
● Education Class ● Workshop ● Group Discussion ● One-on-One Intervention ● Demonstrations	● Newsletters ● Web sites other than eXtension ● Other 1 (Email Lists)

3. Description of targeted audience

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

V(G). Planned Program (Outputs)

NIFA no longer requires you to report target numbers for standard output measures in the Plan of Work. However, all institutions will report actual numbers for standard output measures in the Annual Report of Accomplishments and Results. The standard outputs for which you must continue to collect data are:

- Number of contacts
  - Direct Adult Contacts
  - Indirect Adult Contacts
  - Direct Youth Contacts
  - Indirect Youth Contact
- Number of patents submitted
- Number of peer reviewed publications

☑ Clicking this box affirms you will continue to collect data on these items and report the data in the Annual Report of Accomplishments and Results.

V(H). State Defined Outputs

1. Output Measure

- Number of educational programs delivered focused on increasing local food supplies, improving dietary quality, and increasing physical activity.
- Number of peer reviewed (official) WSU Extension publications published per year.

☑ Clicking this box affirms you will continue to collect data on these items and report the data in the Annual Report of Accomplishments and Results.

V(I). State Defined Outcome

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 Target

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

2. Outcome Type : Change in Knowledge Outcome Measure

3. Associated Knowledge Area(s)

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

4. Associated Institute Type(s)

- 1862 Extension
- 1862 Research

Outcome # 2

1. Outcome Target

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

2. Outcome Type : Change in Action Outcome Measure

3. Associated Knowledge Area(s)

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

4. Associated Institute Type(s)

- 1862 Extension
- 1862 Research

Outcome # 3

1. Outcome Target

Percentage of participants reporting increased physical activity.

2. Outcome Type : Change in Action Outcome Measure

3. Associated Knowledge Area(s)

- 134 - Outdoor Recreation
- 703 - Nutrition Education and Behavior
- 724 - Healthy Lifestyle
- 806 - Youth Development

4. Associated Institute Type(s)

- 1862 Extension

Outcome # 4

1. Outcome Target

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

2. Outcome Type : Change in Condition Outcome Measure

3. Associated Knowledge Area(s)

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

4. Associated Institute Type(s)

- 1862 Extension
- 1862 Research

V(J). Planned Program (External Factors)

1. External Factors which may affect Outcomes

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

Description

Given that many program participants have limited incomes, maintenance of resources related to Food Stamp eligibility and access to SNAP-Ed funded programs are critical for program success. Recent Congressional activity in this area has been destabilizing.

Additionally, continued institutional support for small farms programs, youth development and nutrition education are key to advancing the goals of the program.

V(K). Planned Program - Planned Evaluation Studies

Description of Planned Evaluation Studies

Our evaluation methodologies are designed to assess amount of acquired learning; degree of application of 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 will use survey methods, 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.

V(A). Planned Program (Summary)

Program # 6

1. Name of the Planned Program

Food Safety

2. Brief summary about Planned Program

WSU food safety research pursues several avenues to ensure that our food is safe and nutritious. The epidemiology of virulent enteric bacteria in cattle herds is being studied, with the goal of decreasing the level of these bacteria in feces and present at slaughter. Scientists are developing methods and media to effectively detect and monitor foodborne pathogens and spoilage microorganisms in food products, thereby improving detection of problems before food reaches consumers. New processes have also been developed at WSU that allow microwave sterilization of foods leading to safe, shelf-stable foods that retain many of the characteristics of freshly prepared foods. This process holds great promise for enhancing both the quality and safety of pre-packaged foods. Microwave technology is also being used to develop novel pasteurization techniques. Extension food safety programs address both consumer and industrial food safety issues. These programs target food processors, food purveyors, and families to ensure safe food handling processes leading to reduced risk of foodborne illness among the residents of Washington State and beyond. In some counties, programs are in place that leverage trained volunteers to provide expanded outreach to the public to ensure safe practices are used to preserve homegrown and purchased raw foods.

3. Program existence : Mature (More then five years)

4. Program duration : Long-Term (More than five years)

5. Expending formula funds or state-matching funds : Yes

6. Expending other than formula funds or state-matching funds : Yes

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 (Situation and Scope)

1. Situation and priorities

In 2010, the Centers for Disease Control and Prevention (http://www.cdc.gov/foodborneburden/2011-foodborne-estimates.html) estimated that foodborne diseases cause 48 million people to get sick annually in the US, with 128,000 hospitalizations, and 3,000 deaths. More than 200 known diseases are transmitted through food, including bacteria, viruses, parasites, toxins, metals, and prions. In Washington State alone, 30-150 foodborne disease outbreaks occur each year. Washington State University's priorities include reducing the incidence of pathogenic bacteria in the flora of farm animals and contamination of commercially processed foods, foods prepared by food purveyors, and food prepared in the home. Additionally, WSU research and extension programs focus on identifying and eliminating toxins from raw and processed foods.

2. Scope of the Program

- In-State Extension
- In-State Research
- Multistate Research
- Multistate Extension
- Integrated Research and Extension
- Multistate Integrated Research and Extension

V(D). Planned Program (Assumptions and Goals)

1. Assumptions made for the Program

We assume that foodborne illness will continue to occur in Washington State and that every year thousands of persons will be at risk of hospitalization or death. We also assume that funding supporting research and outreach related to food safety will continue to be available.

2. Ultimate goal(s) of this Program

Reducing the incidence of foodborne illness in Washington State.

V(E). Planned Program (Inputs)

1. Estimated Number of professional FTE/SYs to be budgeted for this Program

Year	Extension		Research	
	1862	1890	1862	1890
2016	25.0	0.0	13.0	0.0
2017	25.0	0.0	13.0	0.0
2018	25.0	0.0	13.0	0.0
2019	25.0	0.0	13.0	0.0

2020	25.0	0.0	13.0	0.0

V(F). Planned Program (Activity)

1. Activity for the Program

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

2. Type(s) of methods to be used to reach direct and indirect contacts

Extension

Direct Methods	Indirect Methods
● Education Class ● Workshop ● One-on-One Intervention	● Newsletters ● Web sites other than eXtension

3. Description of targeted audience

Food processors, food purveyors, food producers and the general public.

V(G). Planned Program (Outputs)

NIFA no longer requires you to report target numbers for standard output measures in the Plan of Work. However, all institutions will report actual numbers for standard output measures in the Annual Report of Accomplishments and Results. The standard outputs for which you must continue to collect data are:

- Number of contacts
  - Direct Adult Contacts
  - Indirect Adult Contacts
  - Direct Youth Contacts
  - Indirect Youth Contact
- Number of patents submitted
- Number of peer reviewed publications

☑ Clicking this box affirms you will continue to collect data on these items and report the data in the Annual Report of Accomplishments and Results.

V(H). State Defined Outputs

1. Output Measure

- Number of conferences, workshops or other training sessions conducted by WSU Extension educators related to food safety.
- Number of peer reviewed (official) WSU Extension publications published per year
- Number of graduate students with a significant professional orientation in the area of Food Safety.

☑ Clicking this box affirms you will continue to collect data on these items and report the data in the Annual Report of Accomplishments and Results.

V(I). State Defined Outcome

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 Target

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

2. Outcome Type : Change in Knowledge Outcome Measure

3. Associated Knowledge Area(s)

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

4. Associated Institute Type(s)

- 1862 Extension
- 1862 Research

Outcome # 2

1. Outcome Target

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

2. Outcome Type : Change in Action Outcome Measure

3. Associated Knowledge Area(s)

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

4. Associated Institute Type(s)

- 1862 Extension
- 1862 Research

Outcome # 3

1. Outcome Target

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

2. Outcome Type : Change in Action Outcome Measure

3. Associated Knowledge Area(s)

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

4. Associated Institute Type(s)

- 1862 Extension
- 1862 Research

V(J). Planned Program (External Factors)

1. External Factors which may affect Outcomes

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

Description

Numerous external factors can impact the success of our research and extension programs. Reduced availability of funding has recently impacted our capacity to deliver some programs related to food safety. It has become necessary for us to reduce the number of trained volunteers in the state because of limited resources needed to train and supervise this resource. Potential future factors include further reductions in funding or changes in federal and state priorities.

V(K). Planned Program - Planned Evaluation Studies

Description of Planned Evaluation Studies

Our evaluation methodologies are designed to assess amount of acquired learning; degree of application of 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 will use survey methods, 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.

V(A). Planned Program (Summary)

Program # 7

1. Name of the Planned Program

Youth and Family Development

2. Brief summary about Planned Program

Washington State University Extension's youth development and family faculty and staff build partnerships, create opportunities and deliver educational programs that advance the quality of life for young people, families and their communities. Our 4-H youth development programs focus on enhancing the capability of youth in grades K- 12. Interventions that these youth receive help to develop their assets (generally referred to as "life skills". While it has been long accepted that parents, siblings, and local communities make significant impact on a youth's life, young people today are also influenced by values and ideas far beyond the borders of any single family or community. Exposure from web-based media, including social media, and other technologies has large and lasting influences on our youth.

4-H youth development programs use planned educational outreach programming and opportunities to build not only the life skills of youth, but also of the adults who serve as mentors. Extensive effort is invested in the volunteer mentors to best prepare them to build the capacity of youth for growth and development. WSU Extension adds further value to its work in youth development through its capacity to engage families. Parents have a great potential to support a young person's successful transition to adulthood. Extension professionals in youth and family development work to ensure that both parents and young people are accessing the skills that they need to be productive members in their community and build strong, healthy families.

The WSU research and extension family living programs focus on an individual's development across the life span within the context of diverse families and communities. Extension promotes building protective factors and resiliency through community-based programs. The critical needs of parents and child-care providers are addressed through direct education and through capacity building programs across the state to address the critical needs of Washington's children and families.

Research in WSU's Department of Human Development and Extension's Area Health Education Center for Eastern Washington focuses on early learning, K-12 age youth, families, and community and social mechanisms related to risk-related behavior, stress management, sexual and sexual orientation issues, alcohol and drug abuse behavior, childhood trauma, and parental-child communication.

3. Program existence : Mature (More then five years)

4. Program duration : Long-Term (More than five years)

5. Expending formula funds or state-matching funds : Yes

6. Expending other than formula funds or state-matching funds : Yes

V(B). Program Knowledge Area(s)

1. Program Knowledge Areas and Percentage

KA Code	Knowledge Area	%1862 Extension	%1890 Extension	%1862 Research	%1890 Research
801	Individual and Family Resource Management	5%		0%	
802	Human Development and Family Well-Being	25%		10%	
803	Sociological and Technological Change Affecting Individuals, Families, and Communities	15%		30%	
805	Community Institutions and Social Services	5%		50%	
806	Youth Development	50%		10%	
	Total	100%		100%	

V(C). Planned Program (Situation and Scope)

1. Situation and priorities

Researchers, youth workers, and policy makers recognize that it is shortsighted and expensive to focus attention on dealing with acute problems of youth while ignoring effective and economically viable preventive measures that can lower the incidence and reduce the lasting impacts of these acute problems. Today, increasing attention is paid to "youth protective factors" that make youth more resilient and thus better able to overcome adversity and emphasize mechanisms that allow problems to be identified and dealt with at earlier ages. Public concern and policy directed toward youth has also shifted from public investments in programs targeting specific problems and threats to young people to a broader, more holistic view of helping youth realize their full potential. A significant proportion of Washington's children are at risk related to one or more of several negative indicators, including abuse, neglect, poor health, substance abuse, teenage pregnancy and violence. 18.5% of Washington's youth live in poverty. Poverty exacerbates other risk factors and is the central reason why many children and families fail to thrive. Young people need to be in environments where they have an opportunity to acquire the basic skills necessary to become responsible family and community members, successful participants in the workforce, and contributing citizens.

When families are strong, research shows that children are more likely to develop the solid foundation they need for a thriving future. Likewise with youth protective factors, parenting education programs often measure family protective factors that promote healthy development of children and youth. Strong families strengthen communities and are important to the social and economic future of the state.

Washington State has experienced very high rates of military deployments of 45% for over the past decade. These stressors are decreasing as the wars in Iraq and Afghanistan are winding down but the consequences of mobilization on family dynamics remain. During the long periods of deployment, which could exceed 555 days for National Guard service personnel, families moved frequently and parents were often separated from their children. Youth in military families, especially, need assistance in connecting with other youth, caring adults, and community programs and services that are sensitive to their specific situations and needs.

Washington State is a state of great demographic contrasts. It has vast rural areas, but the majority

of its population lives in urban areas and now make up the majority of the population. This demographic shift has resulted in positive urban outcomes (e.g., new markets, new business start-ups) but also challenges to rural K-12 schools, quality child-care, healthcare, workforce preparation, care and services for a growing and aging population.

Priorities for programs in the area of youth and family development include youth life skill development; youth engagement in government; strengthening science, engineering and technology interest and literacy among youth; leadership development among youth and adults; promoting health and wellness among youth and families; and increase family protective factors to promote healthy, strong families and communities.

2. Scope of the Program

- In-State Extension
- In-State Research
- Multistate Research
- Multistate Extension
- Integrated Research and Extension
- Multistate Integrated Research and Extension

V(D). Planned Program (Assumptions and Goals)

1. Assumptions made for the Program

Youth, families, and communities will continue be under stress as a result of the current economy and associated job losses, unemployment and business closures, even as the economy starts to improve.

Military deployments will continue. Washington military bases will continue to play a major role in troop deployments.

Funding (both public and private) will be available to support programs that address critical community and human development needs.

Essential youth programs will focus on developing competency in science, technology, engineering and math (STEM); citizenship; and healthy living.

Education will be delived efficiently and through an increased use of technology.

2. Ultimate goal(s) of this Program

Strengthen life skills among youth leading to greater ability to cope with life's stresses and leading to greater social, educational, and economic success.

Strengthen families to enhance preventive measures and to make them more resilient and resistant to social and economic stresses.

V(E). Planned Program (Inputs)

1. Estimated Number of professional FTE/SYs to be budgeted for this Program

Year	Extension		Research	
	1862	1890	1862	1890
2016	71.0	0.0	1.0	0.0
2017	71.0	0.0	1.0	0.0
2018	71.0	0.0	1.0	0.0
2019	71.0	0.0	1.0	0.0
2020	71.0	0.0	1.0	0.0

V(F). Planned Program (Activity)

1. Activity for the Program

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

2. Type(s) of methods to be used to reach direct and indirect contacts

Extension

Direct Methods	Indirect Methods
● Education Class ● Workshop ● Group Discussion ● One-on-One Intervention ● Demonstrations	● Public Service Announcement ● Newsletters ● Web sites other than eXtension ● Other 1 (Social Media)

3. Description of targeted audience

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

V(G). Planned Program (Outputs)

NIFA no longer requires you to report target numbers for standard output measures in the Plan of Work. However, all institutions will report actual numbers for standard output measures in the Annual Report of Accomplishments and Results. The standard outputs for which you must continue to collect data are:

- Number of contacts
  - Direct Adult Contacts
  - Indirect Adult Contacts
  - Direct Youth Contacts
  - Indirect Youth Contact
- Number of patents submitted
- Number of peer reviewed publications

☑ Clicking this box affirms you will continue to collect data on these items and report the data in the Annual Report of Accomplishments and Results.

V(H). State Defined Outputs

1. Output Measure

- Number of workshops, demonstrations, and projects developed to foster positive youth, family and community development.
- Number of peer reviewed (official) WSU Extension publications published annually.

☑ Clicking this box affirms you will continue to collect data on these items and report the data in the Annual Report of Accomplishments and Results.

V(I). State Defined Outcome

O. No	Outcome Name
1	Percentage of evaluated participants who demonstrated increased knowledge and skills relative to key learning objectives.
2	Percentage of participants evaluated who applied knowledge or skills from WSU programs.
3	Difference in grade point average between former 4-H members and peer students at WSU when they enter as university freshman.
4	High School graduation rates for 4-H members compared to their Peers.
5	Number of participants that reported an increase in family protective factors as a result of WSU programs.

Outcome # 1

1. Outcome Target

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

2. Outcome Type : Change in Knowledge Outcome Measure

3. Associated Knowledge Area(s)

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

4. Associated Institute Type(s)

- 1862 Extension
- 1862 Research

Outcome # 2

1. Outcome Target

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

2. Outcome Type : Change in Action Outcome Measure

3. Associated Knowledge Area(s)

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

4. Associated Institute Type(s)

- 1862 Extension
- 1862 Research

Outcome # 3

1. Outcome Target

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

2. Outcome Type : Change in Condition Outcome Measure

3. Associated Knowledge Area(s)

- 803 - Sociological and Technological Change Affecting Individuals, Families, and Communities
- 806 - Youth Development

4. Associated Institute Type(s)

- 1862 Extension

Outcome # 4

1. Outcome Target

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

2. Outcome Type : Change in Condition Outcome Measure

3. Associated Knowledge Area(s)

- 803 - Sociological and Technological Change Affecting Individuals, Families, and Communities
- 806 - Youth Development

4. Associated Institute Type(s)

- 1862 Extension
- 1862 Research

Outcome # 5

1. Outcome Target

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

2. Outcome Type : Change in Condition Outcome Measure

3. Associated Knowledge Area(s)

- 801 - Individual and Family Resource Management

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

4. Associated Institute Type(s)

- 1862 Extension
- 1862 Research

V(J). Planned Program (External Factors)

1. External Factors which may affect Outcomes

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

Description

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 because the uncertainty caused by budget brinksmanship has required more effort to be devoted to acute issues. We have partially compensated through the use of technology in order 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. Additionally, legislative action can create new pressures on researchers and extension educators due to unfunded mandates and changes in organizations that have been traditional partners. The political philosophies that direct funding to people and communities continues to be evaluated through political elections and these could affect both funding and organizational relationships in various ways.

V(K). Planned Program - Planned Evaluation Studies

Description of Planned Evaluation Studies

Our evaluation methodologies are designed to assess amount of acquired learning; degree of application of 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 will use survey methods, 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.

V(A). Planned Program (Summary)

Program # 8

1. Name of the Planned Program

Community and Economic Development

2. Brief summary about Planned Program

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.

3. Program existence : Mature (More then five years)

4. Program duration : Long-Term (More than five years)

5. Expending formula funds or state-matching funds : Yes

6. Expending other than formula funds or state-matching funds : Yes

V(B). Program Knowledge Area(s)

1. Program Knowledge Areas and Percentage

KA Code	Knowledge Area	%1862 Extension	%1890 Extension	%1862 Research	%1890 Research
604	Marketing and Distribution Practices	10%		0%	
608	Community Resource Planning and Development	50%		0%	
610	Domestic Policy Analysis	20%		0%	
803	Sociological and Technological Change Affecting Individuals, Families, and Communities	20%		0%	
	Total	100%		0%	

V(C). Planned Program (Situation and Scope)

1. Situation and priorities

Washington State is a state of great demographic contrasts. It has vast rural areas, but the majority of its population lives in urban areas. Rural communities that once relied upon forestry, fishing, or agriculture are struggling as natural resource based industries have declined or have become more labor

efficient. Rural and urban populations often have different views about the future of the state, and proponents of urban growth and job creation are often at odds with those striving for sustainable development, preservation of agricultural and forest lands, and protection of endangered species, wetlands and watersheds. Large numbers of migrants, primarily from Mexico and Central America, now reside in Washington. In some counties, Latinos now make up the majority of the population. This demographic shift has resulted in positive outcomes (e.g., new markets, new business start-ups) but also challenges to existing school, healthcare, and judicial infrastructure. Priority community development programs include conflict resolution and consensus building; poverty reduction; rural development; urban sustainability and food systems; improvement in local services; non-profit leadership development; promoting good governance - including public engagement in government; and promoting STEM literacy among youth.

2. Scope of the Program

- In-State Extension
- Multistate Extension

V(D). Planned Program (Assumptions and Goals)

1. Assumptions made for the Program

As the general economy continues to improve, urban areas in Washington State will return to economic growth while rural areas will continue to experience challenges associated with job loss, gentrification, and reduced local tax bases, which creates difficulty in addressing critical issues such as roads, law enforcement, and education.

Strong local governments and non-profits are important to a community's success, but at this time, both face the reality of declining resources and staff turnover.

Local and State governments are being asked to do more with less.

Washington's rural areas lag behind urban areas in utilizing digital technologies.

Family asset building is important during periods of economic decline.

Washington State will continue to be a state sought out by immigrants.

The Latino population and other diverse communities in Washington will continue to grow.

Collaborative planning and public policy development continue to be important.

Extension must continue to change its programming mix and diversify its staffing approach to remain relevant to the people of Washington. Additionally, extramural fund development will remain central to our ability to offer effective programming.

2. Ultimate goal(s) of this Program

The ultimate goals of this program are threefold:

1. Enable communities to address critical issues such as poverty and effective delivery of government

services.

2. Better governance through informed decision-making, collaborative planning, conflict resolution, stakeholder engagement, and research supported public policy making.

3. Contribute to the economic vitality of Washington State.

V(E). Planned Program (Inputs)

1. Estimated Number of professional FTE/SYs to be budgeted for this Program

Year	Extension		Research	
	1862	1890	1862	1890
2016	44.0	0.0	0.0	0.0
2017	44.0	0.0	0.0	0.0
2018	44.0	0.0	0.0	0.0
2019	44.0	0.0	0.0	0.0
2020	44.0	0.0	0.0	0.0

V(F). Planned Program (Activity)

1. Activity for the Program

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

2. Type(s) of methods to be used to reach direct and indirect contacts

Extension

Direct Methods	Indirect Methods
● Workshop ● Group Discussion ● One-on-One Intervention ● Other 1 (Group facilitation and planning) ● Other 2 (Collaborative problem-solving)	● Public Service Announcement ● Newsletters ● TV Media Programs ● Web sites other than eXtension

3. Description of targeted audience

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

V(G). Planned Program (Outputs)

NIFA no longer requires you to report target numbers for standard output measures in the Plan of Work. However, all institutions will report actual numbers for standard output measures in the Annual Report of Accomplishments and Results. The standard outputs for which you must continue to collect data are:

- Number of contacts
  - Direct Adult Contacts
  - Indirect Adult Contacts
  - Direct Youth Contacts
  - Indirect Youth Contact
- Number of patents submitted
- Number of peer reviewed publications

☑ Clicking this box affirms you will continue to collect data on these items and report the data in the Annual Report of Accomplishments and Results.

V(H). State Defined Outputs

1. Output Measure

- The number of communities increasing their use of digital technologies.
- The number of local governments, state agencies and non-profits assisted.
- The number of existing or new businesses and entrepreneurs assisted.
- The number of people receiving family asset building education.
- The number of people/agencies provided information that promote export of Washington products.
- The number of scholarly products produced by CED educators.

☑ Clicking this box affirms you will continue to collect data on these items and report the data in the Annual Report of Accomplishments and Results.

V(I). State Defined Outcome

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 Target

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

2. Outcome Type : Change in Action Outcome Measure

3. Associated Knowledge Area(s)

- 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

4. Associated Institute Type(s)

- 1862 Extension

Outcome # 2

1. Outcome Target

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

2. Outcome Type : Change in Condition Outcome Measure

3. Associated Knowledge Area(s)

- 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

4. Associated Institute Type(s)

- 1862 Extension

Outcome # 3

1. Outcome Target

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

2. Outcome Type : Change in Knowledge Outcome Measure

3. Associated Knowledge Area(s)

- 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

4. Associated Institute Type(s)

- 1862 Extension

Outcome # 4

1. Outcome Target

Number of people who initiate family wealth building activities.

2. Outcome Type : Change in Action Outcome Measure

3. Associated Knowledge Area(s)

- 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

4. Associated Institute Type(s)

- 1862 Extension

V(J). Planned Program (External Factors)

1. External Factors which may affect Outcomes

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

Description

Numerous external factors can potentially impact the success of WSU Extension programs in Community and Economic Development. Our slow rise from the recession is resulting in smaller

budgets for university outreach - hopefully, we are seeing stabilization, albeit at much lower funding levels than before. 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 in order 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(K). Planned Program - Planned Evaluation Studies

Description of Planned Evaluation Studies

WSU Extension evaluation methodologies are designed to assess: acquired learning; degree of application of 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 will use survey methods, 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.