2010 Oregon State University Research Plan of Work

Status: Accepted
Date Accepted: 05/29/09

I. Plan Overview

1. Brief Summary about Plan Of Work

The Oregon Agricultural Experiment Station (OAES) has developed 6 programs, replacing the previous 34, to address the six goals under the FY2007-2012 USDA Cooperative State Research, Education and Extension Strategic Plan. Program foci cover biobased economy, nutrition and health, ecosystem services (from both terrestrial and marine resources), water and watershed, sustainable food systems, and rural community health and sustainability.

Research results will be shared through refereed journal articles, abstracts, books and book chapters; theses, local, regional, national and international meetings, symposia and workshops; GIS climate, geophysical and plant maps; and an array of web pages of an array of types. Ten major state output measures were defined along with three outcome measures.

All units in the Oregon Agricultural Experiment Station conduct performance evaluation of their faculty members.These reviews are conducted based on workplan objectives established during the previous review and in the faculty member's position description. In addition, all faculty members with OAES FTE greater than .1 fte are required to establish at least one station project, and they are required to submit both a CRIS report and an Oregon State University report. For the latter, researchers submit reports through the College of Agricultural Sciences' online accountability system, Oregon Invests!. Faculty with extension appointments submit reports through the Extension Service's SOARS database. In both systems, faculty are asked to document accomplishments and outcomes. These reports are used in faculty evaluations. The performance evaluations are a good vehicle to assess our progress toward the goals in our plan of work.

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

Year	Extension		Research	
	1862	1890	1862	1890
2010	5.6	0.0	86.2	0.0
2011	3.0	0.0	75.0	0.0
2012	3.0	0.0	75.0	0.0
2013	3.0	0.0	75.0	0.0
2014	3.0	0.0	80.0	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 Non-University Panel
- Expert Peer Review

2. Brief Explanation

All projects conducted by the OAES are subjected to a peer review process. Each department or branch station is responsible for completing a peer review for all OAES projects submitted for support by state and federal funds (guidance for conducting the review is contained in a policy and procedural manual, available to all faculty and unit leaders). A minimum of three external peer reviews must be received. Project members are required to respond to reviewer comments. The Director or his designee oversees the process for rigor, objectivity, and thoroughness. The Director or his designee must approve all

proposals that are submitted by faculty through the OAES.

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?

During this reporting period, the Oregon Agricultural Experiment Station (OAES) reassessed the six programs used to address its internal strategic plan, which was formulated with input from internal and external stakeholders. Each of these programs in some way supports objectives from one or more of the six strategic goals under the FY2007-2012 strategic plan of the U.S. Department of Agriculture (USDA). All goals are addressed by one of more OAES programs. The OAES programs have targeted efforts on Sustainable Agriculture and FoodSystems, Sustaining Rural Communities, Biobased Products, Ecosystem Services, Water andWatersheds, and Food, Nutrition and Health.

Annual evaluations of outputs and outcomes will provide input into the development of new or revised plans of work that better target state, regional, and USDA priorities and portfolios.

2. How will the planned programs address the needs of under-served and under-represented populations of the State(s)?

The important issues and topics of today are typically complex and multi-faceted. Addressing them often requires intellectual resources from multiple disciplines and multiple perspectives. The College will place high priority on building connections among its component units and with other units within and outside the University where appropriate to advance education or research goals.

Our ecozone-based Branch Stations and county based Extension offices are the front line connection to the myriad sectors in the state. Their visible presence and customer service orientation puts them in direct contact with our stakeholders. They are also able to assess emerging issues and needs as well as new or underserved and under-represented populations. They are often the first to note new stakeholders or emerging groups within the general populations. They are not shy about informing the administrative branch about special needs or under-served populations.

A more formal method of delivering observations and information into the planning process for the Station are the annual development of unit and individual plans of work. Administrative review of these workplans allows more systematic compilation and assessment of these observations.

Partnerships are an effective means to greater "reach" for the College’s programs. We will continue to work (and look for opportunities to expand our relationships) with non-governmental organizations, businesses, and local, state, and federal agencies. Joint programming through cooperative agreements with federal agencies can be especially effective.

3. How will the planned programs describe the expected outcomes and impacts?

Faculty are expected to report annually on their accomplishments and programmatic outcomes. Their reports are edited and posted on Oregon Invests!, a searchable, web-based database which is accessible to the public. This online database was designed to be outcome based system, providing information on economic, environmental, and societal benefits. The system also indicated whether impacts are positive or negative and the general magnitude of the impact. To create the records about faculty effort, the faculty with research appointments in the Agricultural Experiment Station must complete a formal questionnaire which is reviewed by an experienced economist. Follow-on interviews are often conducted with the faculty member to elicit additional information to clarify points.

Outcomes can be sorted by outcome type, topic, location, work unit or discipline. Reports are forwarded to the Station’s communication unit to be used in the semi-annual Station magazine, "Oregon Agricultural Progress," as the basis for press releases about the work, as the basis for an Oregon State University research magazine ("Terra"), departmental reports, and as input into a Provost’s Annual Report. These reports can also be used by the departments as part of the faculty performance review.

In addition to Oregon Invests!, faculty also annually report their accomplishments in CRIS, and NIMSS if appropriate.

As a publicly invested institution, we are expected to measure our productivity and assess its value. We must scrutinize our enrollment trends, research productivity, and the consequences of our outreach education, unit by unit, program by program. We must assure that what we undertake has consequences sufficient to justify the investment and, if not, then be bold enough to prune away that for which need has diminished or productivity has declined, and reinvest where the need or opportunity is greater.

4. How will the planned programs result in improved program effectiveness and/or efficiency?

The portfolio approach taken with the 2009-2013 plan of work encouraged the development of partnerships and collaboration on integrated questions or similar activities. Over the next few years, the College also anticipates consolidating efforts across department and branch experiment stations. These multi- and inter-disciplinary activities should produce more

cohesive and reportable impacts over the next few years as we retool our projects. Also, the consolidation is modifying the way we develop Station-wide metrics and, hopefully, streamlining the way we ask our faculty to report.

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 selected individuals from general public
- Survey specifically with non-traditional groups
- Targeted invitation to traditional stakeholder groups
- Targeted invitation to traditional stakeholder individuals
- Survey specifically with non-traditional individuals
- Survey of selected individuals from the general public
- Survey of the general public
- Survey of traditional stakeholder individuals
- Targeted invitation to non-traditional stakeholder groups
- Survey of traditional stakeholder groups
- Targeted invitation to non-traditional stakeholder individuals

Brief explanation.

At Oregon, OAES through the Colleges of Agricultural Sciences (CAS), Health & Human Sciences (HHS) and Veterinary Medicine (VM) uses several formal and informal avenues to solicit stakeholder input on programs conducted and changes in program direction. Formal bodies convened by the colleges, departments or branch stations meet fairly regularly to aid in the direction and guidance of our programs. These tend to take the form of Advisory Committees or Commodity Groups.

OAES also utilizes a multisectoral stakeholder workshop every other year to gather input. Invitees range from industry, government agencies, nonprofits, consumer groups, and faculty (research, teaching, and extension). They come from a cross-section of diverse food and natural resources systems across the state. This meeting is used to balance regional perspectives and needs and develop a statewide program. This process also helps our diverse clientele understand the needs of the state in light of their own perspective.

Additionally, several websites and a general email address operated by CAS, the departments and branch stations also provide opportunities to receive comments and questions from the public, and well as post responses and changes in programs in response to stakeholder input.

Informally, the deans and directors of CAS and OAES receive input while attending farm and station field days around the state, visiting county-based Extension offices, and participating in other "road trips" around the state. We also gather input while attending meetings, seminars, conferences, and other events that congregate our stakeholders. Making our administrative heads directly available to our clientele is an important mechanism to stay relevant and informed.

CAS has also hired an External Relations Director, who organizes alumni and stakeholder events, hosts special events at county and State fairs and a variety of conferences, receives and transmits input from stakeholders, and makes sure responses are delivered. CAS is also experimenting with newer technological methods for gathering input such as blogs and MySpace.

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 Surveys
- Use External Focus Groups
- Needs Assessments
- Use Internal Focus Groups
- Other (blogs, fairs, websites,)
- Open Listening Sessions

Brief explanation.

The Oregon Agricultural Experiment Station uses formal and informal methods to identify individuals and groups of stakeholders. The most common method is to rely upon our unit leaders (departmental, station and extension leaders), their

faculty and staff, and our students to inform our planning and implementation processes. We also interact regularly with local, state, and federal governmental entities to stay informed about their critical issues and stakeholders. Booths are reserved at state and county fairs, several conferences or expos each year to meet a wider range of stakeholders surveys are often used to collect information about topics of interest. Web pages solicit input as well as deliver requested information. This past year, the College of Agricultural Sciences implemented blogs, MySpace and video clips on its website to reach younger stakeholders and provide information in more timely and graphic formats.

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

Brief explanation

We use field days, formal meeting events, commodity groups and other association groups, faculty and staff, legislative aides, websites, email addresses, relayed messages, surveys, and students to help us identify individual sand goups.

3. A statement of how the input will be considered

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

Brief explanation.

Determining our strategic direction is an on-going, shared responsibility, especially in a College as diverse as this. The power of our planning derives from the process. As noted above, that process includes our continuing dialog with Oregonians and the inevitable distillation of their needs. It also includes matching of faculty strengths with opportunities for outside funding, consistent with our mission. Much of the critical decision-making is at the unit level. Because responsibility is shared between College administration and the units, our strategic planning documents are best seen as a reference for subsequent and continuing conversations between College administration and the individual units. Such conversations will be a regular part of how we operate. Our strategic Intent statement is intended also to be useful as the College takes part in the University's OSU 2007 process, a five-year change initiative. In addition, it is relevant to budget reductions made necessary by declining state revenues in 2002, and to reinvestment and reallocation of resources over the next several years.

At stakeholder workshops CAS administrators pose questions and listen to what attendees have to say, then compile these stakeholders' comments, observations, and suggestions. The summaries are posted on the CAS website and points are incorporated into the CAS Action Plan.

OSU/CAS has and continues to solicit and receive thoughtful critiques and sometimes views that differ from its own. Responses are prepared in a timely fashion and posted either to the particular individual or on webpages or in newletters maintained by CAS and its units.

V. Planned Program Table of Content

S. NO.	PROGRAM NAME
1	P1-Strength in Biobased Products Development: Creating additional value from food and fiber by-produ
2	P2-Excellence in Ecosystem Services
3	P3-Excellence in Food, Nutrition, and Health: creating enhanced foods and food products, nutrition,
4	P4-Excellence in Water and Watersheds: Advance understanding and effective management of water, wate
5	P5-Sustainable Agriculture and Food Systems
6	P6-Sustaining Rural Communities

V(A). Planned Program (Summary)

Program #1

1. Name of the Planned Program

P1-Strength in Biobased Products Development: Creating additional value from food and fiber by-produ

2. Brief summary about Planned Program

Diminishing reserves, increasing price, and the environmental impact of using petroleum dictate that a petroleum-based economy is unsustainable. A reduction in the United States' reliance on petroleum and a shift to the use of renewable, bio-based resources requires that agriculture both produce bio-based feedstock and further develop technologies and strategies to sustainably utilize food, fiber and animal industry by-products for the manufacture of products such as transportation fuels, energy, plastics, synthetic fibers, lubricants, solvents and paints as well as the manufacture of pharmaceuticals, cosmetics, building materials, biocatalysts, and other bio-based, non-food products. Other efforts to reduce our dependency on fossil fuels include the improved biological production of hydrogen from sunlight and agricultural feedstocks, improved microbial feedstocks for biodiesel production, and improved methods to convert waste organic materials to electricity or to hydrogen in microbial fuel cells or in bioelectrochemically assisted microbial reactors.

Recent passage of renewable fuels policies has stimulated demand for and rapid increases in production of first-generation bio-based feedstocks, contributing to an economic boom in some sectors, to economic hardships in others (e.g., livestock, vegetable), and to record increases in food prices and related concerns about food security. Important environmental impact (e.g., water use and quality) and carbon footprint questions remain to be answered as well. Achieving renewable energy and greenhouse gas goals will require the development of second-generation biorefineries (e.g., cellulosic), new feedstocks (e.g., algae, manure, waste products), small-scale distributed systems, and systems that minimize the unintended consequences.

The growth of bio-based industries could revitalize agricultural communities, as transportation logistics and infrastructure may necessitate locating many bio-based industries in rural areas. The creation of value-added products from by-products not only provides economic benefit but could also positively impact the environment. Improved technologies and processes will enhance the industry and the nation's economy while reducing inputs, such as water, and impacts of that industry. Examining the types and sources of productivity, the principal source of long-run growth and prosperity, strongly complements other research areas such as biotechnology, trade, natural resources, and rural development. Besides developing new and better measures of technical change and productivity growth, we need to understand why the observed growth patterns take place.

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
133	Pollution Prevention and Mitigation			10%	
402	Engineering Systems and Equipment			20%	
511	New and Improved Non-Food Products and Processes			40%	
609	Economic Theory and Methods			30%	
	Total			100%	

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

1. Situation and priorities

Worldwide energy demand is expected to continue rising exponentially and generating more than 11 billion tons of CO2. But with nearly two-thirds of the world's proven oil reserves located beneath politically volatile Middle Eastern countries, the U.S. and other nations face an uncertain supply. Also, as the economies of China, India, and other populous countries grow, competition for oil will increase.

The U.S. economy has been built on inexpensive fossil-based energy sources. Diminishing reserves, increasing price, and the environmental impact of using fossil energy, dictate that a petroleum-based economy is unsustainable. A reduction in our reliance on petroleum and a shift to the use of renewable, biobased resources are inevitable. Recent passage of renewable fuels policies has stimulated demand for and rapid increases in production of first-generation bio-based feedstocks, contributing to an economic boom in some sectors, to economic hardships in others (e.g., livestock, vegetable), and to record increases in food prices and related concerns about food security. Important environmental impact (e.g., water use and quality) and carbon footprint questions remain to be answered as well.

Achieving the nation's renewable energy and greenhouse gas goals will require the development of second-generation biorefineries (e.g., cellulosic), new feedstocks (e.g., algae, manure, waste products), small-scale distributed systems, and systems that minimize the unintended consequences. In the future, agriculture can be the base for the manufacture of products such as transportation fuels, energy, plastics, synthetic fibers, lubricants, solvents, and paints. Agriculture also will be integral to the manufacture of pharmaceuticals, cosmetics, building materials, biocatalysts, and other biobased, nonfood products. The growth of biobased industries also will revitalize agricultural communities as transportation logistics and infrastructure may necessitate locating many bio-based industries in rural areas. The creation of value-added products from by-products not only provides economic benefit but could also positively impact the environment. Improved technologies and processes will enhance the industry and the nation's economy while reducing inputs, such as water, and impacts of that industry.

Productivity of this emerging sector will be critical to long-term success. Examining the types and sources of productivity, the principal source of long-run growth and prosperity, strongly complements other research areas such as biotechnology, trade, natural resources, and rural development. Besides developing new and better measures of technical change and productivity growth, we need to understand why the observed growth patterns take place.What are the underlying sources of changes in best-practices technologies and in firm's abilities to achieve them? To understand productivity growth is to understand how innovation occurs.

This program addresses Goals 2 and 3 inUSDA/CSREES's FY2007-2012 Strategic Plan, particularly Objectives 2.1 (expand domestic market opportunities), 3.1 (create opportunities for growth in rural America).

2. Scope of the Program

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

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

1. Assumptions made for the Program

The key assumptions of this research project are that

- Productivity growth is the principal source of long-run growth and prosperity in the U.S. economy.To understand productivity growth is to understand how innovation occurs.
-
- Industry and university biotechnology research not only is a rapidly growing industry in its own right, but is widely regarded to be the principal engine of innovation in U.S. farming.
- Clean, safe, and sustainable sources of energy are needed in order to meet large, projected increases in demand, to provide energy and economic security for the U.S. and other nations, and to relieve environmental stresses related to fossil fuel use, including global climate change.
- Technological solutions are available.

2. Ultimate goal(s) of this Program

The goal of this program is develop sustainable, environmentally friendly and economically viable technologies and bio-based products from the utilization of renewable bioresources.Research to support this program goal includes:

a)the biological production of bioenergy and biofuels and other bioproducts from sunlight and agricultural feedstock and the development of improved microbial feedstocks; and

)the search for the determinants and characteristics of productivity growth and examine these determinants in settings of technological change.

Project Objectives include:

1. To improve hydrogen production in Synechosystis sp. through metabolic engineering and other approaches (Ely, Liu)

2. To improve hydrogen production from agricultural and other cellulosic feedstocks (Liu, Chaplen, Ely),

3. To engineer aquatic species for improved lipid production (Ely, Chaplen, Liu, Murthy)

4. To conduct research in fermentation processes, control systems and biological systems modeling for processing renewable bioresources (Murthy)

5. To identify potential feedstocks and develop processing technologies to extract valuable products from renewable resources(Murthy)

6. To further develop theoretical and computational tools, both parametric and non-parametric, for evaluating technical change, capacity utilization, and productivity growth (Buccola and Fare)

7. To apply these tools to a number of industries and products important to Oregon’s agriculture and rural economy(Buccola and Fare)

8. To examine the determinants of innovation in agricultural biotechnology, with special attention to coordination between public and private sector and to the mix of public-good and private-good inventions(Buccola and Fare).

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
2010	0.0	0.0	3.3	0.0
2011	0.0	0.0	3.3	0.0
2012	0.0	0.0	3.0	0.0
2013	0.0	0.0	3.0	0.0
2014	0.0	0.0	3.0	0.0

V(F). Planned Program (Activity)

1. Activity for the Program

In summary:
- Conduct Research Experiments
- Develop models and simulation tools
- Develop new culture strains and metabolic engineering tools

- Develop Products, Resources.

- Conduct surveys

- Conduct data analyses
- Conduct workshops
- Provide Training.

- Assessments.

- Partnering.

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

Extension	
Direct Methods	**Indirect Methods**
• Other 2 (seminars) • Group Discussion • Demonstrations • Education Class • Other 1 (journal publication) • Workshop • One-on-One Intervention	• Web sites

3. Description of targeted audience

The target audiences for this research are :
ublic sector
rivate sector
economists
olicy makers
agricultural biotechnology firms
farmers
ioenergy and biofuel producers

industrial manufacturers of hydrogen and fuel cells

V(G). Planned Program (Outputs)

1. Standard output measures

Target for the number of persons(contacts) to be reached through direct and indirect contact methods

	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Year	Target	Target	Target	Target
2010	100	600	60	60
2011	100	600	60	60
2012	100	600	60	60
2013	100	600	60	60
2014	100	600	60	60

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

Expected Patent Applications

2010 : 0 **2011 :** 1 **2012 :** 0 **2013 :** 0 **2014 :** 0

3. Expected Peer Review Publications

Year	Research Target	Extension Target	Total
2010	10	0	0
2011	10	1	0
2012	10	0	0
2013	10	0	0
2014	10	1	0

V(H). State Defined Outputs

1. Output Target

- OTHER SCHOLARLY EXCELLENCE: participation on professional boards and panels, as well as science panels, awards, etc.

  2010 2 **2011** 1 **2012** :2 **2013** :1 **2014** 2

- DEVELOP IMPROVED BIOPRODUCT PRODUCTION SYSTEMS: Indicators - Type 1...Improved technologies and production systems for biofuel and bioenergy a) better solar energy capture for hydrogen production b) improved fermentation processes c) new and improved sensors for bioprocessing

  2010 :1 **2011** 2 **2012** :1 **2013** :1 **2014** :1

- DEVELOP IMPROVED BIOPRODUCT PRODUCTION SYSTEMS: Indicators - Type 2... Improved feedstocks a) microbial and algal feedstocks for biodiesel production b) use of agricultural by-products as feedstock c) use of invasive species as feedstock d) development of a cellulosic feedstocks for hydrogen, ethanol, and biodiesel production

  2010 :1 **2011** 1 **2012** :1 **2013** :1 **2014** :1

- PROVIDE TECHNOLOGY, MODELS AND ANALYSES THAT INFORM DECISION-MAKERS, INDUSTRY, AND PEERS REGARDING AGRICULTURAL PRODUCTION: Indicator ...theoretical and computation tools development and application a) generate tools, both parametric and non-parametric, for evaluating technological change, capacity utilization, and

productivity growth b) apply economic tools to a number of industries and products c) identify determinants of innovation in agricultural biotechnology d) examine coordination between public and private sector and the mix of public-good and private-good inventions e) test assumptions about basic research's influence on downstream applications and product development f) understand role and influence of intellectual property regimes on innovation

2010 .3 **2011** .4 **2012** .1 **2013** .1 **2014** .2

V(I). State Defined Outcome

O. No	Outcome Name
1	Knowledge Type 1...Improved knowledge about composition and conversion of feedstocks for biofuels, bioenergy, and co-products a) production and harvesting of algae and micro-organisms b) cellulosic feedstock composition c) essential oils found in invasive species d) metabolic engineering for photobiological hydrogen
2	Knowledge Indicators 2 ... Improved engineering applications to advance production systems for bioenergy: - biomimetic models to create biobased generators to produce molecular H2 and O2 from water and light, with these generators incorporated into integrated H2 energy systems, providing generation, storage, and utilization of H2 in one unit. - optimize the photobiological process to yield higher energy efficiencies. - demonstrate that waste biomass, such animal wastes and organic component of urban wastewater, used as feedstock can not only yield biohydrogen, but that waste can be reduced.
3	Knowledge Indicators - Type 3...Models to look at productivity and technological processes a) Model to look at production simultaneous with negative externality outputs b) Productivity in the agricultural sector and electric utilities c) Network models d) biomimetic models to create biobased generators to product molecular hydrogen and oxygen
4	Knowledge Indicators - Type 4...Productivity information a) understand reverse impact of downstream on upstream research b) understand where to distribute investments on basic-to-applied research continuum and in which fields or subfields to focus
5	Action Indicators - Type 1...Industry apply production systems a) Energy producers optimize photobiological process to yield higher energy efficiencies b) new biobased hydrogen generators are incorporated into integrated hydrogen energy systems, providing generation, storage, and utilization of hydrogen in one unit. c) microbial fuel cells provide on-farm electrical generation
6	Action Indicators - Type 2...economic activity in rural areas a) bioenergy facilities are located close to potential feedstocks to generate additional economic activity
7	Action Indicators - Type 3...improved feedstocks are produced a) algae outproduce terrestrial oilseed crops and oil is easily extracted b) organic materials harvested from animal wastes and urban wastewater generate bio hydrogen and eliminate waste

Outcome #1

1. Outcome Target

Knowledge Type 1...Improved knowledge about composition and conversion of feedstocks for biofuels, bioenergy, and co-products a) production and harvesting of algae and micro-organisms b) cellulosic feedstock composition c) essential oils found in invasive species d) metabolic engineering for photobiological hydrogen

2. Outcome Type : Change in Knowledge Outcome Measure

2010 : 1	**2011 :** 1	**2012 :** 1	**2013 :** 1	**2014 :** 0

3. Associated Institute Type(s)

•1862 Research

4. Associated Knowledge Area(s)

- 133 - Pollution Prevention and Mitigation
- 402 - Engineering Systems and Equipment
- 511 - New and Improved Non-Food Products and Processes

Outcome #2

1. Outcome Target

Knowledge Indicators 2 ... Improved engineering applications to advance production systems for bioenergy: - biomimetic models to create biobased generators to produce molecular H2 and O2 from water and light, with these generators incorporated into integrated H2 energy systems, providing generation, storage, and utilization of H2 in one unit. - optimize the photobiological process to yield higher energy efficiencies. - demonstrate that waste biomass, such animal wastes and organic component of urban wastewater, used as feedstock can not only yield biohydrogen, but that waste can be reduced.

2. Outcome Type : Change in Action Outcome Measure

2010 : 0	**2011 :** 1	**2012 :** 0	**2013 :** 1	**2014 :** 0

3. Associated Institute Type(s)

•1862 Research

4. Associated Knowledge Area(s)

- 133 - Pollution Prevention and Mitigation
- 402 - Engineering Systems and Equipment
- 511 - New and Improved Non-Food Products and Processes

Outcome #3

1. Outcome Target

Knowledge Indicators - Type 3...Models to look at productivity and technological processes a) Model to look at production simultaneous with negative externality outputs b) Productivity in the agricultural sector and electric utilities c) Network models d) biomimetic models to create biobased generators to product molecular hydrogen and oxygen

2. Outcome Type : Change in Knowledge Outcome Measure

2010 : 2	**2011 :** 2	**2012 :** 2	**2013 :** 2	**2014 :** 0

3. Associated Institute Type(s)

•1862 Research

4. Associated Knowledge Area(s)

- 609 - Economic Theory and Methods

Outcome #4

1. Outcome Target

Knowledge Indicators - Type 4...Productivity information a) understand reverse impact of downstream on upstream research b) understand where to distribute investments on basic-to-applied research continuum and in which fields or subfields to focus

2. Outcome Type : Change in Knowledge Outcome Measure

2010 : 1	**2011 :** 0	**2012 :** 1	**2013 :** 0	**2014 :** 0

3. Associated Institute Type(s)

•1862 Research

4. Associated Knowledge Area(s)

- 609 - Economic Theory and Methods

Outcome #5

1. Outcome Target

Action Indicators - Type 1...Industry apply production systems a) Energy producers optimize photobiological process to yield higher energy efficiencies b) new biobased hydrogen generators are incorporated into integrated hydrogen energy systems, providing generation, storage, and utilization of hydrogen in one unit. c) microbial fuel cells provide on-farm electrical generation

2. Outcome Type : Change in Action Outcome Measure

2010 : 1	**2011 :** 0	**2012 :** 1	**2013 :** 0	**2014 :** 0

3. Associated Institute Type(s)

•1862 Research

4. Associated Knowledge Area(s)

- 402 - Engineering Systems and Equipment
- 511 - New and Improved Non-Food Products and Processes

Outcome #6

1. Outcome Target

Action Indicators - Type 2...economic activity in rural areas a) bioenergy facilities are located close to potential feedstocks to generate additional economic activity

2. Outcome Type : Change in Action Outcome Measure

2010 : 0	**2011 :** 0	**2012 :** 0	**2013 :** 0	**2014 :** 0

3. Associated Institute Type(s)

•1862 Research

4. Associated Knowledge Area(s)

- 402 - Engineering Systems and Equipment

Outcome #7

1. Outcome Target

Action Indicators - Type 3...improved feedstocks are produced a) algae outproduce terrestrial oilseed crops and oil is easily extracted b) organic materials harvested from animal wastes and urban wastewater generate bio hydrogen and eliminate waste

2. Outcome Type : Change in Action Outcome Measure

2010 : 0	2011 : 0	2012 : 0	2013 : 0	2014 : 0

3. Associated Institute Type(s)

•1862 Research

4. Associated Knowledge Area(s)

- 133 - Pollution Prevention and Mitigation
- 402 - Engineering Systems and Equipment
- 511 - New and Improved Non-Food Products and Processes

V(J). Planned Program (External Factors)

1. External Factors which may affect Outcomes

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

Description

World energy use increases faster than production can occur, which may spur technological development. However, changes in appropriations, economy, and public priorities may reduce research funding availability.

V(K). Planned Program (Evaluation Studies and Data Collection)

1. Evaluation Studies Planned

- Retrospective (post program)
- During (during program)

Description

{NO DATA ENTERED}

2. Data Collection Methods

- Tests
- On-Site
- Observation
- Sampling
- Structured
- Unstructured

Description

{NO DATA ENTERED}

V(A). Planned Program (Summary)

Program #2

1. Name of the Planned Program

P2-Excellence in Ecosystem Services

2. Brief summary about Planned Program

As the world's human population grows, land and water resources increasingly will be expected to provide not only food and fiber in sustainable production systems, but also "ecosystem services" to maintain the health of the planet. As a result of our discoveries, new businesses and sustainable economies will develop. Outcomes of research may include development of new plant varieties, support of sustainable production systems, new knowledge about agroecosystems, sustainable use of aquatic and marine ecosystems, new engineering schemes, new economic methods of valuation, new agricultural policies, and others. In the future, Oregon nurseries will produce a wide range of plants developed for use in the delivery of plant-based ecosystem solutions to environmental problems. Other Oregon companies will design, install, and maintain ecosystems locally, nationally, and internationally.

3. Program existence : New (One year or less)

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
101	Appraisal of Soil Resources	5%		5%	
102	Soil, Plant, Water, Nutrient Relationships	5%		5%	
103	Management of Saline and Sodic Soils and Salinity	5%		5%	
112	Watershed Protection and Management	5%		5%	
121	Management of Range Resources	5%		5%	
125	Agroforestry	5%		5%	
135	Aquatic and Terrestrial Wildlife	10%		10%	
136	Conservation of Biological Diversity	10%		10%	
201	Plant Genome, Genetics, and Genetic Mechanisms	5%		5%	
212	Pathogens and Nematodes Affecting Plants	5%		5%	
215	Biological Control of Pests Affecting Plants	5%		5%	
302	Nutrient Utilization in Animals	5%		5%	
303	Genetic Improvement of Animals	5%		5%	
311	Animal Diseases	5%		5%	
604	Marketing and Distribution Practices	5%		5%	

605	Natural Resource and Environmental Economics	5%		5%	
712	Protect Food from Contamination by Pathogenic Microorganisms, Parasites, and Naturally Occurring Toxins	5%		5%	
723	Hazards to Human Health and Safety	5%		5%	
	Total	100%		100%	

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

1. Situation and priorities

As the world's human population grows, land and water resources increasingly will be expected to provide not only food and fiber in sustainable production systems, but also "ecosystem services" to maintain the health of the planet. The goal of this program is to advance fundamental knowledge about the environment and natural resources, and foster economic growth and sustainability in a manner that is protective of human and environmental health. Maintaining and restoring ecosystem function and processes are key to sustainable food production and use of natural resources. How these resources are managed depends, in part, on improved understanding of the role humans play in modifying ecosystem structure and function. We assume that a multidisciplinary effort will be needed to develop knowledge of complex ecosystem relationships and restoration technologies that are beyond the scope of a single researcher.

Diverse scientific expertise that ranges from ecological modeling to habitat, population and community ecology is needed to support ecosystem research.The data and information generated as part of this Program will contribute to ecosystem restoration policy decisions and to the continued development of the theoretical understanding of processes affecting aquatic and terrestrial organisms and ecosystem function. Improving the use and sustainability of terrestrial and marine resources in Oregon and the Pacific Northwest will require us to anticipate the future, balance risks with opportunities, and seamlessly integrating research, outreach, and teaching responsibilities.

Economic issues underlie many of the political debates over land and water use in Oregon and the West. Some of the most pressing policy issues include how land and water are and will be managed in the coming decades and questions involving land use in the rural-urban interface. Further, we need to make significant contributions toward providing a stable, sustainable, and healthy supply of food, fuel, and fiber for the nation while strengthening Oregon's rural communities. Research for all ecosystems will Rangeland research will focus on three principal themes: 1) increasing efficiency and sustainability of resource based enterprises, (2) designing multiple use management strategies that ensure and sustain productivity, biodiversity, and stability of watersheds and ecosystems, and (3) expanding humankind's understanding of the region's ecology.Supportive strategies are is to create basic knowledge and to inform decisions on biological control of pathogens, pests, and weeds (a feasible component of integrated pest management programs), on the best use of Oregon's soil resources, and to broadly study the involvement of microorganisms in the health of the world and its plant, animal and human inhabitants.

2. Scope of the Program

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

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

1. Assumptions made for the Program

- policymakers recognize the impact that economic behavior has in social decisions regarding management of water and land resources and these policymakers also value economic analysis when addressing issues related to management of land and water.
- Growers, crop consultants, extension faculty and researchers in agriculture as a whole, and the pear, grape, pear and

cereal/wheat industries in particular, and ecologists and managers of natural ecosystems are seeking research on plant diseases, invasive weeds, and storage decay.

- faculty are in on-going contact with professional peers across the OSU campus, around the state of Oregon, the country, and world. They work in cooperation with peers in state, regional, and federal agencies. They work with county extension and branch research station faculty. They are members of successful national competitive grants. Through this array of contacts they have a keen awareness of local, state, regional, national, and international research needs in the soil sciences.
- a goal of the Oregon State University College of Agricultural Sciences is to advance fundamental knowledge about the environment and natural resources, and foster economic growth and sustainability in a manner that is protective of human and environmental health.
- Maintaining and restoring ecosystem function and processes are key to sustainable food production and use of natural resources.
- Oregonians from individuals to communities seek ways to use natural resources in a sustainable manner.
- The outcomes of the program are deliverables that can be used by individuals, communities, regulatory and management agencies, and natural resources users to maintain or improve ecosystem health.We assume this knowledge will enable citizens and policy makes to make informed decisions and management choices that allow sustainable use of natural resources.
- Microorganisms are ubiquitous and can be viewed in certain cases as limiting agricultural productivity and in other cases as supporting agricultural productivity.

2. Ultimate goal(s) of this Program

To apply scholarship and technology to enhance the capacity of managed landscapes and their biota to optimize the production of ecosystem services, such as: carbon sequestration, wastewater treatment, bioremediation, maintenance of biodiversity, and others.

Program objectives

To examine pressing policy issues regarding how land and water are and will be managed in the coming decades, both in rural areas and in the rural-urban interface. (AREC)

To enable biological and other novel control approaches to be established for diseases of agricultural importance, thereby reducing reliance on more conventional economically and environmentally sensitive and unsustainable practices. (BPPcontrol)

As a core activity of the Coastal Oregon Marine Experiment Station, this program will conduct research to understand, utilize, and sustain marine resources and coastal ecosystems in order to benefit the citizens of Oregon, the Pacific Northwest, the Nation, and the World. (COMES)

The goal of this program is to develop our basic soil science knowledge base so that current and future issues related to the functioning of soils in our world can be addressed in a scientifically sound manner. (CSS-soil)

The goal of this program is to inform the public and policy makers about changes in ecosystem function and processes that result from natural resources use and to identify ways to minimize negative consequences and develop knowledge and technologies that enable ecosystem restoration. This entails robust analyses of data deriving from research of these investigators and that available from work within the broader scientific community.The proposed Program encompasses diverse scientific expertise of faculty whose training and specialization ranges from ecological modeling to population and community ecology.(FW)

To address issues associated with the role of microbes in maintaining the health of the Earth and its inhabitants, and in sustaining agricultural productivity. This program is represented by the following subprograms and thematic areas (MB)

Generate new knowledge that increases the understanding of ecology of rangeland ecosystems. Also, Formulate strategies for sustainable range management through advances in research (REM)

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
2010	0.8	0.0	18.8	0.0
2011	0.5	0.0	15.0	0.0
2012	0.5	0.0	15.0	0.0
2013	0.5	0.0	15.0	0.0
2014	0.5	0.0	15.0	0.0

V(F). Planned Program (Activity)

1. Activity for the Program

The programs includes studies that focus on development of models of community-level responses to perturbations, population dynamics and habitat management for individual aquatic and terrestrial species, and development of methods for monitoring ecosystem changes.The experimental approaches that will be used to meet the specific objectives of these subprograms include field studies in the Oregon, the Pacific Northwest, the U.S., and abroad.In addition, the experimental approaches will also include controlled laboratory experiments and database/model development.

Theoretical and empirical models will be developed to examine land-use policies and impacts on water quality, wildlife habitat, watershed health, and other ecological indicators. Models will be used to examine how resource and agricultural policy affects major land use and cropping patterns, and how these may affect water quality.

In summary:
- conduct research experiments
- collect data
- conduct assessments
- develop monitoring protocols
- develop products, curriculum resources
- conduct workshops & meetings
- present seminars and professional talks
- provide training
- deliver services
- provide counseling
- partnering
- facilitating

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

Extension	
Direct Methods	Indirect Methods
● Workshop ● Other 1 (peer publications) ● One-on-One Intervention ● Other 2 (presentations) ● Group Discussion ● Education Class	● Public Service Announcement ● TV Media Programs ● Web sites ● Other 2 (trade magazines) ● Newsletters ● Other 1 (newspaper)

3. Description of targeted audience

- The general public and those in natural resource-based communities, including ranchers and fishermen
- The research community including scientists working in governmental, industrial, and academic sectors, including biomedical researchers, oceanographers, climatographers, virologists.

- Growers, crop consultants, extension faculty and researchers in the fruit and wheat industry; and ecologists, economists, and managers concerned with invasive species.
- Salmonid industry
- State and federal natural resources management and regulatory agencies, including land managers
- policy makers.

V(G). Planned Program (Outputs)

1. Standard output measures

Target for the number of persons(contacts) to be reached through direct and indirect contact methods

	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Year	Target	Target	Target	Target
2010	57410	60420	16270	57050
2011	109080	264300	31017	483050
2012	160170	2039000	51330	126050
2013	108970	1733500	16305	56050
2014	0	0	0	0

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

Expected Patent Applications

2010 :0 **2011 :**0 **2012 :** 0 **2013 :** 0 **2014 :** 0

3. Expected Peer Review Publications

Year	Research Target	Extension Target	Total
2010	86	0	0
2011	80	0	0
2012	68	0	0
2013	76	0	0
2014	0	0	0

V(H). State Defined Outputs

1. Output Target

- EFFECTS ON AND PROTECTION OF ENVIRONMENTAL HEALTH AND ECOLOGY - Indicator 1a (natural history) - evaluate fish life history variations and migration behaviors, compare information gained through life history information synthesis, molecular genetic laboratory analyses, otolith elemental and isotopic analyses (Miller) - characterize seasonal distributions of endangered great whales and characterize their year-round critical habitats (Mate)

  2010 5 **2011** 5 **2012 :**5 **2013** 5 **2014** 5

- PROVIDE ADDITIONAL UNDERSTANDING FOR PLANT AND ANIMAL PROTECTION FROM DISEASES AND PESTS - Indicator 1a (biology and control of diseases-plants): - control of fire blight of pear and apple with the use of avirulent pathogens, including whether they induce defense responses in the host - risk of movement of the fire blight pathogen with mature symptomless pear fruit. - rust spores timing released in spring and the minimum environmental requirements for infection of leaves. - potential impact of the introduced pathogen, blackberry rust, in the Pacific Northwest region and evaluate chemical control programs for susceptible cultivars. - host abundance, heterogeneity, and spatial structure influence on the spatiotemporal spread of disease. - factors that speed the onset of velocity increase over time. - disease

spread and effects of landscape variables are similar at different spatial scales. - genetic mechanisms of plant pathogens

2010 :8 **2011** :8 **2012** :8 **2013** :8 **2014** :8

- STUDIES TO DECIPHER GENOMES, GENETICS AND MECHANISMS OF PLANTS AND ANIMALS - Indicator 1 (life history strategies) - use emerging statistical and molecular genetic techniques to determine distinctions among alternate life history strategies and separate breeding units among fishery components, particularly in salmon, groundfish, and oysters. (Banks)

  2010 :1 **2011** :2 **2012** :1 **2013** :0 **2014** :1

- DEVELOP IMPROVED ANIMAL AND PLANT PRODUCTION SYSTEMS - develop microparticulate diets for marine fish larvae(Langdon)for aquaculture and restoration projects

  2010 :1 **2011** :1 **2012** :1 **2013** :1 **2014** :0

- PROVIDE TECHNICAL, ECONOMIC AND MARKETING MODELS AND ANALYSES THAT INFORM DECISION-MAKERS, INDUSTRY, AND PEERS...Indicator 1 - develop models for water resources. - assess changes in policies that influence supply and cost of water in agricultural and non-agricultural uses - assess market mechanisms governing water and private land-use decisions - riparian zones that incorporate different ecological processes than upland models (state-and-transition models)

  2010 :10 **2011** :3 **2012** :3 **2013** :3 **2014** :3

- DEVELOP EDUCATIONAL STRATEGIES AND DISTANCE EDUCATION OUTLETS TO FURTHER REACH CLIENTELE. - Approximately 8,000 adults and 2,500 youth per year will have increased awareness and knowledge of ecosystem processes and functions and methods for restoring degraded habitats.

  2010 :10500 **2011** :10500 **2012** :10500 **2013** :10500 **2014** :0

- OTHER SCHOLARLY EXCELLENCE: participation on professional society panels and boards, as well as science panels, and receipt of awards or recognition

  2010 :1 **2011** :1 **2012** :1 **2013** :1 **2014** :1

- EFFECTS ON AND PROTECTION OF ENVIRONMENTAL HEALTH AND ECOLOGY - Indicator 1b (invertebrates) - floral components and landscape features that contribute to insect biodiversity - conservation efforts evaluated through long-term trends in population dynamics of insects - species previously unknown are described

  2010 :5 **2011** :5 **2012** :5 **2013** :5 **2014** :5

- EFFECTS ON AND PROTECTION OF ENVIRONMENTAL HEALTH AND ECOLOGY - Indicator 1c (riparian) - functional groups and a functional group key for meadow riparian systems - riparian relationships and issues associated with livestock grazing

  2010 :5 **2011** :5 **2012** :5 **2013** :5 **2014** :5

- EFFECTS ON AND PROTECTION OF ENVIRONMENTAL HEALTH AND ECOLOGY - Indicator 1d (soils) - fluxes of energy and mass in soils - influence of abiotic and biotic factors on size and composition of microbial communities in soil and how microorganisms affect key soil and plant processes - soil-landscape evolution in Oregon and partition soil respiration measurements on the landscape scale

  2010 :5 **2011** :5 **2012** :5 **2013** :5 **2014** :5

- PROVIDE ADDITIONAL UNDERSTANDING FOR PLANT AND ANIMAL PROTECTION FROM DISEASES AND PESTS - Indicator 1b (control of diseases-animals): - characteristics of and changes due to zebrafish and salmonid diseases

  2010 :1 **2011** :1 **2012** :1 **2013** :1 **2014** :1

- PROVIDE ADDITIONAL UNDERSTANDING FOR PLANT AND ANIMAL PROTECTION FROM DISEASES AND PESTS - Indicator 2 (control of invasive pests): - Biological controls

  2010 :1 **2011** :1 **2012** :1 **2013** :1 **2014** :1

- PROVIDE ADDITIONAL UNDERSTANDING FOR PLANT AND ANIMAL PROTECTION FROM DISEASES AND PESTS -

Indicator 3 (modeling and variables): - host variables (abundance, heterogeneity, or spatial structure) to be included in models to make predictions about disease risks, and to determine the relative importance of each to disease spread.

2010 2 **2011** 2 **2012** :2 **2013** 2 **2014** 2

- STUDIES TO DECIPHER GENOMES, GENETICS AND MECHANISMS OF PLANTS AND ANIMALS - Indicator 2 (breeding) - develop selective breeding program, repository, and resource center for various desirable traits of Pacific oysters (Langdon)

2010 0 **2011** 1 **2012** :1 **2013** 0 **2014** :1

- STUDIES TO DECIPHER GENOMES, GENETICS AND MECHANISMS OF PLANTS AND ANIMALS - Indicator 3 (human system) - identify aspects of biology and biotechnology of viruses and bacteria that affect human health - identify characteristics of food and water systems

2010 2 **2011** 2 **2012** :2 **2013** 2 **2014** 2

- PROVIDE TECHNICAL, ECONOMIC AND MARKETING MODELS AND ANALYSES THAT INFORM DECISION-MAKERS, INDUSTRY, AND PEERS...Indicator 2 - develop models habitat. - characterize sagegrouse habitat, e.g., a new and simplier global positioning system as well as techniques integrating infrared wavelengths of light for more accurate classification algorithms, and on the landscape modeling side, a kinetic resource and environmental spatial systems modeler (KRESS modeler 3.0) developed in 2006 will allow predictions of the suitability of locations on landscapes for either plants or animals.

2010 2 **2011** 2 **2012** :2 **2013** 2 **2014** 2

- PROVIDE TECHNICAL, ECONOMIC AND MARKETING MODELS AND ANALYSES THAT INFORM DECISION-MAKERS, INDUSTRY, AND PEERS...Indicator 3 - develop models for stock assessment and management. - stock assessments to evaluate stock status, harvest management policies, and areas of misunderstanding or disagreement between fishery scientists and fishing industry (Sampson) - drivers of fishing change plus incentive-based and other management tools, their applicability to Oregon fishery problems and fishing community sustainability (Hanna) - fisheries management and marketing in Oregon and the Pacific Northwest (Sylvia)

2010 2 **2011** 2 **2012** :2 **2013** 2 **2014** 2

V(I). State Defined Outcome

O. No	Outcome Name
1	Knowledge Indicator 1a - New tools, models for irrigation and water management - new set of tools to help farm operators make better irrigation scheduling decisions, e.g., deficit irrigation, models and web-based tools to schedule irrigation applications to reduce water use and maximize farm profit
2	Knowledge Indicator 2 - Understand impacts - of land use change on water quality and ecosystems by examining land-use policies at the national scale, using land cover and land use maps, and spatially-explicit policy simulations. - of land use change on populations of different wildlife species.
3	Knowledge Indicator 3 - Economic feasibility, best practices - chemical control programs for susceptible cultivars - biological control to combat invasive plant species - stock assessments can be used to evaluate stock status, harvest management policies, and areas of misunderstanding or disagreement between fishery scientists and fishing industry - incentive-based fishery management tools, spatial ocean management approaches, community-based management, and ecosystem-based management. - new approaches for managing the fishery to increase economic benefits. - market-based tools for managing the environmental impacts of fishing
4	Knowledge Indicator 4a - Environmental and ecological management (life history, migration) - critical life history and migratory issues, e.g., whether there is genetic variation associated with the variations in juvenile migratory behavior of Chinook and coho salmon within coastal watersheds, if stream-estuary ecotone is important to the survival of coastal coho in Oregon, and larval dispersal and juvenile and adult movement patterns in Pacific rockfish and Pacific herring - location and migration patterns of whales
5	Knowledge Indicator 5a - Basic information on ecosystem (habitats) - Understand threshold concepts within riparian systems as they relate to channel morphology, water table and plant community dynamics - Greater awareness of watersheds/invasive species/animal behaviors/watershed conditions.
6	Knowledge Indicator 6 - Genetic information - susceptibility of blackberry germplasm - genotypes of P. violaceum present in the Pacific Northwest as compared to the genotypes in other regions - structure, function and regulation of the VV G1L proteinase and the role that it plays during the assembly and maturation of infectious progeny virions - role a number of critical proteins play in baculovirus genome replication and processing. - molecular mechanisms of quorum sensing function and consequences of these distinct properties, which will have important implications for the development of antivirulence strategies as well as for the particular role of each signaling system in P. aeruginosa group behavior and pathogenesis. - molecular biology of RNA viruses affecting corps, animals and humans, e.g., early stages of viral infection, Trojan horse model, translational enhancer sequences, dicistronic expression. - how the GALLS protein participates in gene transfer to plants and its role in plant transformation - new microorganisms and the mechanisms by which microorganisms acquire and utilize foreign DNA
7	Action Indicator 1a - Better decision-making, behaviors, and policies (water and land use). - Researchers investigate, compare, and integrate the environmental and economic impacts of various land-use policies - Research on soil-landscape evolution will allow for use of remote-sensing and modeling techniques to predict the affects of human, biotic and abiotic forces on soil formation and to use this information in soil mapping, land use planning and other activities. - Farmers learn how to use water more efficiently
8	Action Indicator 2a - Improved technologies and practices (for control of pests and pathogens) - U.S pear and apple industry suppress disease through economical chemical control programs for susceptible cultivars - Novel control approaches to other diseases of plants. - Epidemic modeling at large scales - application of baculovirus technology to a variety of investigations dependent upon the use of this remarkable group of viruses. - assay development and biochemical details of proteolysis
9	Action Indicator 3 - Improved safety - new assays and technology help combat viruses - potential antiviral drugs from rational drug design and high throughput screening efforts designed to develop G1L inhibitors - information about molecular biology of RNA viruses used in designing new approaches for combating pathogenesis by these viruses.

10	Economic Changes in food systems - Risk management of fire blight pathogen could lead to larger export markets for U.S. grown pears. - Enhanced fish, shellfish, and whale populations will be of economic value in coastal tourism - Ocean resource management approaches that integrate ecological and economic components and promote sustained economic productivity for the Oregon seafood industry. - Traceability will increase marketing success and generate higher ex-vessel prices and profits for fishermen, processors, and retailers; Traceability will also be used to collect science information to improve science and management. - The adoption of rights based approaches for managing the environmental effects of fishing will improve economic performance of the industry while also protecting marine species, habitats, and ecosystems. - Improvements in marine fish nutrition will result in expansion of marine aquaculture to meet the increased global demand for fish. - The Pacific oyster breeding program will provide significant benefits to this $3.7 billion dollar industry as well as provide global benefits through its approach to oyster breeding.
11	Environmental Changes 1 - food systems - Provide more sustainable approaches for managing plant disease - Restored health and stability to marine food webs - Adoption of rights based approaches for managing the environmental effects of fishing will improve economic performance of the industry while also protecting marine species, habitats, and ecosystems - The pacific oyster breeding program will provide significant benefits to this $3.7 billion dollar industry as well as provide global benefits through its approach to oyster breeding - Reduce impact of disease on wild and cultured salmonids
12	Societal Changes - more enlightened populace with regard to the value of habitats and conservation.
13	Knowledge Indicator 1b - New tools, models for crop production - Simplified, realistic crop growth models easily applied to variety of soils, climates and irrigation technologies which also help make decisions regarding economic tradeoffs between various decisions or competing goals - weather-based models that indicate when spores are first released in spring and the minimum environmental requirements for infection of leaves. - know which host variables (abundance, heterogeneity, or spatial structure) need to be included in models to make predictions about disease risks, and to determine the relative importance of each to disease spread.
14	Knowledge Indicator 1c - New tools, models for land-use decisions - regional econometric models that reveal the importance of localized factors such as climate and access to commodity markets on private land-use decisions, and incorporate these results into the national model to increase the accuracy of land-use change predictions. - GIS-based, spatially explicit model to predict development patterns and land prices that would have existed when one or more land use regulation had been removed in the southern part of the Willamette Valley. - spatially explicit model to examine the causes of sprawl and its socioeconomic consequences.
15	Knowledge Indicator 1d - New tools, models for seafood - traceability and case studies for seafood
16	Knowledge Indicator 4b - Environmental and ecological management (habitat) - awareness of potential problems associated with riparian grazing. - Improved monitoring and management of rangelands and forest lands, including modeling for preservation and expansion of native ungulates in North America and Asia.
17	Knowledge Indicator 4c - Environmental and ecological management (monitoring of pathogens) - chromatophore cells for their use as a living sensor for rapid detection of food- and water- associated pathogenic bacteria and their toxins. - host and geographic range, pathogenesis, taxonomy, modes of transmission, and treatment of infectious and toxicological diseases of importance to wild and cultured fishes, particularly those afflicting fishes in the Pacific Northwest region and how to minimize the impact of these diseases.
18	Knowledge Indicator 5b - Basic information on ecosystem (species assemblages) - ecology of a variety of insect species and the dynamics of multi-hundred species assemblages in forested habitats - SAR11 for investigations aimed at understanding how plankton cells use light dependent proton pumps, and impact the efficiency of carbon cycling in the ocean surface.
19	Knowledge Indicator 5c - Basic information on ecosystem (soils) - fluid movement though soils, - biogeochemical recycling in soils, - carbon and nitrogen cycling in soils, - microbial diversity in soils, - soil-landscape evolution.
20	Action Indicator 1b - Better decision-making, behaviors, and policies (soil management). - Research on carbon and nitrogen cycling will lead to better regional and national nutrient sequestration plans as partial solutions for nutrient contamination and global warming concerns. - Research on microbial diversity will lead to better understandings of changes that occur in soils under different management regimes, of inherent differences in soil microbe diversity, and of the ability of soils to recover from events that affect microbial populations.

21	Action Indicator 1c - Better decision-making, behaviors, and policies (natural resources and ecosystems). - better conservation practices reduce mortalities and promote population recovery of whales - individuals will modify behaviors and practices so that ecosystem functions and processes can be restored. - Policy makers will develop incentives, rules and regulations that prevent further resource damage or encourage ecosystem restoration - the knowledge about atmospheric carbon and carbon sequestered in oceanic waters will enable more accurate models for the global carbon cycle - ecosystem restoration policy decisions based upon the theoretical understanding of processes affecting aquatic and terrestrial organisms and ecosystem function.
22	Action Indicator 1d - Better decision-making, behaviors, and policies (fisheries & seafood). - establish management and conservation/restoration efforts for salmonids, Pacific rockfish, Pacific herring, and shellfish - Better fishery management and ocean policies that are compatible with issues of economics, incentives, communities and ecosystems. - approaches for managing the pink shrimp fishery and the environmental effects of fishing
23	Action Indicator 2b - Improved technologies and practices (seafood and fisheries) - traceability systems for marketing and science research (electronic logbooks). - principles of seafood marketing and trade - fisheries management strategies to encompass detailed knowledge of the dispersal/disease process - Performance of complex microparticle types that provide nutrients to marine larval fish
24	Action Indicator 2c - Improved technologies and practices (ecosystem services) - Research on fluid flows in soils will allow for better waste material containment facility design. - new ecosystem service industries in Oregon that deliver products or manage plant based systems designed for specific environmental problems. - Improved indicators of environmental health as described in the Oregon State of the Environment report.
25	Environmental Changes 2 - ecosystems - Global warming will be addressed in part by carbon sequestration strategies - Soil microbial health will be maintained or improved - Changes in policies will result in sustainable natural resource use or ecosystems restoration

Outcome #1

1. Outcome Target

Knowledge Indicator 1a - New tools, models for irrigation and water management - new set of tools to help farm operators make better irrigation scheduling decisions, e.g., deficit irrigation, models and web-based tools to schedule irrigation applications to reduce water use and maximize farm profit

2. Outcome Type : Change in Knowledge Outcome Measure

2010 :2	**2011** : 2	**2012** : 2	**2013** :2	**2014** :2

3. Associated Institute Type(s)

•1862 Research

4. Associated Knowledge Area(s)

- 101 - Appraisal of Soil Resources
- 102 - Soil, Plant, Water, Nutrient Relationships
- 103 - Management of Saline and Sodic Soils and Salinity
- 112 - Watershed Protection and Management
- 135 - Aquatic and Terrestrial Wildlife
- 212 - Pathogens and Nematodes Affecting Plants
- 215 - Biological Control of Pests Affecting Plants
- 311 - Animal Diseases
- 604 - Marketing and Distribution Practices
- 605 - Natural Resource and Environmental Economics
- 712 - Protect Food from Contamination by Pathogenic Microorganisms, Parasites, and Naturally Occurring Toxins
- 723 - Hazards to Human Health and Safety

Outcome #2

1. Outcome Target

Knowledge Indicator 2 - Understand impacts - of land use change on water quality and ecosystems by examining land-use policies at the national scale, using land cover and land use maps, and spatially-explicit policy simulations. - of land use change on populations of different wildlife species.

2. Outcome Type : Change in Knowledge Outcome Measure

2010 :0	**2011** : 1	**2012** : 0	**2013** :1	**2014** :0

3. Associated Institute Type(s)

•1862 Research

4. Associated Knowledge Area(s)

- 112 - Watershed Protection and Management
- 121 - Management of Range Resources
- 135 - Aquatic and Terrestrial Wildlife
- 136 - Conservation of Biological Diversity
- 605 - Natural Resource and Environmental Economics

Outcome #3

1. Outcome Target

Knowledge Indicator 3 - Economic feasibility, best practices - chemical control programs for susceptible cultivars - biological control to combat invasive plant species - stock assessments can be used to evaluate stock status, harvest management policies, and areas of misunderstanding or disagreement between fishery scientists and fishing industry - incentive-based fishery management tools, spatial ocean management approaches, community-based management, and ecosystem-based management. - new approaches for managing the fishery to increase economic benefits. - market-based tools for managing the environmental impacts of fishing

2. Outcome Type : Change in Knowledge Outcome Measure

2010 6 **2011 :** 6 **2012 :** 6 **2013** 6 **2014 :** 0

3. Associated Institute Type(s)

•1862 Research

4. Associated Knowledge Area(s)

- 135 - Aquatic and Terrestrial Wildlife
- 136 - Conservation of Biological Diversity
- 212 - Pathogens and Nematodes Affecting Plants
- 215 - Biological Control of Pests Affecting Plants
- 604 - Marketing and Distribution Practices
- 605 - Natural Resource and Environmental Economics

Outcome #4

1. Outcome Target

Knowledge Indicator 4a - Environmental and ecological management (life history, migration) - critical life history and migratory issues, e.g., whether there is genetic variation associated with the variations in juvenile migratory behavior of Chinook and coho salmon within coastal watersheds, if stream-estuary ecotone is important to the survival of coastal coho in Oregon, and larval dispersal and juvenile and adult movement patterns in Pacific rockfish and Pacific herring - location and migration patterns of whales

2. Outcome Type : Change in Knowledge Outcome Measure

2010 2 **2011 :** 1 **2012 :** 1 **2013** 2 **2014 :** 1

3. Associated Institute Type(s)

•1862 Research

4. Associated Knowledge Area(s)

- 135 - Aquatic and Terrestrial Wildlife
- 136 - Conservation of Biological Diversity
- 311 - Animal Diseases
- 605 - Natural Resource and Environmental Economics

Outcome #5

1. Outcome Target

Knowledge Indicator 5a - Basic information on ecosystem (habitats) - Understand threshold concepts within riparian systems as they relate to channel morphology, water table and plant community dynamics - Greater awareness of watersheds/invasive species/animal behaviors/watershed conditions.

2. Outcome Type : Change in Knowledge Outcome Measure

2010 :	2	2011 :	2	2012 :	2	2013 :	2	2014 :	2

3. Associated Institute Type(s)

•1862 Research

4. Associated Knowledge Area(s)

- 102 - Soil, Plant, Water, Nutrient Relationships
- 112 - Watershed Protection and Management
- 121 - Management of Range Resources
- 125 - Agroforestry
- 135 - Aquatic and Terrestrial Wildlife
- 136 - Conservation of Biological Diversity

Outcome #6

1. Outcome Target

Knowledge Indicator 6 - Genetic information - susceptibility of blackberry germplasm - genotypes of P. violaceum present in the Pacific Northwest as compared to the genotypes in other regions - structure, function and regulation of the VV G1L proteinase and the role that it plays during the assembly and maturation of infectious progeny virions - role a number of critical proteins play in baculovirus genome replication and processing. - molecular mechanisms of quorum sensing function and consequences of these distinct properties, which will have important implications for the development of antivirulence strategies as well as for the particular role of each signaling system in P. aeruginosa group behavior and pathogenesis. - molecular biology of RNA viruses affecting corps, animals and humans, e.g., early stages of viral infection, Trojan horse model, translational enhancer sequences, dicistronic expression. - how the GALLS protein participates in gene transfer to plants and its role in plant transformation - new microorganisms and the mechanisms by which microorganisms acquire and utilize foreign DNA

2. Outcome Type : Change in Knowledge Outcome Measure

2010 :	12	2011 :	12	2012 :	12	2013 :	12	2014 :	0

3. Associated Institute Type(s)

•1862 Research

4. Associated Knowledge Area(s)

- 136 - Conservation of Biological Diversity
- 201 - Plant Genome, Genetics, and Genetic Mechanisms
- 311 - Animal Diseases
- 712 - Protect Food from Contamination by Pathogenic Microorganisms, Parasites, and Naturally Occurring Toxins
- 723 - Hazards to Human Health and Safety

Outcome #7

1. Outcome Target

Action Indicator 1a - Better decision-making, behaviors, and policies (water and land use). - Researchers investigate, compare, and integrate the environmental and economic impacts of various land-use policies - Research on soil-landscape evolution will allow for use of remote-sensing and modeling techniques to predict the affects of human, biotic and abiotic forces on soil formation and to use this information in soil mapping, land use planning and other activities. - Farmers learn how to use water more efficiently

2. Outcome Type : Change in Action Outcome Measure

2010 : 2 **2011 :** 2 **2012 :** 2 **2013 :** 2 **2014 :** 2

3. Associated Institute Type(s)

•1862 Research

4. Associated Knowledge Area(s)

- 101 - Appraisal of Soil Resources
- 102 - Soil, Plant, Water, Nutrient Relationships
- 103 - Management of Saline and Sodic Soils and Salinity
- 112 - Watershed Protection and Management
- 121 - Management of Range Resources
- 125 - Agroforestry
- 135 - Aquatic and Terrestrial Wildlife
- 136 - Conservation of Biological Diversity
- 605 - Natural Resource and Environmental Economics

Outcome #8

1. Outcome Target

Action Indicator 2a - Improved technologies and practices (for control of pests and pathogens) - U.S pear and apple industry suppress disease through economical chemical control programs for susceptible cultivars - Novel control approaches to other diseases of plants. - Epidemic modeling at large scales - application of baculovirus technology to a variety of investigations dependent upon the use of this remarkable group of viruses. - assay development and biochemical details of proteolysis

2. Outcome Type : Change in Action Outcome Measure

2010 : 2 **2011 :** 3 **2012 :** 2 **2013 :** 1 **2014 :** 1

3. Associated Institute Type(s)

•1862 Research

4. Associated Knowledge Area(s)

- 201 - Plant Genome, Genetics, and Genetic Mechanisms
- 212 - Pathogens and Nematodes Affecting Plants
- 215 - Biological Control of Pests Affecting Plants
- 712 - Protect Food from Contamination by Pathogenic Microorganisms, Parasites, and Naturally Occurring Toxins
- 723 - Hazards to Human Health and Safety

Outcome #9

1. Outcome Target

Action Indicator 3 - Improved safety - new assays and technology help combat viruses - potential antiviral drugs from rational drug design and high throughput screening efforts designed to develop G1L inhibitors - information about molecular biology of RNA viruses used in designing new approaches for combating pathogenesis by these viruses.

2. Outcome Type : Change in Action Outcome Measure

2010 :	2011 :	2012 :	2013 :	2014 :
1	1	1	1	0

3. Associated Institute Type(s)

•1862 Research

4. Associated Knowledge Area(s)

- 201 - Plant Genome, Genetics, and Genetic Mechanisms
- 212 - Pathogens and Nematodes Affecting Plants
- 215 - Biological Control of Pests Affecting Plants
- 303 - Genetic Improvement of Animals
- 311 - Animal Diseases
- 712 - Protect Food from Contamination by Pathogenic Microorganisms, Parasites, and Naturally Occurring Toxins
- 723 - Hazards to Human Health and Safety

Outcome #10

1. Outcome Target

Economic Changes in food systems - Risk management of fire blight pathogen could lead to larger export markets for U.S. grown pears. - Enhanced fish, shellfish, and whale populations will be of economic value in coastal tourism - Ocean resource management approaches that integrate ecological and economic components and promote sustained economic productivity for the Oregon seafood industry. - Traceability will increase marketing success and generate higher ex-vessel prices and profits for fishermen, processors, and retailers; Traceability will also be used to collect science information to improve science and management. - The adoption of rights based approaches for managing the environmental effects of fishing will improve economic performance of the industry while also protecting marine species, habitats, and ecosystems. - Improvements in marine fish nutrition will result in expansion of marine aquaculture to meet the increased global demand for fish. - The Pacific oyster breeding program will provide significant benefits to this $3.7 billion dollar industry as well as provide global benefits through its approach to oyster breeding.

2. Outcome Type : Change in Condition Outcome Measure

2010 :	2011 :	2012 :	2013 :	2014 :
0	1	1	0	1

3. Associated Institute Type(s)

•1862 Research

4. Associated Knowledge Area(s)

- 112 - Watershed Protection and Management
- 135 - Aquatic and Terrestrial Wildlife
- 136 - Conservation of Biological Diversity
- 201 - Plant Genome, Genetics, and Genetic Mechanisms
- 212 - Pathogens and Nematodes Affecting Plants
- 215 - Biological Control of Pests Affecting Plants
- 302 - Nutrient Utilization in Animals
- 303 - Genetic Improvement of Animals
- 604 - Marketing and Distribution Practices
- 605 - Natural Resource and Environmental Economics
- 712 - Protect Food from Contamination by Pathogenic Microorganisms, Parasites, and Naturally Occurring Toxins

- 723 - Hazards to Human Health and Safety

Outcome #11

1. Outcome Target

Environmental Changes 1 - food systems - Provide more sustainable approaches for managing plant disease - Restored health and stability to marine food webs - Adoption of rights based approaches for managing the environmental effects of fishing will improve economic performance of the industry while also protecting marine species, habitats, and ecosystems - The pacific oyster breeding program will provide significant benefits to this $3.7 billion dollar industry as well as provide global benefits through its approach to oyster breeding - Reduce impact of disease on wild and cultured salmonids

2. Outcome Type : Change in Condition Outcome Measure

2010 :0 **2011 :** 0 **2012 :** 0 **2013 :**1 **2014 :**0

3. Associated Institute Type(s)

•1862 Research

4. Associated Knowledge Area(s)

- 135 - Aquatic and Terrestrial Wildlife
- 136 - Conservation of Biological Diversity
- 201 - Plant Genome, Genetics, and Genetic Mechanisms
- 212 - Pathogens and Nematodes Affecting Plants
- 215 - Biological Control of Pests Affecting Plants
- 302 - Nutrient Utilization in Animals
- 303 - Genetic Improvement of Animals
- 311 - Animal Diseases
- 604 - Marketing and Distribution Practices
- 605 - Natural Resource and Environmental Economics
- 723 - Hazards to Human Health and Safety

Outcome #12

1. Outcome Target

Societal Changes - more enlightened populace with regard to the value of habitats and conservation.

2. Outcome Type : Change in Condition Outcome Measure

2010 :0 **2011 :** 0 **2012 :** 0 **2013 :**0 **2014 :**0

3. Associated Institute Type(s)

•1862 Research

4. Associated Knowledge Area(s)

- 101 - Appraisal of Soil Resources
- 112 - Watershed Protection and Management
- 121 - Management of Range Resources
- 125 - Agroforestry
- 135 - Aquatic and Terrestrial Wildlife
- 136 - Conservation of Biological Diversity

- 605 - Natural Resource and Environmental Economics

Outcome #13

1. Outcome Target

Knowledge Indicator 1b - New tools, models for crop production - Simplified, realistic crop growth models easily applied to variety of soils, climates and irrigation technologies which also help make decisions regarding economic tradeoffs between various decisions or competing goals - weather-based models that indicate when spores are first released in spring and the minimum environmental requirements for infection of leaves. - know which host variables (abundance, heterogeneity, or spatial structure) need to be included in models to make predictions about disease risks, and to determine the relative importance of each to disease spread.

2. Outcome Type : Change in Knowledge Outcome Measure

2010 2	**2011 :** 2	**2012 :** 2	**2013** 2	**2014 :** 2

3. Associated Institute Type(s)

•1862 Research

4. Associated Knowledge Area(s)

- 215 - Biological Control of Pests Affecting Plants

Outcome #14

1. Outcome Target

Knowledge Indicator 1c - New tools, models for land-use decisions - regional econometric models that reveal the importance of localized factors such as climate and access to commodity markets on private land-use decisions, and incorporate these results into the national model to increase the accuracy of land-use change predictions. - GIS-based, spatially explicit model to predict development patterns and land prices that would have existed when one or more land use regulation had been removed in the southern part of the Willamette Valley. - spatially explicit model to examine the causes of sprawl and its socioeconomic consequences.

2. Outcome Type : Change in Knowledge Outcome Measure

2010 0	**2011 :** 0	**2012 :** 0	**2013** 0	**2014 :** 0

3. Associated Institute Type(s)

•1862 Research

4. Associated Knowledge Area(s)

- 605 - Natural Resource and Environmental Economics

Outcome #15

1. Outcome Target

Knowledge Indicator 1d - New tools, models for seafood - traceability and case studies for seafood

2. Outcome Type : Change in Knowledge Outcome Measure

2010 0	**2011 :** 1	**2012 :** 1	**2013** 0	**2014 :** 0

3. Associated Institute Type(s)

•1862 Research

4. Associated Knowledge Area(s)

- 604 - Marketing and Distribution Practices
- 605 - Natural Resource and Environmental Economics
- 723 - Hazards to Human Health and Safety

Outcome #16

1. Outcome Target

Knowledge Indicator 4b - Environmental and ecological management (habitat) - awareness of potential problems associated with riparian grazing. - Improved monitoring and management of rangelands and forest lands, including modeling for preservation and expansion of native ungulates in North America and Asia.

2. Outcome Type : Change in Knowledge Outcome Measure

2010 :	2011 :	2012 :	2013 :	2014 :
1	1	1	1	1

3. Associated Institute Type(s)

•1862 Research

4. Associated Knowledge Area(s)

- 112 - Watershed Protection and Management
- 121 - Management of Range Resources
- 136 - Conservation of Biological Diversity

Outcome #17

1. Outcome Target

Knowledge Indicator 4c - Environmental and ecological management (monitoring of pathogens) - chromatophore cells for their use as a living sensor for rapid detection of food- and water- associated pathogenic bacteria and their toxins. - host and geographic range, pathogenesis, taxonomy, modes of transmission, and treatment of infectious and toxicological diseases of importance to wild and cultured fishes, particularly those afflicting fishes in the Pacific Northwest region and how to minimize the impact of these diseases.

2. Outcome Type : Change in Knowledge Outcome Measure

2010 :	2011 :	2012 :	2013 :	2014 :
1	1	1	1	1

3. Associated Institute Type(s)

•1862 Research

4. Associated Knowledge Area(s)

- 311 - Animal Diseases
- 712 - Protect Food from Contamination by Pathogenic Microorganisms, Parasites, and Naturally Occurring Toxins
- 723 - Hazards to Human Health and Safety

Outcome #18

1. Outcome Target

Knowledge Indicator 5b - Basic information on ecosystem (species assemblages) - ecology of a variety of insect species and the dynamics of multi-hundred species assemblages in forested habitats - SAR11 for investigations aimed at understanding how plankton cells use light dependent proton pumps, and impact the efficiency of carbon cycling in the ocean surface.

2. Outcome Type : Change in Knowledge Outcome Measure

2010 :	2011 :	2012 :	2013 :	2014 :
2	2	2	2	2

3. Associated Institute Type(s)

•1862 Research

4. Associated Knowledge Area(s)

- 135 - Aquatic and Terrestrial Wildlife
- 136 - Conservation of Biological Diversity

Outcome #19

1. Outcome Target

Knowledge Indicator 5c - Basic information on ecosystem (soils) - fluid movement though soils, - biogeochemical recycling in soils, - carbon and nitrogen cycling in soils, - microbial diversity in soils, - soil-landscape evolution.

2. Outcome Type : Change in Knowledge Outcome Measure

2010 2 **2011 :** 2 **2012 :** 2 **2013** 2 **2014 :** 2

3. Associated Institute Type(s)

•1862 Research

4. Associated Knowledge Area(s)

- 101 - Appraisal of Soil Resources
- 102 - Soil, Plant, Water, Nutrient Relationships
- 103 - Management of Saline and Sodic Soils and Salinity
- 136 - Conservation of Biological Diversity

Outcome #20

1. Outcome Target

Action Indicator 1b - Better decision-making, behaviors, and policies (soil management). - Research on carbon and nitrogen cycling will lead to better regional and national nutrient sequestration plans as partial solutions for nutrient contamination and global warming concerns. - Research on microbial diversity will lead to better understandings of changes that occur in soils under different management regimes, of inherent differences in soil microbe diversity, and of the ability of soils to recover from events that affect microbial populations.

2. Outcome Type : Change in Action Outcome Measure

2010 2 **2011 :** 2 **2012 :** 2 **2013** 2 **2014 :** 2

3. Associated Institute Type(s)

•1862 Research

4. Associated Knowledge Area(s)

- 101 - Appraisal of Soil Resources
- 102 - Soil, Plant, Water, Nutrient Relationships
- 103 - Management of Saline and Sodic Soils and Salinity
- 136 - Conservation of Biological Diversity

Outcome #21

1. Outcome Target

Action Indicator 1c - Better decision-making, behaviors, and policies (natural resources and ecosystems). - better conservation practices reduce mortalities and promote population recovery of whales - individuals will modify behaviors and practices so that ecosystem functions and processes can be restored. - Policy makers will develop incentives, rules and regulations that prevent further resource damage or encourage ecosystem restoration - the knowledge about atmospheric carbon and carbon sequestered in oceanic waters will enable more accurate models for the global carbon cycle - ecosystem restoration policy decisions based upon the theoretical understanding of processes affecting aquatic and terrestrial organisms and ecosystem function.

2. Outcome Type : Change in Action Outcome Measure

2010 3 **2011 :** 3 **2012 :** 3 **2013** 3 **2014 :** 3

3. Associated Institute Type(s)

•1862 Research

4. Associated Knowledge Area(s)

- 112 - Watershed Protection and Management
- 121 - Management of Range Resources
- 135 - Aquatic and Terrestrial Wildlife
- 136 - Conservation of Biological Diversity
- 605 - Natural Resource and Environmental Economics

Outcome #22

1. Outcome Target

Action Indicator 1d - Better decision-making, behaviors, and policies (fisheries & seafood). - establish management and conservation/restoration efforts for salmonids, Pacific rockfish, Pacific herring, and shellfish - Better fishery management and ocean policies that are compatible with issues of economics, incentives, communities and ecosystems. - approaches for managing the pink shrimp fishery and the environmental effects of fishing

2. Outcome Type : Change in Action Outcome Measure

2010 2 **2011 :** 2 **2012 :** 2 **2013** 2 **2014 :** 2

3. Associated Institute Type(s)

•1862 Research

4. Associated Knowledge Area(s)

- 112 - Watershed Protection and Management
- 135 - Aquatic and Terrestrial Wildlife
- 136 - Conservation of Biological Diversity
- 605 - Natural Resource and Environmental Economics

Outcome #23

1. Outcome Target

Action Indicator 2b - Improved technologies and practices (seafood and fisheries) - traceability systems for marketing and science research (electronic logbooks). - principles of seafood marketing and trade - fisheries management strategies to encompass detailed knowledge of the dispersal/disease process - Performance of complex microparticle types that provide nutrients to marine larval fish

2. Outcome Type : Change in Action Outcome Measure

2010 2 **2011 :** 2 **2012 :** 2 **2013** 2 **2014 :** 2

3. Associated Institute Type(s)

•1862 Research

4. Associated Knowledge Area(s)

- 135 - Aquatic and Terrestrial Wildlife
- 136 - Conservation of Biological Diversity
- 302 - Nutrient Utilization in Animals
- 311 - Animal Diseases
- 604 - Marketing and Distribution Practices
- 605 - Natural Resource and Environmental Economics
- 712 - Protect Food from Contamination by Pathogenic Microorganisms, Parasites, and Naturally Occurring Toxins

Outcome #24

1. Outcome Target

Action Indicator 2c - Improved technologies and practices (ecosystem services) - Research on fluid flows in soils will allow for better waste material containment facility design. - new ecosystem service industries in Oregon that deliver products or manage plant based systems designed for specific environmental problems. - Improved indicators of environmental health as described in the Oregon State of the Environment report.

2. Outcome Type : Change in Action Outcome Measure

2010 :0	**2011 :** 0	**2012 :** 1	**2013 :**1	**2014 :**0

3. Associated Institute Type(s)

•1862 Research

4. Associated Knowledge Area(s)

- 101 - Appraisal of Soil Resources
- 102 - Soil, Plant, Water, Nutrient Relationships
- 103 - Management of Saline and Sodic Soils and Salinity
- 112 - Watershed Protection and Management

Outcome #25

1. Outcome Target

Environmental Changes 2 - ecosystems - Global warming will be addressed in part by carbon sequestration strategies - Soil microbial health will be maintained or improved - Changes in policies will result in sustainable natural resource use or ecosystems restoration

2. Outcome Type : Change in Condition Outcome Measure

2010 :0	**2011 :** 0	**2012 :** 0	**2013** :0	**2014 :**0

3. Associated Institute Type(s)

•1862 Research

4. Associated Knowledge Area(s)

- 101 - Appraisal of Soil Resources
- 102 - Soil, Plant, Water, Nutrient Relationships
- 103 - Management of Saline and Sodic Soils and Salinity
- 112 - Watershed Protection and Management
- 121 - Management of Range Resources
- 136 - Conservation of Biological Diversity

V(J). Planned Program (External Factors)

1. External Factors which may affect Outcomes

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

Description

US immigration policy affects the ability of students to come to the US for advanced study. The short-term nature of many funding sources and rapidity with which research priorities seem to change does not allow for long-term research or research with longer-term economic benefit.

An assessment of the impacts of policy on land and water use is critically dependent on the policies in place at present and other policies that are to be implemented or are under consideration. Likewise, unexpected legal rulings can suddenly create policy issues that demand analysis and educational programs for the public and policymakers. Unanticipated changes in marine and fishery laws could influence adaptation, as could major changes in market and or resource stock conditions, and changes in the state and coastal economies. Public opinion is also a powerful force in determining both state and federal resource commitments necessary to sustain this program.

Consequently, it is critically important that those implementing this program have the flexibility to react to important new policy initiatives that may become important over the next five years. A critical component for this research program is funding at all levels. Further, in view of the strong reliance for the delivery of this program on competitively obtained grant funds, continuing success and productivity will depend on the success of each subprogram in remaining competitive. This is done by conducting relevant research and by communicating and disseminating the results of that research, so that the new knowledge may be used by other scientists for further research or for the good of society.

V(K). Planned Program (Evaluation Studies and Data Collection)

1. Evaluation Studies Planned

- After Only (post program)
- Case Study
- Comparisons between program participants (individuals,group,organizations) and non-participants
- Retrospective (post program)
- During (during program)
- Before-After (before and after program)
- Comparisons between different groups of individuals or program participants experiencing different levels of program intensity.

Description

Tests

Evaluations of the subprograms of this program occur on a regular basis through the grant-awarding process. Grants are awarded on the basis of past productivity and the relevance and quality of planned experiments.

The second major type of evaluation will be in the form of reports that list productivity of each subprogram (and of the program as a whole) in terms of articles published in journals or other venues, conference communications, patents awarded, etc. and other forms of productivity and recognition generated by activities.

2. Data Collection Methods

- Sampling
- Case Study
- Unstructured
- Observation
- On-Site
- Structured
- Tests

Description

The success of the research and extension programs will be determined using several criteria:

(a) The number of presentations made to policymakers addressing the subjects included in this proposal;

(b) The number of popular press publications authored by the project participants or articles in which work on this project is cited;

(c) The number of refereed journal articles published by project participants;

(d) The number of citations of work published by project participants.

(e) Other indicators that demonstrate ways in which the research efforts have caused policymakers, producers or opinion makers to change behavior or viewpoint in response to this research.

The project participants will track these numbers on an annual basis and provide a summary that will be included in the annual report.

V(A). Planned Program (Summary)

Program #3

1. Name of the Planned Program

P3-Excellence in Food, Nutrition, and Health: creating enhanced foods and food products, nutrition,

2. Brief summary about Planned Program

Future lifestyles will emphasize maintaining health and preventing diseases that now limit human lifespan. As our understanding of the complex relationships between diet and health expands, markets will grow for safe, highly nutritious foods and for functional foods and biopharmaceuticals that have disease prevention and health promotion effects. Our existing strengths in areas such as biotechnology and genomics, agricultural production systems, food processing and food safety, environmental toxicology and agricultural marketing, trade, and economics position the Oregon Agricultural Experiment Station to further understand and develop the agriculture and food system in Oregon and the region. A combination of conventional, organic, and biotechnology-based approaches will provide an array of strategies for sustainable production of nutritionally enhanced crops and food. These agricultural and food products will ensure a range of marketing niches for producers while providing the consumer with robust choices within a safe and secure food system. Research will support producers and marketers in the production of certified organic and health-enhanced foods. Research will also provide analyses of health effects of agricultural and environmental chemicals as well as the use of foods and phytonutrients to maintain well-being. Expanded consumer education about the relationships of food, nutrition, and health will provide U.S. citizens with information for making individual choices among an array of foods and food products.

3. Program existence : New (One year or less)

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
133	Pollution Prevention and Mitigation	5%		5%	
204	Plant Product Quality and Utility (Preharvest)	5%		5%	
306	Environmental Stress in Animals	5%		5%	
308	Improved Animal Products (Before Harvest)	5%		5%	
311	Animal Diseases	5%		5%	
314	Toxic Chemicals, Poisonous Plants, Naturally Occurring Toxins, and Other Hazards Affecting Animals	5%		5%	
501	New and Improved Food Processing Technologies	10%		10%	
502	New and Improved Food Products	10%		10%	
602	Business Management, Finance, and Taxation	5%		5%	
603	Market Economics	5%		5%	
606	International Trade and Development	5%		5%	
607	Consumer Economics	5%		5%	
702	Requirements and Function of Nutrients and Other Food Components	5%		5%	
703	Nutrition Education and Behavior	5%		5%	
711	Ensure Food Products Free of Harmful Chemicals, Including Residues from Agricultural and Other Sources.	5%		5%	

712	Protect Food from Contamination by Pathogenic Microorganisms, Parasites, and Naturally Occurring Toxins	5%		5%	
723	Hazards to Human Health and Safety	5%		5%	
724	Healthy Lifestyle	5%		5%	
	Total	100%		100%	

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

1. Situation and priorities

Future lifestyles will emphasize maintaining health and preventing diseases that now limit human lifespan. Markets will grow for safe, highly nutritious foods and for functional foods and biopharmaceuticals that have disease prevention and health promotion effects such as anti-oxidant, anti-toxic, cancer-inhibiting, and anti-inflammatory properties. Enrichment of fresh fruits with calcium, zinc, vitamin E or other PACs may increase the intake of these nutrients, thereby decreasing the need for nutritional supplements. Knowledge of the chemical constituents, pharmacokinetics, and metabolic pathways will augment and enhance our ability to prevent chronic disease and extend health-span. An understanding of which components are degraded or enhanced during processing will enable delivery of more potent forms of natural foods and food ingredients. Other important health issues in the U.S. include cancer and obesity which result in loss of lives, as well as high health care costs and loss of productivity in the work force.

Dairy, livestock and poultry producers are interested in finding natural products that meet the public's interest in healthy foods and will enhance animal health without having to rely on antibiotics or other pharmaceuticals. There is also interest in obtaining omega-3 fatty acids through animal products.Therefore producers have a need for nutritional strategies and for organic natural products that will enhance animal health and production and still allow the animal products they produce to qualify as natural and/or organic.

Agricultural chemicals are one of many tools used to ensure an abundant food supply. Judicious use of agricultural chemicals demands practical knowledge of their fate and effects in agricultural and natural ecosystems.The vast majority of chemicals that are present in the environment as a consequence of their manufacture, use, or intentional consumption (e.g. food additives) have not been tested for their toxicity or efficacy. There is a profound need develop a new strategy for testing xenobiotics as well as chemicals found in the human environment, and understanding the mechanism of chemical action to find safer use of beneficial chemical supplements. Further, responsible use of soil, air and water resources for the production of food, feed and fiber must be balanced with the need to minimize impacts on human health, and preserve natural ecosystems and the biodiversity they support

Foodborne disease outbreaks traced to seafood consumption and that of fresh fruits and vegetables is of continuing concern in the U.S. Advocated as part of a healthy diet, coupled with a growing consumer preference for minimally handled and processed food, results in a need to develop new and more product-specific technologies designed to curtail microbial contamination and decomposition with these foods.

Value-added processing or further manufacturing and marketing of agricultural-based products offer considerable potential for expansion, economic growth and job creation in the region. but business need information to tackle perceived high risk.

We address USDA/CSREES Strategic Goals 2-6 in this program.

2. Scope of the Program

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

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

1. Assumptions made for the Program

The Oregon agricultural landscape is changing, and the need for differentiating Oregon products through nutrient-enhanced parameters is key to assuring success in the marketplace. There is growing interest in identifying the specific chemoprotective constituents and their mechanisms of action. For example, zinc plays an important role in protecting cellular components from oxidation and damage to DNA and may play an important role in prostate cancer development. There may be other important minerals and foods that provide protection. Concentrates of fruits and vegetables are hoped to be able to act as natural anti-oxidants, prevent the onset of cancer, and inhibit atherosclerosis, heart disease, and arthritis.We assume development of this knowledge will enable citizens and policy makes to make informed decisions and management choices that allow sustainable use of natural resources.

Oregon and other states of the Northwest produce have a particularly diversified agricultural production base with few crops that can be produced efficiently for the commodity market. This situation drives a need for value-added and niche market products to accomplish economic sustainability for agricultural producers and food processors. The development and adaptation of new food technologies requires today broader and deeper knowledge of food properties and accurate estimations of the response of quality attributes in foods to conventional and new non-thermal processes. The Oregon industry alone cannot respond to these demands, as new and improved technologies generate new engineering challenges requiring further research. Advances in these areas may optimally be achieved by OSU researchers working independently and also in collaboration with other research institutions in the U.S., and with the food processing industry.

How Oregon's resources are managed to assure food is available, affordable, safe, and produced in a manner that sustains the health of people and the environment depends, in part, on improved understanding of the potential for adverse impacts of practices employed in agriculture and related industries.

2. Ultimate goal(s) of this Program

The goal of this program is to develop wholesome, secure, high value/ high quality and safe food supply that yield successful and profitable Northwest producers and processing industries.

Long-term objectives within this program include:

- To advance fundamental knowledge about food, nutrition, and health (FST)
- To improve the success and profitability of Northwest food producing, marketing and processing industries through research and education in consumer economics, sensory and consumer preferences, and value-added product development (FIC)
- To demonstrate the benefits of human nutrition and interaction of healthy behavioral choices, including healthy diet and physical activity (HHS)
- To identify food compounds, dietary patterns, and educational strategies that promote healthy lifestyles (hhs)
- To provide strategies to prevent obesity in high risk families to reduce the incidence of obesity in the U.S. and improve weight maintenance. (hhs)
- To inform the public and policy makers about risks and benefits of agricultural and emerging chemical uses. This entails robust analyses of data deriving from research of these investigators and that available from work within the broader scientific community. (EMT)
- To understand the health effects of environmental chemicals a s function of their ability to act as ligands for certain ligand-activated Transcription Factors (EMT)
- To identify, develop, and/or validate trace analytical methods, characterize reaction pathways and transformation rates, and determine impacts for agricultural chemicals and other contaminants, as well as biomarkers. (EMT)
- To enhance human and animal health, well-being, and survivability with the use of nutrition and nutrigenomics and development of organic production (ANS)
- To evaluate mechanisms by which feed supplements are able to contribute to improved fatty acid metabolism or to augment innate and acquired immunity in domestic animals.(ans)

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
2010	1.6	0.0	20.9	0.0
2011	1.2	0.0	18.0	0.0
2012	1.2	0.0	18.0	0.0
2013	1.2	0.0	18.0	0.0
2014	1.0	0.0	18.0	0.0

V(F). Planned Program (Activity)

1. Activity for the Program

This program will result in multiple outputs as a result of the following proposed activities:
•Conducting laboratory, pilot-plant experiments and data collection. •Conducting research experinments •Developing knowledge and new technology of food processing systems. •Developing curricular materials. •Developing quality monitoring protocols •Developing products, curriculum, resources •Developing services •Presenting seminars and professional talks. •Conducting workshops and training sessions. •Publishing scientific findings. •Assessments •Partnering

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

Extension	
Direct Methods	**Indirect Methods**
• Other 2 (presentations) • Workshop • Education Class • Demonstrations • Other 1 (publications) • Group Discussion	• Web sites • Public Service Announcement

3. Description of targeted audience

There are diverse audiences for information this project generates. They can be classified into four general groups: (1) the general public and food consumers; (2) state and federal food regulatory agencies; and (3) the research community including scientists working in government, industry, and academic sectors; and (4) the commercial food processing industry or commodity groups.

V(G). Planned Program (Outputs)

1. Standard output measures

Target for the number of persons(contacts) to be reached through direct and indirect contact methods

	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Year	Target	Target	Target	Target
2010	8975	26700	750	5000
2011	9025	26700	750	5000
2012	9050	26700	750	5000
2013	9020	26700	750	5000
2014	0	0	0	0

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

Expected Patent Applications

2010 :2 **2011 :**0 **2012 :** 1 **2013 :**0 **2014 :**0

3. Expected Peer Review Publications

Year	Research Target	Extension Target	Total
2010	80	0	0
2011	67	0	0
2012	57	0	0
2013	57	0	0
2014	0	0	0

V(H). State Defined Outputs

1. Output Target

- IMPROVED ANIMAL AND PLANT PRODUCTION SYSTEMS Indicator: number of experiments or tests - experiments to reduce percentage of mortality to enhance hatchability in poultry - tests to identify a marker of immunity in livestock

  2010 2 **2011** 2 **2012 :**2 **2013** 2 **2014** 2

- EFFECTS ON AND PROTECTION OF HUMAN HEALTH Indicator 1 ...Numbers of nutrients/minerals - increase health-enhancing nutrients in novel product development - number of mineral supplementation developed to reduce the incidence of cancer

  2010 :1 **2011** 1 **2012 :**1 **2013 :**1 **2014 :**1

- EFFECTS ON AND PROTECTION OF HUMAN HEALTH Indicator 2 ...Obesity intervention strategies or measures - identify strategies (message, pricing, foods) that will increase choosing healthful food choices among adolescents and young adults - Identify key parent-child relationships that contribute to childhood overweight and resiliency in various populations. - identify opportunities for preventive interventions - Identify objective, physiological-based measures for tailoring interventions for specific groups and subgroups. - develop new or improved intervention strategies targeted to childhood overweight in low income families.

  2010 2 **2011** 2 **2012 :**2 **2013** 2 **2014** 2

- EFFECTS ON AND PROTECTION OF HUMAN and ENVIRONMENTAL/ECOLOGICAL HEALTH Indicator 1 ...Agricultural/Environmental chemical analyses - assess risks of toxins - develop analytical methods and biomarkers for agricultural chemicals and other contaminants - evaluate the variation and patterns in the incidence of human pesticide exposures - assess risk factors for the development of various cancers by DNA damage and compromising DNA repair mechanisms. - identify, validate, localize and characterize specific responsive genes, which have the potential to serve as

biomarkers of toxins - develop and evaluate transgenic lines that show changes in reporter gene expression in response to toxicants - refine agrichemical risk assessment for aquatic insects to include life history and behavior - develop, refine, improve quantitative procedures that improve our ability to assess the risks that pest management practices pose to beneficial invertebrates.

2010 :1 **2011** :1 **2012** :1 **2013** :1 **2014** :1

- ECONOMIC AND MARKETING MODELS AND ANALYSES THAT INFORM DECISION-MAKERS, INDUSTRY, AND PEERS Indicator 1 - market analyses - provide food industry with better understanding of market conditions and marketing strategies - develop demand and firm strategies (FIC) - analyze food consumption and import demand in the Pacific Rim and other international markets

2010 :1 **2011** :1 **2012** :1 **2013** :1 **2014** :1

- ECONOMIC AND MARKETING MODELS AND ANALYSES THAT INFORM DECISION-MAKERS, INDUSTRY, AND PEERS Indicator 2 - consumer studies - establish survey tool and data to describe current consumer buying and consumption habits - determine relationship of lifestyle to taste and consumer acceptance. - evaluate integrated research and extension activities between food scientists and business strategists

2010 :1 **2011** :1 **2012** :1 **2013** :1 **2014** :1

- TECHNOLOGY, MODELS AND ANALYSES THAT INFORM DECISION-MAKERS, INDUSTRY, AND PEERS REGARDING FOOD PRODUCTS Indicator 1 - food quality attributes - determine quality attributes of Northwest fruits, vegetables, cereals, seafood, and beverages

2010 :2 **2011** :2 **2012** :2 **2013** :2 **2014** :2

- TECHNOLOGY, MODELS AND ANALYSES THAT INFORM DECISION-MAKERS, INDUSTRY, AND PEERS REGARDING FOOD PRODUCTS Indicator 2 - value added products - develop value-added products through a systematic product development strategy

2010 :2 **2011** :2 **2012** :2 **2013** :2 **2014** :2

- TECHNOLOGY, MODELS AND ANALYSES THAT INFORM DECISION-MAKERS, INDUSTRY, AND PEERS REGARDING FOOD PRODUCTS Indicator 3 - food technology - determine best use of innovative or emerging processing methods, e.g., high pressure processing, laser technology, and radio frequency identification tags.

2010 :2 **2011** :2 **2012** :2 **2013** :2 **2014** :2

- OTHER SCHOLARLY EXCELLENCE: participation on professional boards and panels, as well as science panels, awards, etc.

2010 :10 **2011** :10 **2012** :10 **2013** :10 **2014** :10

V(I). State Defined Outcome

O. No	Outcome Name
1	Knowledge Indicator 1a - Understanding Human Health and Nutrition (nutritional behaviors) * Understand the relationship between farm subsidy program and increasing obesity rates in the United States * Identify new or improved obesity intervention strategies in the community setting * Identify objective, physiological-based measures that correspond to target behaviors (bio-behavioral markers) for use later as measures of intervention progress and success or means for tailoring effective interventions * Identify key parent-child relationships that reflect resiliency and the interaction of these relationships with targeted nutritional behaviors * Understand various inputs and interactions of family and child, SES, nutrition, physiology and behavior * Identify strategies (message, pricing, foods) that will increase choosing healthful food choices among adolescents and young adults
2	Knowledge Indicator 2a - Characterize and model toxins arising from food production and processing (analytical methods and tools) * New analytical methods and biomarkers to cost-effectively identify and track agricultural chemicals and other contaminants through time and space * Develop transgenic lines of zebrafish for response to toxicants * Identify agents, mechanisms of action, and dose response for reducing fetal risk from toxic chemicals * Model system to evaluate dioxin toxicity to humans and characterize specific responsive genes to toxicants
3	Knowledge Indicator 3 - Methods to improve Animal Health production systems - improve maternal diet through understanding of fundamental relationships between maternal diet, fatty acid metabolism and egg hatchability - develop technological strategy to enhance the efficacy of vaccination programs in livestock - develop a diagnostic method to assess immune health of livestock
4	Knowledge Indicator 4... Improved knowledge of consumer and market conditions and factors that affect business survival - Improved understanding of market conditions and knowledge to determine business choices. - Development of a process map for food business development and planning. - Training of nascent and existing food entrepreneurs in food business management. - Expanded knowledge base of factors important to distinguish different types of consumers and their food choices - Develop an understanding of motivations for food choice and strategies to impact them
5	Action Indicator 1. Improved nutrition - More schools offer/encourage healthful foods - More effective programs and student experiences related to healthful foods - Markers and strategies become the standards of methods and measurement of childhood overweight and resiliency. - Policies consider health and financial implications of the farm subsidy program.
6	Action Indicator - 2. Percentage health risks reduced - Markers for oxidative stress and DNA integrity lead to novel approaches for identifying biomarkers of zinc deficiency in humans. - Zinc supplementation will be an effective strategy in limiting the incidence of prostate cancer - Effective dietary intervention strategies are broadly applied to reduce obesity - Modulate maternal diet to reduce the risk to the fetus from toxic chemicals
7	Action Indicator - 3. Improved food handling and regulations - Individuals and industry modify food production and handling practices. - Intervention strategies reduce bacterial contamination, increase shelf life, and reduce occurrences of food-borne illnesses.
8	Action Indicator - 4. Improved animal husbandry - Poultry industry changes feed formulations to reduce embryonic mortality during incubation (thereby enhancing hatchability) and to improve animal health and to produce health-enhancing nutrients (thus developing value-added poultry foods). - Livestock producers use diagnostic methods and new vaccination programs to increase immunity (innate and acquired) in domestic animals
9	Action Indicator - 5. Improved competitiveness of Pacific Northwest food businesses. - New and existing businesses expand markets based on new understanding about market factors - Increased business activity and success in the Northwest food industries. - More successful starts by food businesses
10	Action Indicator - 6. Informed policy-making and management - Policy makers will develop food processing regulations that prevent incidences of food-borne illnesses. - Improved decision-making/policy on regulation of PAH in aquatic ecosystems. - Public health recommendations reduce the burden of prostate cancer.
11	Action Indicator - 7. Protection of natural environment from agricultural chemicals - Reduce the fate of agricultural chemicals in remote aquatic ecosystems - Improve policies or regulation of pesticides

12	Change Indicator - Economic: - Application of knowledge and new leading-edge food technologies will result in improved food quality, value and safety with positive impacts on value-added food production, processing, handling, and distribution systems. - Sustainable competitive advantage for Northwest food industries that are able to accurately gage consumer demand for their products. - Improve the food economy by developing new, stronger, and growing food businesses in the state. - Help reduce the state's unemployment through the creation of jobs in these food companies. - Hatchability and value-added poultry foods will bring increased economic returns to the US poultry industry.
13	Change Indicator - Societal: - Better human and animal health, well-being, and survivability result with the use of nutrition and nutrigenomics and organic production. - Reduce health care costs associated with prostate cancer and improve the quality of life of thousands of American men . - Control the growth in the rate of obesity and osteoporosis among youth and solutions reverse trends in childhood obesity - Build environmental public health capacity - Mitigate how federal expenditures related to the farm subsidy program are linked to Medicaid expenditures for obesity related health conditions.
14	Change Indicator - Environmental (risk assessment, policies and management of exposure): - Enhanced environmental quality within an economically responsible context. - Reduced exposure of human and aquatic organisms to fluorochemicals - Moderate the relative contribution of regional U.S. and Canadian agricultural sources (both current and historic uses of these chemicals) and long-range or global sources in contributing to the deposition of agricultural chemicals to remote ecosystems in the Western U.S. - Minimize the risk of adverse impact of pesticide use on human health.
15	Knowledge Indicator 1b - Understanding Human Health and Nutrition (nutrition) * Identify new risk factors in prostate cancer and offer novel dietary modifications to reduce the incidence of prostate cancer * Knowledge of the mechanisms behind the health benefits of fruits and vegetables.
16	Knowledge Indicator 2 b- Characterize and model toxins arising from food production and processing (effects and extent) * Evaluate effects of aging on bioavailability of agricultural contaminants * Determine ways to evaluate extent that landfills are a significant source of fluorochemicals and the extent to which they are present in crops intended for human consumption
17	Knowledge Indicator 2 c- Characterize and model toxins arising from food production and processing (mechanisms) * Examine mechanisms that underlie the immune suppression * Identify role of human AhR polymorphisms and role of Arnt in mediating and relieving dioxin toxicity
18	Knowledge Indicator 2d - Characterize and model toxins arising from food production and processing (education) * Provide technical training and resources to agricultural and regulatory stakeholders on ecotoxicology of pesticides and integrated pest, nutrient, and water management.

Outcome #1

1. Outcome Target

Knowledge Indicator 1a - Understanding Human Health and Nutrition (nutritional behaviors) * Understand the relationship between farm subsidy program and increasing obesity rates in the United States * Identify new or improved obesity intervention strategies in the community setting * Identify objective, physiological-based measures that correspond to target behaviors (bio-behavioral markers) for use later as measures of intervention progress and success or means for tailoring effective interventions * Identify key parent-child relationships that reflect resiliency and the interaction of these relationships with targeted nutritional behaviors * Understand various inputs and interactions of family and child, SES, nutrition, physiology and behavior * Identify strategies (message, pricing, foods) that will increase choosing healthful food choices among adolescents and young adults

2. Outcome Type : Change in Knowledge Outcome Measure

2010 2 **2011 :** 2 **2012 :** 2 **2013** 2 **2014 :** 2

3. Associated Institute Type(s)

•1862 Research

4. Associated Knowledge Area(s)

- 502 - New and Improved Food Products
- 703 - Nutrition Education and Behavior
- 723 - Hazards to Human Health and Safety
- 724 - Healthy Lifestyle

Outcome #2

1. Outcome Target

Knowledge Indicator 2a - Characterize and model toxins arising from food production and processing (analytical methods and tools) * New analytical methods and biomarkers to cost-effectively identify and track agricultural chemicals and other contaminants through time and space * Develop transgenic lines of zebrafish for response to toxicants * Identify agents, mechanisms of action, and dose response for reducing fetal risk from toxic chemicals * Model system to evaluate dioxin toxicity to humans and characterize specific responsive genes to toxicants

2. Outcome Type : Change in Knowledge Outcome Measure

2010 3 **2011 :** 3 **2012 :** 3 **2013** 3 **2014 :** 3

3. Associated Institute Type(s)

•1862 Research

4. Associated Knowledge Area(s)

- 133 - Pollution Prevention and Mitigation
- 314 - Toxic Chemicals, Poisonous Plants, Naturally Occurring Toxins, and Other Hazards Affecting Animals
- 711 - Ensure Food Products Free of Harmful Chemicals, Including Residues from Agricultural and Other Sources.
- 723 - Hazards to Human Health and Safety

Outcome #3

1. Outcome Target

Knowledge Indicator 3 - Methods to improve Animal Health production systems - improve maternal diet through understanding of fundamental relationships between maternal diet, fatty acid metabolism and egg hatchability - develop technological strategy to enhance the efficacy of vaccination programs in livestock - develop a diagnostic method to assess immune health of livestock

2. Outcome Type : Change in Knowledge Outcome Measure

2010 :2	2011 : 1	2012 : 2	2013 :2	2014 : 1

3. Associated Institute Type(s)

•1862 Research

4. Associated Knowledge Area(s)

- 308 - Improved Animal Products (Before Harvest)
- 311 - Animal Diseases

Outcome #4

1. Outcome Target

Knowledge Indicator 4... Improved knowledge of consumer and market conditions and factors that affect business survival - Improved understanding of market conditions and knowledge to determine business choices. - Development of a process map for food business development and planning. - Training of nascent and existing food entrepreneurs in food business management. - Expanded knowledge base of factors important to distinguish different types of consumers and their food choices - Develop an understanding of motivations for food choice and strategies to impact them

2. Outcome Type : Change in Knowledge Outcome Measure

2010 :3	2011 : 3	2012 : 3	2013 :3	2014 : 0

3. Associated Institute Type(s)

•1862 Research

4. Associated Knowledge Area(s)

- 204 - Plant Product Quality and Utility (Preharvest)
- 502 - New and Improved Food Products
- 602 - Business Management, Finance, and Taxation
- 603 - Market Economics
- 606 - International Trade and Development
- 607 - Consumer Economics
- 703 - Nutrition Education and Behavior
- 724 - Healthy Lifestyle

Outcome #5

1. Outcome Target

Action Indicator 1. Improved nutrition - More schools offer/encourage healthful foods - More effective programs and student experiences related to healthful foods - Markers and strategies become the standards of methods and measurement of childhood overweight and resiliency. - Policies consider health and financial implications of the farm subsidy program.

2. Outcome Type : Change in Action Outcome Measure

2010 :1	2011 : 1	2012 : 1	2013 :1	2014 : 1

3. Associated Institute Type(s)

•1862 Research

4. Associated Knowledge Area(s)

- 703 - Nutrition Education and Behavior
- 724 - Healthy Lifestyle

Outcome #6

1. Outcome Target

Action Indicator - 2. Percentage health risks reduced - Markers for oxidative stress and DNA integrity lead to novel approaches for identifying biomarkers of zinc deficiency in humans. - Zinc supplementation will be an effective strategy in limiting the incidence of prostate cancer - Effective dietary intervention strategies are broadly applied to reduce obesity - Modulate maternal diet to reduce the risk to the fetus from toxic chemicals

2. Outcome Type : Change in Action Outcome Measure

2010 :3	**2011 :** 3	**2012 :** 3	**2013** :3	**2014 :**0

3. Associated Institute Type(s)

•1862 Research

4. Associated Knowledge Area(s)

- 702 - Requirements and Function of Nutrients and Other Food Components
- 703 - Nutrition Education and Behavior
- 723 - Hazards to Human Health and Safety
- 724 - Healthy Lifestyle

Outcome #7

1. Outcome Target

Action Indicator - 3. Improved food handling and regulations - Individuals and industry modify food production and handling practices. - Intervention strategies reduce bacterial contamination, increase shelf life, and reduce occurrences of food-borne illnesses.

2. Outcome Type : Change in Action Outcome Measure

2010 :1	**2011 :** 0	**2012 :** 0	**2013** :1	**2014 :**0

3. Associated Institute Type(s)

•1862 Research

4. Associated Knowledge Area(s)

- 204 - Plant Product Quality and Utility (Preharvest)
- 314 - Toxic Chemicals, Poisonous Plants, Naturally Occurring Toxins, and Other Hazards Affecting Animals
- 501 - New and Improved Food Processing Technologies
- 702 - Requirements and Function of Nutrients and Other Food Components
- 703 - Nutrition Education and Behavior
- 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
- 724 - Healthy Lifestyle

Outcome #8

1. Outcome Target

Action Indicator - 4. Improved animal husbandry - Poultry industry changes feed formulations to reduce embryonic mortality during incubation (thereby enhancing hatchability) and to improve animal health and to produce health-enhancing nutrients (thus developing value-added poultry foods). - Livestock producers use diagnostic methods and new vaccination programs to increase immunity (innate and acquired) in domestic animals

2. Outcome Type : Change in Action Outcome Measure

2010 :	2011 :	2012 :	2013 :	2014 :
1	0	0	1	0

3. Associated Institute Type(s)

•1862 Research

4. Associated Knowledge Area(s)

- 306 - Environmental Stress in Animals
- 308 - Improved Animal Products (Before Harvest)
- 311 - Animal Diseases

Outcome #9

1. Outcome Target

Action Indicator - 5. Improved competitiveness of Pacific Northwest food businesses. - New and existing businesses expand markets based on new understanding about market factors - Increased business activity and success in the Northwest food industries. - More successful starts by food businesses

2. Outcome Type : Change in Action Outcome Measure

2010 :	2011 :	2012 :	2013 :	2014 :
2	0	2	0	0

3. Associated Institute Type(s)

•1862 Research

4. Associated Knowledge Area(s)

- 602 - Business Management, Finance, and Taxation
- 603 - Market Economics
- 606 - International Trade and Development
- 607 - Consumer Economics

Outcome #10

1. Outcome Target

Action Indicator - 6. Informed policy-making and management - Policy makers will develop food processing regulations that prevent incidences of food-borne illnesses. - Improved decision-making/policy on regulation of PAH in aquatic ecosystems. - Public health recommendations reduce the burden of prostate cancer.

2. Outcome Type : Change in Action Outcome Measure

2010 :	2011 :	2012 :	2013 :	2014 :
1	0	1	0	0

3. Associated Institute Type(s)

•1862 Research

4. Associated Knowledge Area(s)

- 133 - Pollution Prevention and Mitigation
- 314 - Toxic Chemicals, Poisonous Plants, Naturally Occurring Toxins, and Other Hazards Affecting Animals
- 711 - Ensure Food Products Free of Harmful Chemicals, Including Residues from Agricultural and Other Sources.
- 712 - Protect Food from Contamination by Pathogenic Microorganisms, Parasites, and Naturally Occurring Toxins
- 723 - Hazards to Human Health and Safety

Outcome #11

1. Outcome Target

Action Indicator - 7. Protection of natural environment from agricultural chemicals - Reduce the fate of agricultural chemicals in remote aquatic ecosystems - Improve policies or regulation of pesticides

2. Outcome Type : Change in Action Outcome Measure

2010 0 **2011 :** 1 **2012 :** 0 **2013** 0 **2014 :** 0

3. Associated Institute Type(s)

•1862 Research

4. Associated Knowledge Area(s)

- 133 - Pollution Prevention and Mitigation
- 306 - Environmental Stress in Animals
- 314 - Toxic Chemicals, Poisonous Plants, Naturally Occurring Toxins, and Other Hazards Affecting Animals
- 711 - Ensure Food Products Free of Harmful Chemicals, Including Residues from Agricultural and Other Sources.
- 712 - Protect Food from Contamination by Pathogenic Microorganisms, Parasites, and Naturally Occurring Toxins
- 723 - Hazards to Human Health and Safety

Outcome #12

1. Outcome Target

Change Indicator - Economic: - Application of knowledge and new leading-edge food technologies will result in improved food quality, value and safety with positive impacts on value-added food production, processing, handling, and distribution systems. - Sustainable competitive advantage for Northwest food industries that are able to accurately gage consumer demand for their products. - Improve the food economy by developing new, stronger, and growing food businesses in the state. - Help reduce the state's unemployment through the creation of jobs in these food companies. - Hatchability and value-added poultry foods will bring increased economic returns to the US poultry industry.

2. Outcome Type : Change in Condition Outcome Measure

2010 0 **2011 :** 0 **2012 :** 0 **2013** 0 **2014 :** 0

3. Associated Institute Type(s)

•1862 Research

4. Associated Knowledge Area(s)

- 501 - New and Improved Food Processing Technologies
- 502 - New and Improved Food Products
- 602 - Business Management, Finance, and Taxation
- 603 - Market Economics
- 606 - International Trade and Development
- 607 - Consumer Economics

Outcome #13

1. Outcome Target

Change Indicator - Societal: - Better human and animal health, well-being, and survivability result with the use of nutrition and nutrigenomics and organic production. - Reduce health care costs associated with prostate cancer and improve the quality of life of thousands of American men . - Control the growth in the rate of obesity and osteoporosis among youth and solutions reverse trends in childhood obesity - Build environmental public health capacity - Mitigate how federal expenditures related to the farm subsidy program are linked to Medicaid expenditures for obesity related health conditions.

2. Outcome Type : Change in Condition Outcome Measure

2010 :0 **2011 :** 0 **2012 :** 0 **2013 :**0 **2014 :**0

3. Associated Institute Type(s)

•1862 Research

4. Associated Knowledge Area(s)

- 204 - Plant Product Quality and Utility (Preharvest)
- 314 - Toxic Chemicals, Poisonous Plants, Naturally Occurring Toxins, and Other Hazards Affecting Animals
- 502 - New and Improved Food Products
- 702 - Requirements and Function of Nutrients and Other Food Components
- 703 - Nutrition Education and Behavior
- 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
- 724 - Healthy Lifestyle

Outcome #14

1. Outcome Target

Change Indicator - Environmental (risk assessment, policies and management of exposure): - Enhanced environmental quality within an economically responsible context. - Reduced exposure of human and aquatic organisms to fluorochemicals - Moderate the relative contribution of regional U.S. and Canadian agricultural sources (both current and historic uses of these chemicals) and long-range or global sources in contributing to the deposition of agricultural chemicals to remote ecosystems in the Western U.S. - Minimize the risk of adverse impact of pesticide use on human health.

2. Outcome Type : Change in Condition Outcome Measure

2010 :0 **2011 :** 0 **2012 :** 0 **2013 :**0 **2014 :**0

3. Associated Institute Type(s)

•1862 Research

4. Associated Knowledge Area(s)

- 133 - Pollution Prevention and Mitigation
- 306 - Environmental Stress in Animals
- 314 - Toxic Chemicals, Poisonous Plants, Naturally Occurring Toxins, and Other Hazards Affecting Animals
- 711 - Ensure Food Products Free of Harmful Chemicals, Including Residues from Agricultural and Other Sources.
- 712 - Protect Food from Contamination by Pathogenic Microorganisms, Parasites, and Naturally Occurring Toxins
- 723 - Hazards to Human Health and Safety

Outcome #15

1. Outcome Target

Knowledge Indicator 1b - Understanding Human Health and Nutrition (nutrition) * Identify new risk factors in prostate cancer and offer novel dietary modifications to reduce the incidence of prostate cancer * Knowledge of the mechanisms behind the health benefits of fruits and vegetables.

2. Outcome Type : Change in Knowledge Outcome Measure

2010 :	2011 :	2012 :	2013 :	2014 :
1	1	1	1	1

3. Associated Institute Type(s)

•1862 Research

4. Associated Knowledge Area(s)

- 702 - Requirements and Function of Nutrients and Other Food Components
- 703 - Nutrition Education and Behavior
- 723 - Hazards to Human Health and Safety
- 724 - Healthy Lifestyle

Outcome #16

1. Outcome Target

Knowledge Indicator 2 b- Characterize and model toxins arising from food production and processing (effects and extent) * Evaluate effects of aging on bioavailability of agricultural contaminants * Determine ways to evaluate extent that landfills are a significant source of fluorochemicals and the extent to which they are present in crops intended for human consumption

2. Outcome Type : Change in Knowledge Outcome Measure

2010 :	2011 :	2012 :	2013 :	2014 :
1	1	1	1	1

3. Associated Institute Type(s)

•1862 Research

4. Associated Knowledge Area(s)

- 314 - Toxic Chemicals, Poisonous Plants, Naturally Occurring Toxins, and Other Hazards Affecting Animals
- 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
- 724 - Healthy Lifestyle

Outcome #17

1. Outcome Target

Knowledge Indicator 2 c- Characterize and model toxins arising from food production and processing (mechanisms) * Examine mechanisms that underlie the immune suppression * Identify role of human AhR polymorphisms and role of Arnt in mediating and relieving dioxin toxicity

2. Outcome Type : Change in Knowledge Outcome Measure

2010 :	2011 :	2012 :	2013 :	2014 :
0	0	1	0	0

3. Associated Institute Type(s)

•1862 Research

4. Associated Knowledge Area(s)

- 501 - New and Improved Food Processing Technologies
- 711 - Ensure Food Products Free of Harmful Chemicals, Including Residues from Agricultural and Other Sources.
- 712 - Protect Food from Contamination by Pathogenic Microorganisms, Parasites, and Naturally Occurring Toxins
- 723 - Hazards to Human Health and Safety

Outcome #18

1. Outcome Target

Knowledge Indicator 2d - Characterize and model toxins arising from food production and processing (education) * Provide technical training and resources to agricultural and regulatory stakeholders on ecotoxicology of pesticides and integrated pest, nutrient, and water management.

2. Outcome Type : Change in Knowledge Outcome Measure

2010 : 0	2011 : 0	2012 : 0	2013 : 1	2014 : 0

3. Associated Institute Type(s)

•1862 Research

4. Associated Knowledge Area(s)

- 703 - Nutrition Education and Behavior
- 724 - Healthy Lifestyle

V(J). Planned Program (External Factors)

1. External Factors which may affect Outcomes

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

Description

This program focuses in part on increasing understanding and knowledge of food product development, that is, food processing technologies (edible coatings, vacuum infusion and high pressure processing), microbial detection methods for research/food production, food chemistry, and sensory quality.Multiple external factors inform decisions regarding priorities for research and extension activities. Recent food recall incidents, media exposure, or current "hot topics" can drive the food research agenda. Agricultural commodity groups, state natural resource agencies, the major food processing industry, and consumer interest groups influence allocation of state and federal funds through the legislative process. They also sponsor research directly.

This program also focuses on increasing understanding about transfer, fate, and effects of environmental contaminants, especially those transmitted through the production of food. Our efforts look at food quality and safety, water quality, and sustainability of ecosystem structure and organization that provides society beneficial uses.

Multiple external factors inform decisions regarding priorities for research and extension activities. Agricultural commodity groups, state natural resource agencies, Native American Tribes, and environmental interest groups influence allocation of state funds through the legislative process. They also sponsor research directly.

Scientific peer review panels are especially important in directing federal support for research and extension. Public opinion is also a powerful force in determining both state and federal resource commitments necessary to sustain this program.

V(K). Planned Program (Evaluation Studies and Data Collection)

1. Evaluation Studies Planned

- Retrospective (post program)
- During (during program)

Description

Most evaluation will be retrospective. Efforts will be evaluated based on the stated objectives, and the entire programmatic

project will undergo periodic evaluation.The evaluation process will assess project planning, project implementation and project outcomes.Publications, survey to assess adoption and Oregon Ag Invests will be utilized in evaluation. Numbers of manuscripts and theses will be tabulated for the Program. Reactions of peer review panels to grant applications is another means for evaluation of research initiatives. Faculty departments record each submission and our accounting system tracks awards. Reviews of total intramural and extramural funding occurs on a semi-annual basis. Data collection will occur as appropriate in accordance with the expected outcomes.

2. Data Collection Methods

- On-Site
- Unstructured
- Sampling
- Structured
- Tests
- Observation

Description
{NO DATA ENTERED}

V(A). Planned Program (Summary)

Program #4

1. Name of the Planned Program

P4-Excellence in Water and Watersheds: Advance understanding and effective management of water, wate

2. Brief summary about Planned Program

Water resources in Oregon are over-subscribed and face competing demands from urban, industrial, agricultural, hydroelectric, environmental and First Nation users.A large portion of the state's water and energy (Stroh 2005) resources are devoted to agriculture.At the same time, Oregonians have always prided themselves on the quality of life, in particular the natural beauty, afforded by this state.In some regions, groundwater resources are closed to further exploitation.Endangered species issues, including salmon and sucker fish (Lackey et al. 2006), involve available flow quantities, stream temperatures, toxin levels, and the magnitude and quality of stream habitat.Water resources in the state are typically allocated on an either/or basis, e.g. water can be used either for irrigation or hydroelectric power generation, water can be used either for maintenance of downstream habitat or for irrigation, All aspects of society are affected by the distribution and allocation of water resources (Pimentel et al. 1997).The urban centers and relatively plentiful rainfall areas west of the Cascade Mountains offers a distinct contrast with the sparsely populated, arid regions east of the Cascades.In Oregon, in contrast with more highly urbanized and industrialized parts of the country, the society appears to take a greater interest in and have a better understanding of natural resource issues.

Water scarcity, or completing uses for finite water resources, will only increase in the future. Given the uncertainty associated with changing availability of water resources (IPCC 2007), critical questions remain regarding the effects of water scarcity and hazards on people and the environment of Oregon and our ability to limit and mitigate those effects.The program goal is to identify the major resource constraint issues and to provide water resource management decision-makers with the best scientific information available for addressing the allocation, management and engineering of soil and water resources. The integrated program encompasses natural ecosystems at the watershed or stream scale, as well as quantifying anthropogenic impacts related to site contamination or water use for irrigation and their effects on the natural ecosystem. Research will focus on two activity areas:1) Improved agricultural water management and 2) Watershed enhancement and sustainability.

3. Program existence : New (One year or less)

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
101	Appraisal of Soil Resources	10%		10%	
102	Soil, Plant, Water, Nutrient Relationships	10%		10%	
111	Conservation and Efficient Use of Water	10%		10%	
112	Watershed Protection and Management	10%		10%	
132	Weather and Climate	10%		10%	
133	Pollution Prevention and Mitigation	10%		10%	
403	Waste Disposal, Recycling, and Reuse	10%		10%	
404	Instrumentation and Control Systems	10%		10%	
405	Drainage and Irrigation Systems and Facilities	10%		10%	
902	Administration of Projects and Programs	10%		10%	
	Total	100%		100%	

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

1. Situation and priorities

The quantity, quality, and distribution of fresh water are major determinants of land productivity, and influence the quality of the environment, the economy, and virtually every human activity on Earth. Competition for diverse uses of water is increasingly severe, especially in areas with limited quantities of clean water such as the intermountain West or in communities along the Oregon coast. Water resources in Oregon are over-subscribed and face competing demands from urban, industrial, agricultural, hydroelectric, environmental, and First Nation users. Water resources in the state are typically allocated on an either/or basis, e.g. water can be used either for irrigation or hydroelectric power generation.In some regions, groundwater resources are closed to further exploitation. Endangered species issues, including salmon and sucker fish, involve available flow quantities, stream temperatures, toxin levels, and the magnitude and quality of stream habitat.

Water scarcity, or completing uses for finite water resources, will only increase in the future. Given the uncertainty associated with changing availability of water resources, critical questions remain regarding the effects of water scarcity and hazards on people and the environment of Oregon and our ability to limit and mitigate those effects. This program must identify the major resource constraint issues and provide water resource management decision-makers with the best scientific

information available for addressing the allocation, management and engineering of soil and water resources.

Watershed, river basin scale resource simulation models, continuous data streams on temperature and soil water distribution, as well as decision tools are needed to integrate natural ecosystems at the watershed or river scale, as well as quantify and mitigate anthropogenic impacts related to site contamination or water use for irrigation and their effects on the natural ecosystem. The lack of continuous data on the spatial structure of soil water distribution is recognized as a key impediment to advancement of hydrologic science. How do local processes scale up to landscape behaviors, how do hydrologic and biological processes interact, and how will global climate change effect water resources? Important research needs include landscape subsurface hydrology and snow accumulation and ablation.

Evapotranspiration is a major component of the water cycle and is critical in irrigation water requirements, water rights management, hydrological studies and construction of water budgets used in managing water resources, both for agricultural and non-agricultural areas. Knowing the probability of annual crop water demand and the difference in water demand for different crops makes it possible for growers to plan crop rotations, change cropping patterns and adopt new crops ensuring that crop water demand will be met. This will allow water conservation and optimization of crop production.

This program addresses Goals 6 and 2 of the FY2007-2012 USDA CSREES Strategic Plan, particularly Objectives 6.1 (clean, abundant water), and Objective 2.2 (increase efficiency of agricultural production).

2. Scope of the Program

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

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

1. Assumptions made for the Program

The program assumes that water resource issues will become even more important to society and that water scarcity, or completing uses for finite water resources, will only increase in the future. Watershed enhancement and sustainability affect river restoration and management. The intersecting uses and water interfaces require a wide range of interrelated research and technological approaches within this program. There remains a need to identify the major resource constraint issues and develop models and decision-making tools for all levels of governance. Oregon society takes a great interest in and participate in natural resource issues.

2. Ultimate goal(s) of this Program

The program goal is to provide water resource management decision-makers with the best scientific and technical information available for addressing the allocation, management and engineering of water resources. The programmatic goal can be addressed through the following two research areas: 1) Improved agricultural water management and 2) Watershed enhancement and sustainability.

Area 1 - Improved agricultural water management

Objectives:

•Develop instrumentation and apply instrumentation systems to monitoring soil moisture content and soil hydraulic properties from scales of 1-10,000 m – Selker and Cuenca •Evaluate evapotranspiration estimating methods for application in state-wide water resource management – Cuenca •Investigate aquifer recharge project design to enhance stream habitat and increase available water resources for consumptive use – Selker and Cuenca

Area 2 - Watershed enhancement and sustainability

Objectives:

•Investigate biotic-abiotic interactions and responses to disturbance in aquatic environments under natural and anthropogenitically-influenced conditions– Tullos •Develop watershed scale and river basin scale water resource simulation models and decision tools examining coupled natural and human systems and trajectories of change under alternative future scenarios – Bolte and Cuenca

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
2010	0.1	0.0	0.2	0.0
2011	0.5	0.0	2.0	0.0
2012	0.5	0.0	2.0	0.0
2013	0.5	0.0	2.0	0.0
2014	0.5	0.0	2.0	0.0

V(F). Planned Program (Activity)

1. Activity for the Program

Research is often carried out at field sites which are related to a specific project. Field sites with short- and long-term instrument deployment are located in all four corners of Oregon, as well as Washington State, Kansas and Canada.

We will develop and use novel soil-water instrumentation. Passive measurement of spatially distributed soil temperature can allow for estimation of the energy consumption of evapotranspiration and soil water flux. Beyond passive reporting of temperature, the use of actively heated fiber optics for the observation of subsurface water movement and water content via a heat pulse offer new research opportunities. Continuous temporal and spatial measurement at various scales will be validated and incorporated into new models and measurement tools. Improved spatial statistics is an aspect affecting remote sensing experiments and measurements, particularly related to soil moisture.

We will update and expand the reference evapotranspiration data currently available for Oregon. We expect to develop references for short and tall crops, disease and weed free, shaded and not short of water scenarios. We will compare estimates to recently available data form AGRIMET stations to validate estimating methods. We will consolidate meteorological data and develop a database in support of this effort. Information will be used to update Extension publications (both hard copy and online) to allow better information accessibility and wider range of applications. The effort is also applicable for long term agricultural and water resources planning.

Technological advances have made possible the development of a hydrologic model capable of simulating the interactions and processes between surface water and groundwater. Results of model simulation will help in the decision making process by producing a water budget analysis and an easy visualization of several management scenarios, e.g., no surface recharge from the irrigation canals.

Field observations of physical and biological processes and functions, benthic macroinvertebrate community, numerical and statistical models play critical roles in understanding the driving principles of watershed and river ecosystems and linkages. In addition, the use of laboratory flumes for simulating sediment and channel changes are a "safe" and controlled way to experiment with or predict outcomes of river management activities.

Watershed and river basin scale resource simulation models and decision tools will be used to examine coupled natural and human systems and trajectories of change under alternative future scenarios.

- Conduct Research Experiments.

- Construct Research Facilities.
- Monitor and evaluate

- Conduct Workshops, meetings.

- Deliver Services.

- Develop Products, Curriculum, Resources.

- Provide Training.

- Assessments.

- Partnering.

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

Extension	
Direct Methods	**Indirect Methods**
• Other 2 (seminars) • Workshop • Group Discussion • Other 1 (journals) • Demonstrations • Education Class	• Newsletters • Web sites

3. Description of targeted audience

The audience includes typical citizens in urban settings through extension outreach, those responsible for agricultural production through extension outreach and workshops, the engineering profession through publication of results in professional journals, and undergraduate and graduate students through presentation of project descriptions and results in a classroom setting.

V(G). Planned Program (Outputs)

1. Standard output measures

Target for the number of persons(contacts) to be reached through direct and indirect contact methods

	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Year	Target	Target	Target	Target
2010	200	300	50	100
2011	200	300	50	100
2012	200	300	50	100
2013	200	300	50	100
2014	0	0	0	0

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

Expected Patent Applications

2010 : 2 **2011 :** 0 **2012 :** 0 **2013 :** 0 **2014 :** 0

3. Expected Peer Review Publications

Year	Research Target	Extension Target	Total
2010	2	0	0
2011	2	0	0
2012	2	0	0
2013	2	0	0
2014	0	0	0

V(H). State Defined Outputs

1. Output Target

- EFFECTS ON AND PROTECTION OF ENVIRONMENTAL HEALTH AND ECOLOGY: Indicator Type 1...Document natural processes and responses to anthropogenitically-influenced conditions: a) Understand feedbacks between plants, soil hydraulic processes and atmospheric boundary layer development - Selker b) Evaluate dynamics and variability in fish and benthic macroinvertebrate communities - Tullos c) Investigate biotic-abiotic interactions and responses to disturbance in aquatic environments, both historically and in response to events or management - Tullos

  2010 1 **2011** 2 **2012** 1 **2013** 0 **2014** 0

- EFFECTS ON AND PROTECTION OF ENVIRONMENTAL HEALTH AND ECOLOGY: Indicator - Type 2...Develop instrumentation and apply instrumentation systems (monitor, survey, collect data) to test hypotheses and events: a) Monitor soil moisture content and soil hydraulic properties at various scales related to 1) landscape subsurface hydrology 2) snow accumulation and ablation 3) upscaling from point to pixel - Selker; b) Monitor response to dam removal - Tullos

  2010 1 **2011** 1 **2012** 1 **2013** 1 **2014** 0

- EFFECTS ON AND PROTECTION OF ENVIRONMENTAL HEALTH AND ECOLOGY: Indicators - Type 3....Develop models and reference data: (soil) a) Evaluate predictive power soil moisture and soil hydraulic models - Selker b) Evaluate evapotranspiration estimating methods for state-wide water resource management - Cuenca

  2010 1 **2011** 1 **2012** 1 **2013** 1 **2014** 0

- EFFECTS ON AND PROTECTION OF ENVIRONMENTAL HEALTH AND ECOLOGY: Indicators - Type 3b....Develop models and reference data: (steams/rivers) c) Investigate aquifer recharge project design to enhance stream habitat and increase available water resources, examine management scenarios (5) Cuenca and Selker d) Investigate biotic-abiotic interactions and responses to disturbance in aquatic environments relative to river management strategies (5) - Tullos

  2010 1 **2011** 1 **2012** 1 **2013** 1 **2014** 1

- EFFECTS ON AND PROTECTION OF ENVIRONMENTAL HEALTH AND ECOLOGY: Indicators - Type 3c....Develop models and reference data: (watershed) e) Examine coupled natural and human systems through watershed scale and river basin scale water resource simulation models and decision tools (whole system, vegetation, ecosystem services models) - Bolte and Cuenca f) Understand human elements in natural resources management (human surveys, analyses of landscape actors and social institutions) and conduct multiagent and adaptive management modeling - Bolte and Cuenca

  2010 1 **2011** 1 **2012** 1 **2013** 1 **2014** 1

- OTHER SCHOLARLY EXCELLENCE: participation on professional boards and committees, as well as science panels, and receipt of awards

  2010 2 **2011** 2 **2012** 2 **2013** 2 **2014** 2

V(I). State Defined Outcome

O. No	Outcome Name
1	Knowledge Indicators - Type 1...People provided information: - Informed decision-makers and citizenry - Better informed extension faculty - Better informed watershed councils and irrigation managers - Better informed agricultural producers - Trained scholars and peers
2	Knowledge Indicators - Type 2a - better understanding about water resource systems (and soil) * interconnectivity of soil and water resources
3	Knowledge Indicators - Type 3 Better tools and models, e.g., flumes, continuous data probes, revised models, coupled models
4	Action/Application Indicators - Type 1 Decision-makers use resource allocation or management tools e.g., Revised Oregon Irrigation Water Requirements Guide, websites
5	Action/Application Indicators - Type 2 Improved irrigation water management
6	Condition Indicators - Type 1 - Environmental a) Improved water availability and quality b) Improved watershed hydrology
7	Knowledge Indicators - Type 2b - better understanding about water resource systems (organisms) * aquatic species habitat and survival,
8	Knowledge Indicators - Type 2c - better understanding about water resource systems (management) * effects of management strategies

Outcome #1

1. Outcome Target

Knowledge Indicators - Type 1...People provided information: - Informed decision-makers and citizenry - Better informed extension faculty - Better informed watershed councils and irrigation managers - Better informed agricultural producers - Trained scholars and peers

2. Outcome Type : Change in Knowledge Outcome Measure

2010 :20 **2011 :** 20 **2012 :** 20 **2013 :**20 **2014 :**20

3. Associated Institute Type(s)

•1862 Research

4. Associated Knowledge Area(s)

- 101 - Appraisal of Soil Resources
- 102 - Soil, Plant, Water, Nutrient Relationships
- 111 - Conservation and Efficient Use of Water
- 112 - Watershed Protection and Management
- 132 - Weather and Climate
- 133 - Pollution Prevention and Mitigation
- 403 - Waste Disposal, Recycling, and Reuse
- 404 - Instrumentation and Control Systems
- 405 - Drainage and Irrigation Systems and Facilities
- 902 - Administration of Projects and Programs

Outcome #2

1. Outcome Target

Knowledge Indicators - Type 2a - better understanding about water resource systems (and soil) * interconnectivity of soil and water resources

2. Outcome Type : Change in Knowledge Outcome Measure

2010 :0 **2011 :** 0 **2012 :** 0 **2013 :**1 **2014 :**1

3. Associated Institute Type(s)

•1862 Research

4. Associated Knowledge Area(s)

- 101 - Appraisal of Soil Resources
- 102 - Soil, Plant, Water, Nutrient Relationships
- 111 - Conservation and Efficient Use of Water
- 112 - Watershed Protection and Management
- 133 - Pollution Prevention and Mitigation
- 404 - Instrumentation and Control Systems
- 405 - Drainage and Irrigation Systems and Facilities
- 902 - Administration of Projects and Programs

Outcome #3

1. Outcome Target

Knowledge Indicators - Type 3 Better tools and models, e.g., flumes, continuous data probes, revised models, coupled models

2. Outcome Type : Change in Knowledge Outcome Measure

2010 3 **2011 :** 3 **2012 :** 3 **2013** 3 **2014 :** 3

3. Associated Institute Type(s)

•1862 Research

4. Associated Knowledge Area(s)

- 101 - Appraisal of Soil Resources
- 102 - Soil, Plant, Water, Nutrient Relationships
- 111 - Conservation and Efficient Use of Water
- 112 - Watershed Protection and Management
- 132 - Weather and Climate
- 133 - Pollution Prevention and Mitigation
- 403 - Waste Disposal, Recycling, and Reuse
- 404 - Instrumentation and Control Systems
- 405 - Drainage and Irrigation Systems and Facilities
- 902 - Administration of Projects and Programs

Outcome #4

1. Outcome Target

Action/Application Indicators - Type 1 Decision-makers use resource allocation or management tools e.g., Revised Oregon Irrigation Water Requirements Guide, websites

2. Outcome Type : Change in Action Outcome Measure

2010 0 **2011 :** 0 **2012 :** 0 **2013** 0 **2014 :** 0

3. Associated Institute Type(s)

•1862 Research

4. Associated Knowledge Area(s)

- 101 - Appraisal of Soil Resources
- 102 - Soil, Plant, Water, Nutrient Relationships
- 111 - Conservation and Efficient Use of Water
- 112 - Watershed Protection and Management
- 132 - Weather and Climate
- 133 - Pollution Prevention and Mitigation
- 403 - Waste Disposal, Recycling, and Reuse
- 404 - Instrumentation and Control Systems
- 405 - Drainage and Irrigation Systems and Facilities
- 902 - Administration of Projects and Programs

Outcome #5

1. Outcome Target

Action/Application Indicators - Type 2 Improved irrigation water management

2. Outcome Type : Change in Action Outcome Measure

2010 :	2011 :	2012 :	2013 :	2014 :
1	0	1	0	0

3. Associated Institute Type(s)

•1862 Research

4. Associated Knowledge Area(s)

- 111 - Conservation and Efficient Use of Water
- 112 - Watershed Protection and Management
- 404 - Instrumentation and Control Systems
- 405 - Drainage and Irrigation Systems and Facilities

Outcome #6

1. Outcome Target

Condition Indicators - Type 1 - Environmental a) Improved water availability and quality b) Improved watershed hydrology

2. Outcome Type : Change in Condition Outcome Measure

2010 :	2011 :	2012 :	2013 :	2014 :
0	0	0	0	0

3. Associated Institute Type(s)

•1862 Research

4. Associated Knowledge Area(s)

- 102 - Soil, Plant, Water, Nutrient Relationships
- 111 - Conservation and Efficient Use of Water
- 112 - Watershed Protection and Management
- 133 - Pollution Prevention and Mitigation
- 403 - Waste Disposal, Recycling, and Reuse
- 404 - Instrumentation and Control Systems
- 405 - Drainage and Irrigation Systems and Facilities

Outcome #7

1. Outcome Target

Knowledge Indicators - Type 2b - better understanding about water resource systems (organisms) * aquatic species habitat and survival,

2. Outcome Type : Change in Knowledge Outcome Measure

2010 :	2011 :	2012 :	2013 :	2014 :
0	1	1	0	0

3. Associated Institute Type(s)

•1862 Research

4. Associated Knowledge Area(s)

- 111 - Conservation and Efficient Use of Water

- 112 - Watershed Protection and Management

Outcome #8

1. Outcome Target

Knowledge Indicators - Type 2c - better understanding about water resource systems (management) * effects of management strategies

2. Outcome Type : Change in Knowledge Outcome Measure

2010 :0 **2011 :** 0 **2012 :** 1 **2013 :**0 **2014 :**0

3. Associated Institute Type(s)

•1862 Research

4. Associated Knowledge Area(s)

- 111 - Conservation and Efficient Use of Water
- 112 - Watershed Protection and Management
- 133 - Pollution Prevention and Mitigation
- 404 - Instrumentation and Control Systems
- 902 - Administration of Projects and Programs

V(J). Planned Program (External Factors)

1. External Factors which may affect Outcomes

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

Description

The Oregon Water Resources Department has limited funding, compared to other states, to sponsor applied research beneficial to water resource conservation in the state.Therefore outside, federal funding must be sought for these studies and there is continuously less discretionary funding available at the federal level.Changes in public policy and under-funding of environmental programs are external factors that affect the program outcomes.

V(K). Planned Program (Evaluation Studies and Data Collection)

1. Evaluation Studies Planned

- Before-After (before and after program)

Description

Studies will be made of net radiation and evapotranspiration estimating methods using meteorological data from different climate regimes and latitudes.The results of various types of estimating methods will be compared with high quality net radiometer and precise weighing lysimeter data records for evaluation.

2. Data Collection Methods

- Tests

Description

Data for meteorological parameters, net radiation and evapotranspiration from cooperating research sites in different countries, climates and latitudes will be combined with field data collected by the Hydrologic Science Team in Oregon.

All the data records will be quality controlled using standard procedures and combined into a very large database for analysis.

V(A). Planned Program (Summary)

Program #5

1. Name of the Planned Program

P5-Sustainable Agriculture and Food Systems

2. Brief summary about Planned Program

Sustainable agricultural systems are economically viable, utilize ecological principles that preserve environmental quality, enhance food safety and security, and promotehealthy communities. A combination of approaches will be needed to ensure production of food, fiber, and fuels in a sustainable fashion, despite decreasing availability of water, labor, and land. Increasing market demand require growers to meet new sustainability standards in order to maintain access to markets, as well as creating new market opportunities for integrated farming and food systemsthat support rural and urban economic development.

The nation is going through many changes in the market, environment, economy, and politics, leading various social changes in the marketplace. Drastic changes in the marketplace, especially in rural America, have threatened the well-being of rural community residents and the economic survival of rural producers and retailers. In order to improve the economic vitality of rural America and thus well-being of the community, research is needed to identify the current problems faced by rural businesses and consumers, and further, to develop the business strategy to assist rural businesses to gain economic competitiveness. Rapid technology development has been a critical change that has threatened the survival of rural communities that lack resources and knowledge to be responsive to changes in technology. Thus, there is a pressing need to address how rural communities can respond to the changes in the marketplace as a result of technological development. As the contribution of agriculture and manufacturing to rural community has declined, the importance of rural retail business to improve the economic well-being of community becomes critical.

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
102	Soil, Plant, Water, Nutrient Relationships	5%		5%	
111	Conservation and Efficient Use of Water	5%		5%	
121	Management of Range Resources	5%		5%	
202	Plant Genetic Resources and Biodiversity	5%		5%	
204	Plant Product Quality and Utility (Preharvest)	5%		5%	
205	Plant Management Systems	5%		5%	
206	Basic Plant Biology	5%		5%	
216	Integrated Pest Management Systems	10%		10%	
301	Reproductive Performance of Animals	5%		5%	
302	Nutrient Utilization in Animals	5%		5%	
307	Animal Production Management Systems	5%		5%	
501	New and Improved Food Processing Technologies	5%		5%	
502	New and Improved Food Products	5%		5%	
511	New and Improved Non-Food Products and Processes	5%		5%	
601	Economics of Agricultural Production and Farm Management	5%		5%	

602	Business Management, Finance, and Taxation	5%		5%	
603	Market Economics	5%		5%	
607	Consumer Economics	5%		5%	
803	Sociological and Technological Change Affecting Individuals, Families and Communities	5%		5%	
	Total	100%		100%	

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

1. Situation and priorities

For agriculture and food systems to be economically viable for the long term, they need to utilize ecological principles that preserve environmental quality, enhance food safety and security, and promote healthy communities. A combination of integrative, ecological and technology-based approaches will be necessary to produce nutritious food, fiber, horticultural crops, and biofuels with reduced chemical and energy inputs on less available farmland and rangeland and with decreasing availability of water and labor. Increasing labor costs and availability concern producers of high-value crops; they seek technologies that will reduce their dependence on migrant labor and increase their efficiencies. Continued urban development will accelerate competition for existing land and water resources; global climate change may further jeopardize water supplies.

Citizens are increasingly concerned about food safety and the source of their food. There are enormous educational opportunities for people to understand the local and international food system, from the development of a crop to its production and processing to its transport and handling prior to purchase. Further, the importance of local food systems that address the food quality and security issues is growing. Strengthening local food systems is an important opportunity for positive economic and community development.

There are also increasing expectations for compliance to certification standards for market access. Enabling accurate prediction of plant diseases and pests will impact their control by allowing more specific, economical and integrated measures to be utilized. There will be increased scrutiny of the carbon footprint made by various production-distribution systems and market or regulatory forces will require reduction in carbon emissions and a reduced water footprint. Programs are needed to further the development and understanding of ecologically and technologically robust farming systems that function within a sustainable local, regional and international food system. The end user, consumers, will also be an important consideration.

This program serves the following goals and objectives in the USDA/CSREES Strategic Plan for 2007-2012: Objective 2.1 (expand domestic market opportunities), Objective 2.2 (increase efficiency of agricultural production and marketing systems), Objective 3.1 (expand economic opportunities), Objective 4.2 (reduce the number and severity of agricultural pest and disease outbreaks), Objective 6.1 (ensure clean, abundant water and clean, healthy air), Objective 6.2 (enhance soil quality to maintain productive working lands), Objective 6.3 (protect, enhance, and manage forests and rangelands), and Objective 6.4 (protect and enhance wildlife habitat).

2. Scope of the Program

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

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

1. Assumptions made for the Program

Faculty members will effectively collaborate with professional peers on the various OSU campuses, university and governmental scientists in the state, region and the country and with peers around the world. They work with county extension faculty and with commodity commission and grower association leaders. They converse directly with end users of their products. They are members of successful regional and national competitive grant consortia.Through this array of contacts they have a keen awareness of local, state, regional, national and international research needs in crop production practices, pest management, and alternative crops.

2. Ultimate goal(s) of this Program

This interdisciplinary program will develop and apply improved tools of agronomy, plant pathology, soil science, weed science, animal science, biology, and social science to sustainably address challenges facing Oregon's agricultural producers of food, feed, fiber, horticulture, and biofuels/bioenergy.

•To examine the fundamental molecular mechanisms critical to plant production and associated agricultural practices (BPP-gen)

•To conduct molecular and field programs concerning the control of pathogens and nematodes affecting crops of commercial importance. (BPPpath)

•To improve plant product quality and utility through understanding of plant genomes, genetics, genetic mechanisms, and genetic resources (HORT-basic)

•To understand plants and plant ecology to improve biological efficiencies and reduce abiotic stresses, disease resistance, and/or the way plants function with landscape ecosystems (HORT-basic)

•To improve reproductive efficiency in domestic animals and birds (ANS-repro)

•To develop sustainable animal production systems while maintaining the natural resources that support animal production (ANS-sus)

•To identify disease mechanisms, animal models, vaccines, and antibioltic resistance that mitigate the consequences of animal disease in agricultural and food systems (VM)

•To develop and apply the best tools in contemporary plant, soil, genetics, biology and pest management sciences to address the challenges and opportunities facing Oregon's agricultural industry, plant science and natural resource communities (CSS-pest,agron,gen)

•To develop and apply improved research and Extension tools in agronomy, plant pathology, soil science, weed science and biology to address the challenges facing Oregon's dryland crop producers (CBARC)

•Improve competitiveness in domestic production, processing, and marketing (MES)

•Enhance the quality of the environment through better understanding of and building on agriculture's and forestry's complex links with soil, water, air, and biotic resources (MES)

•To address issues relative the sustainable management of range/forest resources for biological diversity and the maintenance of rural economies that depend upon natural resources for industry (REM)

•To improve horticultural management systems by integrating practices, cultivars, and technologies to achieve greater efficiencies, intgegrated pest management, organic production, and products that meet market and consumer demand while considering impacts on the environment, worker protection, and human health or livelihoods (HORT-mgmt)

•To analyze the comparative advantage of U.S. agricultural and food industries, and their counterparts in Oregon (AREC-adv)

•To improve the well-being and vibrancy of rural communities by enhancing the economic competitiveness of rural retailers through understanding social change in the marketplace (HHS-kim)

•To determine the impact of integrating science in secondary agricultural education programs (AGED)

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
2010	3.0	0.0	42.9	0.0
2011	2.0	0.0	40.0	0.0
2012	1.0	0.0	38.0	0.0
2013	1.0	0.0	38.0	0.0
2014	1.0	0.0	38.0	0.0

V(F). Planned Program (Activity)

1. Activity for the Program

Organic, value-added, and technological (bio-based, information-centered, robotic, nanotechnology, etc.) approaches complement conventional agriculture. By utilizing contemporary research tools in agronomy, animal or soil science, plant nutrition and pest management this program will develop improved practices for cropping and animal production systems that will enhance the potential use of alternative crops, reduce soil erosion, reduce the economic, social, and environmental costs of crop pests, and maintain or increase soil biological, chemical and physical properties. Animal systems will reduce wastes and discharges while improving productivity and husbandry techniques.

Research and extension will also look at key areas of various social changes in the marketplace impacting producers, retailers and consumers. The research aims to determine (1) how technology impacts producers/retailers/consumers in the market place, with a special emphasis on rural markets in America; (2) how society impacts consumer demand for goods and services with a goal of improving the well-being of consumers; and (3) how to develop economic linkages among producers, retailers, and consumers for the community development.

In addition, a broad coalition of agricultural, environmental and food groups has coalesced around the need for a single, integrated center for sustainable agriculture and food systems information, research, and education. Over the past decade, the Oregon Agricultural Experiment Station has been building core expertise systematically across the range of agriculture disciplines. The creation of an Oregon Sustainable Agriculture and Food Systems Research, Education and Outreach Center will allow existing and newly acquired expertise from strategic investments to be mobilized in a targeted, coordinated, systematic response tailored to these emerging needs. The center will coordinate its activities with and through the various departments, Extension offices, and Agricultural Research Stations. In addition it will coordinate resources and efforts with the Institute for Natural Resources, the Institute for Water and Watersheds, and the Rural Studies Program. This resource center will be web-based and will draw on contributions from many state and federal agencies, non-profit organizations, certifiers, and others as needed. Outcomes include more economically and ecologically sustainable farms and ranches; a more resilient rural economy; stronger bonds between rural, urban, and periurban residents; and a healthier environment for all Oregonians.- Conduct Research Experiments.

- Conduct surveys

- Conduct Workshops, Meetings.

- Deliver Services.

- Develop Products, Curriculum, Resources.

- Provide Training.

- Provide Demonstrations

- Provide Counseling.

- Assessments.

- Work with Media.

- Partnering.

- Facilitating.

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

Extension	
Direct Methods	**Indirect Methods**
• Group Discussion • Other 1 (publications) • Workshop • Education Class • Demonstrations • Other 2 (presentations) • One-on-One Intervention	• Newsletters • Web sites • Other 1 (trade magazines)

3. Description of targeted audience

Professional peers and scientific communities, extension faculty, veterinarians, vaccine producers

State commodity commissions, grower groups, packers, crop consultants

Natural resource industry clientele – growers, field representatives, grower co-ops and partnerships, processors and handlers, export companies, importing companies

County, state and federal agencies – USDA-ARS, Oregon Department of Agriculture, Natural Resources Conservation Service, Bureau of Indian Affairs, Confederated Tribes of the Umatilla Indian Reservation, US Forest Service, and Bureau of Land Management.

Policy makers, public health officials, and community leaders

Teachers and students, Extension personnel and other educators

Genetic companies

Nutritional consultants

Nonprofit conservation groups and ecologists

General public and consumers

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V(G). Planned Program (Outputs)

1. Standard output measures

Target for the number of persons(contacts) to be reached through direct and indirect contact methods

	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Year	Target	Target	Target	Target
2010	32530	75000	740	1100
2011	32530	75000	640	1000
2012	32617	75000	640	1000
2013	32645	75000	640	1000
2014	32645	75000	640	1000

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

Expected Patent Applications

2010 :6 **2011 :**4 **2012 :** 11 **2013 :**8 **2014 :**3

3. Expected Peer Review Publications

Year	Research Target	Extension Target	Total
2010	148	4	152
2011	151	4	155
2012	150	4	154
2013	153	4	157
2014	150	4	154

V(H). State Defined Outputs

1. Output Target

- DEVELOP BETTER UNDERSTANDING OF BASIC PHYSIOLOGY OF PLANTS AND ANIMALS...Indicator 1- Environmental response by plants o Evaluate protein supplement of cool versus warm season forage o understand responses to environmental signals, germination, growth and development pathways

2010 2 **2011** 2 **2012 :**2 **2013** 2 **2014** 2

- DEVELOP BETTER UNDERSTANDING OF BASIC PHYSIOLOGY OF PLANTS AND ANIMALS ...Indicator 2 - Animal reproductive factors o Identify factors affecting reproduction, e.g., physiological constraints limiting gamete viability, differentiation and outgrowth of endodermal cells from the bovine inner cell mass during the formation of extraembryonic endoderm, the relationship and interactions between the immune and reproductive systems with regard to establishment and maintenance of pregnancy.

  2010 2 **2011** 2 **2012** :2 **2013** 2 **2014** 2

- CARRY OUT STUDIES TO DECIPHER GENOMES, GENETICS AND MECHANISMS...Indicator 1- Bacteria And Viruses And Other Microorganisms o Obtain insights to evolutionary histories of microbes and plants, e.g, nitrifying bacteria within microbial communities and the unique niches of different species of nitrifying bacteria, o Identify differences and similarities among microorganisms in mono- and co-cultures.

  2010 2 **2011** 2 **2012** :2 **2013** 2 **2014** 2

- CARRY OUT STUDIES TO DECIPHER GENOMES, GENETICS AND MECHANISMS...Indicator 2 - Genetic diversity and function o Identify novel and previously unknown genes, microarray analysis of genes o Determine the role of specific genes and model metabolism o Identify co-regulated gene sets by their function. o Characterize genetic diversity in economically important crop plants, o Further understand the interaction of antagonistic signaling pathways

  2010 3 **2011** 3 **2012** :3 **2013** 3 **2014** 3

- CARRY OUT STUDIES TO DECIPHER GENOMES, GENETICS AND MECHANISMS...Indicator 3 - Disease resistance and higher tolerances o Carry out molecular breeding in adapted germplasm o Understand disease resistance, defense pathways o Develop transgenic lines of higher tolerances, e.g., freezing, morphology and yields

  2010 2 **2011** 2 **2012** :2 **2013** 2 **2014** 2

- CARRY OUT STUDIES TO DECIPHER GENOMES, GENETICS AND MECHANISMS...Indicator 4 - Reproduction factors o Know expression patterns and identity of cells expressing suppressors of cytokine signaling genes, and how these genes are regulated in reproductive tissues o Describe effects of the reproductive hormones on gene expression and cell function o Understand genetic load present in economically significant populations of poultry based upon the identification of embryonic failures (e.g., in Coturnix quail)

  2010 3 **2011** 3 **2012** :3 **2013** 3 **2014** 3

- BREEDING PROGRAMS THAT RESULT IN DESIRABLE TRAITS, CULTIVARS AND VARIETIES...Indicator - improved traits. o Improved breeding lines and new varieties for barley, meadowfoam, potato, wheat (for general public and/or licensed release and special market opportunities) o Improved crop quality including wheat and potato starches and proteins, oil quality and quantity in meadowfoam/canola/mustard/camellina and of glucosinolates o Improved germplasm for year-round marketing. o Alkaline tolerant poplar tree varieties for saw log production on poor and sloping soils with the aid of drip irrigation. o Improved horticultural crops to meet the needs of industry, e.g., hazelnut, beans, snap pea, tomato, apples, broccoli, organic lines

  2010 5 **2011** 5 **2012** :5 **2013** 5 **2014** 5

- DEVELOP IMPROVED ANIMAL AND PLANT PRODUCTION SYSTEMS...Indicator 1 - animal reproductive success rates o Develop improved, surviving offspring and appropriate calving dates, o Reduce lambing production inputs (e.g., remove those of high mortality risk) and improve weaned lamb weight o Synchronize forage and carcass data for calf and cow management

  2010 2 **2011** 0 **2012** :5 **2013** 0 **2014** :1

- DEVELOP IMPROVED ANIMAL AND PLANT PRODUCTION SYSTEMS...Indicator 2 - nutrition, feeding and forage relationships. o Evaluate grazing distribution and use of riparian pastures o Analyze forest fuel reduction/burning and stocking rate effects on cattle diets in mixed conifer rangelands o Identify influence of season on cattle resource selection on mixed conifer rangelands o Investigate influence of early weaning on cattle distribution and use of late season mixed conifer forests o Evaluate influence of overstory management on understory forage quality of stocking rates

  2010 :1 **2011** 1 **2012** :1 **2013** :1 **2014** :1

- DEVELOP IMPROVED ANIMAL AND PLANT PRODUCTION SYSTEMS...Indicator 3 - inputs for plant systems. Dryland crops * Strategies for efficient use of soil nitrate and the other available N sources, nitrogen management * Improved crop

management recommendations for nutrients, temperature, moisture and other abiotic stresses, plant growth regulators, attack by other organisms * Nutrient management strategies, e.g., for soft white wheat grown in conservation tillage systems * Potential alternative crops for cereal-based crop rotations; best management practices for alternative crops * A comprehensive understanding of the morphological, physiological and/or genetic basis for plant responses in studied management systems Irrigated crops * Efficient irrigations systems, e.g., subsurface drip irrigation or different bed conformation works with potatoes, automated systems that use soil moisture monitoring to override fixed schedule drip irrigation systems when the soil was too wet * Environmental improvements such as avoiding leaching water and nitrate to groundwater. * Improved nutrient applications Horticultural crops * Precision management systems in vineyards, with nutrition component * Improved production efficiency knowledge and practices, such as new berry cultivars, new rootstocks, grafted stock, cold hardiness, disease resistance, chemical control of pests; nutrient budget recommendations, improved weed management, water use, off-season production methods, water conservation and recycling, soil quality parameters, post-harvest management, and identify alternative crops for pest and weed management * Best management practices for new varieties Small farms. * Improved practices in small farms.

2010 8 **2011** 8 **2012** 8 **2013** 8 **2014** 8

- UNDERSTANDING FOR PLANT AND ANIMAL PROTECTION FROM DISEASES AND PESTS TO GROWERS AND PEERS, Indicator 1 - pest management systems * Pest management systems * Weed management with improved herbicides and cultural management * Optimum inputs and agronomically compatible weed management in alternate crops * Biology of yellow nutsedge under local conditions * Decay management programs appropriate to various producer objectives, e.g., efficacy of individual treatments for control of postharvest decay of pear fruit, and quantify and compare the efficacy of treatment programs composed of diverse, multiple control tactics. * Decay risk prediction models for use in orchards and packinghouses * Fumigants used at reduced rates in combination with other nematicides * Crop management systems for suppression of CRKN using suppressive rotation crops, green manure crops and reduced nematicide use * Technologies for efficient application of viral vectors in grapevine.

  2010 4 **2011** 4 **2012** 4 **2013** 4 **2014** 4

- PROVIDE ADDITIONAL UNDERSTANDING FOR PLANT AND ANIMAL PROTECTION FROM DISEASES AND PESTS TO GROWERS AND PEERS, Indicator 2 - disease resistance * Uncover disease resistance gene evolution in plants and compare evolutionary histories * Develop and release wheat cultivars with improved capacity to resist or tolerate infections by plant-pathogenic fungi and plant-parasitic nematodes * Innovations that mitigate the detrimental effect of Verticillium wilt, probably the most limiting disease of potato in the Treasure Valley * Understand physiological basis of plant disease resistance and susceptibility

  2010 2 **2011** 3 **2012** 2 **2013** 1 **2014** 1

- PROVIDE ADDITIONAL UNDERSTANDING FOR PLANT AND ANIMAL PROTECTION FROM DISEASES AND PESTS TO GROWERS AND PEERS, Indicator 3 - herbicide identification and resistance * Release new crop varieties with herbicide resistance. * Identify herbicides that can be safely and efficaciously used in different crops * Control downy brome and other weeds through extracts from broadleaf plants (natural herbicides) * Evaluate new herbicide candidates and non-chemical cultural practices under field conditions for weed control effectiveness, crop safety, and soil persistence

  2010 5 **2011** 5 **2012** 5 **2013** 5 **2014** 5

- PROVIDE ADDITIONAL UNDERSTANDING FOR PLANT AND ANIMAL PROTECTION FROM DISEASES AND PESTS TO GROWERS AND PEERS, Indicator 4 - pathogen and pest biology * Develop basic knowledge of pests by conducting pest biology trials at lab, growth chamber, greenhouse, small plot and/or field scale levels; control of slugs, symphilids, crane flies, cereal leaf beetle; native and invasive grassy and broadleaf weeds including wild oat, brome spp., jointed goatgrass, annual bluegrass, and clover broomrape, Sudden oak death, orchardgrass, choke pathogens, cereal leaf beetle * Understand species complex and fungicide sensitivity

  2010 5 **2011** 5 **2012** 5 **2013** 5 **2014** 5

- Output Measure 6 - EFFECTS ON AND PROTECTION OF ENVIRONMENTAL HEALTH AND ECOLOGY...Indicator 1 - erosion control experiments o Conduct large plot studies in commercial wheat fields to develop season-long chemical fallow management systems and compare chemical fallow treatments with conventional tilled summer.

  2010 1 **2011** 1 **2012** 1 **2013** 1 **2014** 1

- EFFECTS ON AND PROTECTION OF ENVIRONMENTAL HEALTH AND ECOLOGY Indicator 2 - animal effects o Analyze competition between deer, elk, and cattle in grazing impacts o Develop more economical and environmentally sustainable dairy and beef production systems that meet new environmental requirements

2010 2 **2011** 2 **2012** :2 **2013** 2 **2014** 2

- EFFECTS ON AND PROTECTION OF ENVIRONMENTAL HEALTH AND ECOLOGY...Indicator 3 - green management practices for horticultural crops o Develop green or organic practices for industry, such as plants adapted to specific sites and specific environmental purposes, ecological orchard systems, organic cover crops o Model the spread of an invasive species making use of genomics (microarray, sequencing) and ecological (field/greenhouse experiments) data.

2010 3 **2011** 3 **2012** :3 **2013** 3 **2014** 3

- Output Measure 7 - PROVIDE ECONOMIC AND MARKETING MODELS AND ANALYSES THAT INFORM DECISION-MAKERS, INDUSTRY, AND PEERS...Indicator 1 - land use management analyses. o Assess land ownership fragmentation and economic impacts o Develop ranch economic models o Develop framework to integrate economic, social, and ecological aspects of rangeland sustainability o Evaluate use of rangeland website o Identify policy alternatives for fire and fire surrogate management

2010 4 **2011** 4 **2012** :4 **2013** 4 **2014** 4

- PROVIDE ECONOMIC AND MARKETING MODELS AND ANALYSES THAT INFORM DECISION-MAKERS, INDUSTRY, AND PEERS...Indicator 2 - markets and trade analyses o Provide information to producer groups on factors shaping global markets. o Use model to show key relationships that tie climate change to the distribution of crop yields, comparative advantage, geography, and international trade. o Show productivity-convergence effects resulting from product trade and foreign direct investment (channels of international knowledge flow and rate of productivity convergence)

2010 2 **2011** 2 **2012** :2 **2013** 2 **2014** 2

- PROVIDE ECONOMIC AND MARKETING MODELS AND ANALYSES THAT INFORM DECISION-MAKERS, INDUSTRY, AND PEERS...Indicator 3 - profitability and productivity studies o Productivity factors to measure technological strength of U.S. agriculture and processed food industries o Studies of community based micro processing centers for agricultural products

2010 2 **2011** 2 **2012** :2 **2013** 2 **2014** 2

- Output Measure 8 - DEVELOP AND ENHANCE VOLUNTEER PROGRAMS FOR BROADER APPLICATION OF RESEARCH AND EXTENSION INFORMATION o Reach Master Gardners (new, past, and current) through MG training programs and materials, websites, and other distance education programs o Refine OSU Urban and Community Horticulture Website to reach new audiences.

2010 250 **2011** 300 **2012** :350 **2013** 500 **2014** 500

- Output Measure 9 - DEVELOP DISTANCE and OTHER EDUCATION OUTLETS TO FURTHER REACH CLIENTELE. o Develop new databases and frequently most asked questions for eXtension o Compare perceptions of science teachers and agriculture teachers on integrating science into the agriculture curriculum

2010 :1 **2011** 0 **2012** :1 **2013** 0 **2014** :1

V(I). State Defined Outcome

O. No	Outcome Name
1	KNOWLEDGE, Indicator 1a - horticultural plant production management systems. * Growers improve their production systems to remain competitive: precision horticulture, mineral nutrition, new varieties, new cultural practices, innovations, pest control, and organic systems and fundamental aspects of data analysis
2	KNOWLEDGE, Indicator 2a - animal reproductive biology and management * improved fertility in dairy cattle * reduced uterine infections * management factors that influence loss of potential lambs in commercial ewes
3	KNOWLEDGE, Indicator 3 - forage and nutrient management * workshops and other forms of teaching provided on issues related to grazing, manure management, and production systems. * Beef industry will understand forage quality dynamics for dominant forage species in Oregon, * Beef industry will understand how management practices can synchronize the relationship between forage nutrient supply and cow nutrient requirements, how pre-weaning and post-weaning calf management practices influence lifetime productivity of the calf and carcass quality and how feedstuffs can influence the health and physiological stress of the calf.
4	KNOWLEDGE, Indicator 4a - plant breeding for plant attributes. * Growers learn about new cultivars with novel attributes and greatest potential for production in the Pacific Northwest; variety trials published online; Examples: Rotational crop cultivars, Varieties released (with Plant Variety Protection coverage) for general public and/or licensed release * Regulation of embryo maturation in cereals. * Researchers determine sets of genes involved in critical processes, e.g., functions of nitrifiers, including genes involved in mutualistic growth between ammonia and nitrite oxidizers, genes involved in Fe metabolism, and genes involved in autotrophy and lithotrophy.
5	KNOWLEDGE, Indicator 5b - pest management * Basic pest biology information, * new pesticides registered * Growers become aware of pest management processes, including level of management required, risks associated with this pest as it becomes established, * Fumigants used at reduced rates in combination with other nematicides are likely to be the optimum management strategies for control of CRKN.
6	KNOWLEDGE, Indicator 6a - economic studies * Producer groups learn about factors shaping global markets and productivity-convergence effects on US agricultural and processed food production and trade.
7	Action Indicator 1 - Adoption of new varietals o reduce yield losses and expenses, o rejuvenate orchards o achieve better productivity and efficiency: o provide environmental benefits (less fungicide applications, etc.), o effectively compete on world market with new varieties o Commercial processors and fresh market growers, as well as home gardeners, achieve greater production efficiency, more stable productivity, and reduced costs from the use of improved varieties.
8	Action Indicator 2 - Improved animal fertility and genetic stock o Producers and animal health professionals improve fertility and prevent uterine infections in dairy cattle from implementing every-day on-farm practices. o Industry stores sperm cells with minimal loss of function for use as a commodity and for long-term maintenance of genetic stock
9	ACTION Indicator 3a - animal management tools used by private sector * Beef producers improve their economic competitive advantage and improve the ecological sustainability of production systems. * manure management
10	Action Indicator 4 - conservation strategies adopted o Conservation bio-control strategies are implemented differently and active restoration strategies occur. Land owners and managers assess ecosystem services provided by their riparian restorations via a user-friendly web tool. o Growers adopt improved, scale-dependent practices selected for various market niches with emphasis on reducing environmental degradation and impact. Commercial small farms will have more diverse and economically viable technologies and production techniques or systems available for their use o Growers implement drip irrigation and produce more marketable yields of onions, potatoes, and poplar trees than with furrow or sprinkler irrigation.and achieve efficient use of soil nitrate and the other available N sources under drip irrigation. o Generation of the viral vectors for grapevine disease control and functional genomics vectors have a potential for replacing current strategies of using chemical fungicides and bactericides with viral biocontrol strategies.

11	Action Indicator 5 - improved agricultural economies o The knowledge generated about productivity-convergence will be crucial in designing policies to improve the welfare of agricultural producers and food processors and the general public who will be affected by the evolution of these industries (e.g., food quality and safety, resource scarcity and pollution). o Domestic policymaking and multilateral trade negotiations will mitigate effects of climate change in reduction of trade barriers and subsidies. o Climate change will be related to changes in comparative advantage in international crop production, and in turn the pattern and volume of trade. This information will be important in the context of domestic policymaking and multilateral trade negotiations as it pertains to reduction of trade barriers and subsidies.
12	Change Indicator 1 - Ecological / Environmental o Landscapes will impact the way Oregonians use and manage plants to create beauty, modify environment, and improve health and well-being of individuals and communities. This program will change the way people use plants to modify their environment such as moderating temperature on buildings, improving water infiltration on surfaces, contributing to ecosystem services at landscape or watershed scales, etc. o Food/farm systems reduce surface and/or groundwater or other pollution in the environment, while improving nutrient and water budgets, and organic production systems. o New reduced risk, environmentally safer pest control tools will be available that are target pest specific will facilitate the implementation of IPM programs. o Environmental change will occur from temperature modifications; enhanced water conservation and wildlife; reduced runoff, fire incidence and pests; improved nutrient use and recycling; and other ecosystem services. o Better ecological methodologies will lead to more social, economic, and environmental benefits and cost effective and sustainable restoration. Improved valuation of ecological services associated with restorations will greatly facilitate market-based conservation practices such as mitigation banking and effluent trading. Better conservation bio-control strategies will decrease the costs associated with insect losses and the use of insecticides. o enhance the nation's natural resource base and environment by revealing cost-effective means to control plant diseases and reduce the need for pesticides. o Biocontrols will reduce environmental damage and costs of grape growing and facilitate the development of the table and wine grapes with improved quality and nutritional value and therefore to increase competitiveness of the US grape growers and wine makers at the world markets. o Improved soil, water, and crop management practices and strategies that protect Oregon resources o Management of public and private rangelands will sustain and improve ecological values as desired by the public and the rural communities that depend on the natural resources. o Strategies for avoiding invasive pests will be in place o Plant disease resistance will lower the amount of pesticide use, resulting in a more healthful environment and reduced exposure of humans to hazardous chemicals.
13	Change Indicator 2 - Societal o Social change will occur through new perceptions of green technologies and social value or capital of horticultural landscapes to enhance human health, therapy, wellness, and social networks. o Social impacts include consumer awareness and appreciation of the abundance of locally grown ornamental plant materials and native species for use in landscapes will increase; also awareness of invasive species. o Social change will enhance quality of life in rural areas by improving economic stability of family farms, wineries, wine tasting, and tourism with new practices and cropping systems and/or livestock management practices/systems. o Social change will improve economic stability of families and quality of life with improved cropping systems. o Worker safety with bio-based pest control and dwarf rootstocks (short ladders) will be improved; farm workers will find other employment with increased mechanization. Local and community markets increase social networking in rural communities. o Increased opportunities for rural community marketers and processors will be developed; o Public health will be improved through the use of crops with improved nutritional value o Sustainable and economically viable wheat and dryland cropping industry for vibrant rural economy in eastern Oregon o The public has access to an ongoing research data base that allows for natural resource/land management decisions to have a fundamental basis in science.

14	Change Indicator 3 - Economic o The economic value of landscapes will increase. Cost and benefit analyses of plants usage to modify environments with green technologies will reveal positive economic impacts and improved health and wellness from horticultural therapy. o Economic impacts include reduced costs, increased benefits, and production efficiencies from use of water and nutrient budgets in recycled water systems, improved pest management, and diagnosis of plant problems to increase sales of quality products. Costs of regulatory procedures will be reduced with water and nutrient budgets and management systems. o Profitability of berry crops in Oregon is expected to improve as new cropping systems, cultivars, practices, and efficiencies are implemented. Machine harvest technologies will be adapted or developed for Oregon to reduce production costs and improve competitiveness in global markets. o Profitability of vegetable and specialized seed crops is expected to improve as new cropping systems, cover crops, nitrogen management, reduced tillage, and cultivars are adopted by growers. Communication networks will enable timely communication and utilization of technologies to alert growers of weather related pest incidence, educational events, and practices. o Profitability of viticulture in Oregon is expected to improve as new cropping systems, cultivars, practices, and efficiencies are implemented. Niche markets, wine tasting, and tourism are primary outlets for Oregon wines. o Profitability of tree fruits and nut crops in Oregon is expected to improve as new cropping systems, cultivars, practices, and efficiencies are implemented. High density orchards are expected to improve production efficiencies and increase markets. o Agricultural producers will realize greater economic return in their cropping enterprises; Plant nutrient and other production input use will be optimized o Producers maximize the control of postharvest decay within the various production and marketing objectives of producers. o Biocontrols will reduce environmental damage and costs of grape growing and facilitate the development of the table and wine grapes with improved quality and nutritional value and therefore to increase competitiveness of the US grape growers and wine makers at the world markets. o Higher-value niche markets will be established o Beef producers in the Intermountain and Great Basin areas remain completive on a regional, national, and global basis. o Producers greatly improve their reproductive efficiency by removing bad genes thus increasing productivity and economics of the industry. Industry thus has improved resource and economic sustainability through reduced costs and/or increased productivity. o Better understanding of the costs, benefits, and potential impact of legislation on the dairy industry, and thus more economically and environmentally sustainable systems for dairy and beef production. o Intense selection reduces needs for assistance in pasture lambing conditions. o Economic viability of farmers markets will be enhanced o Agricultural producers will realize greater economic return in their enterprises; o Increased potato yield will increase potato farmers' income as well as the stability of potato production of the world. The potential increase from 29,000 acres to as much as 100,000 acres will increase Oregon's market share and economic benefits.
15	KNOWLEDGE, Indicator 1b - landscape management systems. * Professional turf/landscape managers, nursery retailers, gardeners, and people associated with restoration/conservation projects will learn about sustainable gardening practices (eg. fertilizers, water, and pest management including organic), turf management, horticulture and aboriculture principles and practices, streamside gardening, native plants, invasive species, fire prevention, methods to minimize water runoff and use, wildlife enhancement, conservation and stewardship, and add value and beauty.
16	KNOWLEDGE, Indicator 1c - dryland production management systems. * Producers, NRCS, conservation districts and environmental agencies learn about whole farm nutrient management. * Basic agronomic practices for commercially promising alternative crops under reduced tillage systems.
17	KNOWLEDGE, Indicator 1d - irrigated production management systems. * Growers and the public sector are made aware that environmentally friendly drip and micro sprinkler irrigation systems produce increased crop yield and crop quality and that less nitrogen is required when crops are irrigated than with furrow and regular sprinkler irrigation
18	KNOWLEDGE, Indicator 1e - marketing approaches * Improved marketing approaches for local markets and community food systems.
19	KNOWLEDGE, Indicator 2b - animal reproductive genetics. * genetic causes of early embryonic failures, * developmental biology of the early bovine embryo * factors affecting establishment of extraembryonic endoderm * sire genotype effects on embryonic loss * understanding genetic basis for fertility in male poultry including sperm cell function
20	KNOWLEDGE, Indicator 4b - plant attributes for health. * Antioxidant effects of various carotenoids and flavonoids, and impact of flavonoids on antioxidant effect * Stakeholders learn about human health benefits, disease resistance, and breeding for organic systems of vegetables.
21	KNOWLEDGE, Indicator 5a - weed control * factors affecting herbicide activity * herbicides registered, * natural herbicides to control weeds in organic and/or no-till wheat production, * improved weed control in no-till fallow systems, including optimum inputs

22	KNOWLEDGE, Indicator 5c - disease biology, control and resistance * Facilitate future planned activities in functional genomics and provide a more robust sampling of the Pleosporales for comparative genomic studies by the fungal research community. * Efficacy of various orchard, postharvest, and storage methods for control of postharvest decay of pear * Molecular mechanisms responsible for closterovirus reproduction and transport in plants and develop model to predict risk * Functions of the GLRaV-2 proteases in virus reproduction and spread, as well as characterize mechanisms of BYV Hsp70h interactions with actin cytoskeleton and targeting to plasmodesmata; approaches to engineering GLRaV-2 gene expression vectors. * Elucidate the underlying molecular mechanisms of pathogenicity (virulence) and disease susceptibility (compatibility) and disease development. * Technologies for efficient application of viral vectors in grapevine. * Disease resistance discoveries, including gene evolution, plant lines * Information for the development of resistant wheat germplasm to tan spot. * relationships between disease susceptibility and disease resistance. Characterize genes involved in Victoria Blight Disease susceptibility, and uncovered
23	KNOWLEDGE, Indicator 6b - trade * We expect to show that international trade will be an important vehicle by which adaptations can be made to global climate change. * Researchers will uncover key relationships that tie climate change to the distribution of crop yields, comparative advantage, geography, and international trade. * Policy makers will understand that climate change will be related to changes in comparative advantage in international crop production, and in turn the pattern and volume of trade. * Numerical estimates will be provided regarding how climate change will affect crop prices, production costs, and the economic welfare of producers, consumers, and society at large.
24	KNOWLEDGE, Indicator 6c - community education. * Ways to integrate agricultural education into high school curriculums
25	1ACTION Indicator 3b - plant management tools used by private and public sector * Farmers will more strategically plan for crop production * Crop rotation sequences and Green manure crops in combination with reduced or no nematicide use, particularly for short season potato crops to suppress nematode populations. * End users adopt new pesticide and pest management systems and strategies for working with invasive pests * District-specific control programs will reduce usage of fungicides with low efficacy and emphasize integrated control practices.
26	ACTION Indicator 3c - post harvest tools used by private sector * Growers, packers and extension faculty incorporate practices to lower decay risk, including reduced fungicide usage, and identify high risk fruit lots and to market these before decay has time to develop in storage. * Interaction of program components and the overall efficacy of various combinations of orchard, postharvest, and storage factors will be the guides to the description of programs for implementation in the pear industry. * Determine packinghouse water system contamination by fungal pathogens. Commercial service lab can apply PCR technology to maintain sanitation determine most effective fungicides for each species. * Customized decay control program for each unique pathogen complex.
27	ACTION Indicator 3d - land and invasive species management tools used by private and public sector * Land management protocols will be used in public land management policy decisions. * Understand pollen flow mechanisms between wheat and its wild relative jointed goatgrass

Outcome #1

1. Outcome Target

KNOWLEDGE, Indicator 1a - horticultural plant production management systems. * Growers improve their production systems to remain competitive: precision horticulture, mineral nutrition, new varieties, new cultural practices, innovations, pest control, and organic systems and fundamental aspects of data analysis

2. Outcome Type : Change in Knowledge Outcome Measure

2010 : 5	**2011 :** 5	**2012 :** 5	**2013 :** 5	**2014 :** 5

3. Associated Institute Type(s)

•1862 Research

4. Associated Knowledge Area(s)

- 102 - Soil, Plant, Water, Nutrient Relationships
- 111 - Conservation and Efficient Use of Water
- 202 - Plant Genetic Resources and Biodiversity
- 204 - Plant Product Quality and Utility (Preharvest)
- 205 - Plant Management Systems
- 216 - Integrated Pest Management Systems

Outcome #2

1. Outcome Target

KNOWLEDGE, Indicator 2a - animal reproductive biology and management * improved fertility in dairy cattle * reduced uterine infections * management factors that influence loss of potential lambs in commercial ewes

2. Outcome Type : Change in Knowledge Outcome Measure

2010 : 1	**2011 :** 1	**2012 :** 1	**2013 :** 1	**2014 :** 1

3. Associated Institute Type(s)

•1862 Research

4. Associated Knowledge Area(s)

- 121 - Management of Range Resources
- 301 - Reproductive Performance of Animals
- 302 - Nutrient Utilization in Animals
- 307 - Animal Production Management Systems
- 601 - Economics of Agricultural Production and Farm Management

Outcome #3

1. Outcome Target

KNOWLEDGE, Indicator 3 - forage and nutrient management * workshops and other forms of teaching provided on issues related to grazing, manure management, and production systems. * Beef industry will understand forage quality dynamics for dominant forage species in Oregon, * Beef industry will understand how management practices can synchronize the relationship between forage nutrient supply and cow nutrient requirements, how pre-weaning and post-weaning calf management practices influence lifetime productivity of the calf and carcass quality and how feedstuffs can influence the health and physiological stress of the calf.

2. Outcome Type : Change in Knowledge Outcome Measure

2010 3 **2011 :** 3 **2012 :** 3 **2013** 3 **2014 :** 3

3. Associated Institute Type(s)

•1862 Research

4. Associated Knowledge Area(s)

- 111 - Conservation and Efficient Use of Water
- 121 - Management of Range Resources
- 302 - Nutrient Utilization in Animals
- 307 - Animal Production Management Systems

Outcome #4

1. Outcome Target

KNOWLEDGE, Indicator 4a - plant breeding for plant attributes. * Growers learn about new cultivars with novel attributes and greatest potential for production in the Pacific Northwest; variety trials published online; Examples: Rotational crop cultivars, Varieties released (with Plant Variety Protection coverage) for general public and/or licensed release * Regulation of embryo maturation in cereals. * Researchers determine sets of genes involved in critical processes, e.g., functions of nitrifiers, including genes involved in mutualistic growth between ammonia and nitrite oxidizers, genes involved in Fe metabolism, and genes involved in autotrophy and lithotrophy.

2. Outcome Type : Change in Knowledge Outcome Measure

2010 5 **2011 :** 5 **2012 :** 5 **2013** 5 **2014 :** 5

3. Associated Institute Type(s)

•1862 Research

4. Associated Knowledge Area(s)

- 102 - Soil, Plant, Water, Nutrient Relationships
- 202 - Plant Genetic Resources and Biodiversity
- 204 - Plant Product Quality and Utility (Preharvest)
- 205 - Plant Management Systems
- 206 - Basic Plant Biology

Outcome #5

1. Outcome Target

KNOWLEDGE, Indicator 5b - pest management * Basic pest biology information, * new pesticides registered * Growers become aware of pest management processes, including level of management required, risks associated with this pest as it becomes established, * Fumigants used at reduced rates in combination with other nematicides are likely to be the optimum management strategies for control of CRKN.

2. Outcome Type : Change in Knowledge Outcome Measure

2010 3 **2011 :** 3 **2012 :** 3 **2013** 3 **2014 :** 3

3. Associated Institute Type(s)

•1862 Research

4. Associated Knowledge Area(s)

- 202 - Plant Genetic Resources and Biodiversity
- 205 - Plant Management Systems

- 206 - Basic Plant Biology
- 216 - Integrated Pest Management Systems

Outcome #6

1. Outcome Target

KNOWLEDGE, Indicator 6a - economic studies * Producer groups learn about factors shaping global markets and productivity-convergence effects on US agricultural and processed food production and trade.

2. Outcome Type : Change in Knowledge Outcome Measure

2010 :1 **2011 :** 1 **2012 :** 1 **2013 :**1 **2014 :**1

3. Associated Institute Type(s)

•1862 Research

4. Associated Knowledge Area(s)

- 601 - Economics of Agricultural Production and Farm Management
- 603 - Market Economics
- 607 - Consumer Economics
- 803 - Sociological and Technological Change Affecting Individuals, Families and Communities

Outcome #7

1. Outcome Target

Action Indicator 1 - Adoption of new varietals o reduce yield losses and expenses, o rejuvenate orchards o achieve better productivity and efficiency: o provide environmental benefits (less fungicide applications, etc.), o effectively compete on world market with new varieties o Commercial processors and fresh market growers, as well as home gardeners, achieve greater production efficiency, more stable productivity, and reduced costs from the use of improved varieties.

2. Outcome Type : Change in Action Outcome Measure

2010 :1 **2011 :** 1 **2012 :** 1 **2013 :**1 **2014 :**1

3. Associated Institute Type(s)

•1862 Research

4. Associated Knowledge Area(s)

- 202 - Plant Genetic Resources and Biodiversity
- 204 - Plant Product Quality and Utility (Preharvest)
- 205 - Plant Management Systems
- 206 - Basic Plant Biology
- 216 - Integrated Pest Management Systems

Outcome #8

1. Outcome Target

Action Indicator 2 - Improved animal fertility and genetic stock o Producers and animal health professionals improve fertility and prevent uterine infections in dairy cattle from implementing every-day on-farm practices. o Industry stores sperm cells with minimal loss of function for use as a commodity and for long-term maintenance of genetic stock

2. Outcome Type : Change in Action Outcome Measure

2010 :	2011 :	2012 :	2013 :	2014 :
1	1	1	1	1

3. Associated Institute Type(s)

•1862 Research

4. Associated Knowledge Area(s)

- 301 - Reproductive Performance of Animals
- 302 - Nutrient Utilization in Animals
- 307 - Animal Production Management Systems

Outcome #9

1. Outcome Target

ACTION Indicator 3a - animal management tools used by private sector * Beef producers improve their economic competitive advantage and improve the ecological sustainability of production systems. * manure management

2. Outcome Type : Change in Action Outcome Measure

2010 :	2011 :	2012 :	2013 :	2014 :
1	1	1	1	1

3. Associated Institute Type(s)

•1862 Research

4. Associated Knowledge Area(s)

- 111 - Conservation and Efficient Use of Water
- 121 - Management of Range Resources
- 302 - Nutrient Utilization in Animals
- 307 - Animal Production Management Systems
- 601 - Economics of Agricultural Production and Farm Management

Outcome #10

1. Outcome Target

Action Indicator 4 - conservation strategies adopted o Conservation bio-control strategies are implemented differently and active restoration strategies occur. Land owners and managers assess ecosystem services provided by their riparian restorations via a user-friendly web tool. o Growers adopt improved, scale-dependent practices selected for various market niches with emphasis on reducing environmental degradation and impact. Commercial small farms will have more diverse and economically viable technologies and production techniques or systems available for their use o Growers implement drip irrigation and produce more marketable yields of onions, potatoes, and poplar trees than with furrow or sprinkler irrigation.and achieve efficient use of soil nitrate and the other available N sources under drip irrigation. o Generation of the viral vectors for grapevine disease control and functional genomics vectors have a potential for replacing current strategies of using chemical fungicides and bactericides with viral biocontrol strategies.

2. Outcome Type : Change in Action Outcome Measure

2010 :	2011 :	2012 :	2013 :	2014 :
2	2	1	2	0

3. Associated Institute Type(s)

•1862 Research

4. Associated Knowledge Area(s)

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

- 121 - Management of Range Resources
- 204 - Plant Product Quality and Utility (Preharvest)
- 205 - Plant Management Systems
- 206 - Basic Plant Biology
- 216 - Integrated Pest Management Systems
- 511 - New and Improved Non-Food Products and Processes
- 601 - Economics of Agricultural Production and Farm Management
- 602 - Business Management, Finance, and Taxation
- 803 - Sociological and Technological Change Affecting Individuals, Families and Communities

Outcome #11

1. Outcome Target

Action Indicator 5 - improved agricultural economies o The knowledge generated about productivity-convergence will be crucial in designing policies to improve the welfare of agricultural producers and food processors and the general public who will be affected by the evolution of these industries (e.g., food quality and safety, resource scarcity and pollution). o Domestic policymaking and multilateral trade negotiations will mitigate effects of climate change in reduction of trade barriers and subsidies. o Climate change will be related to changes in comparative advantage in international crop production, and in turn the pattern and volume of trade. This information will be important in the context of domestic policymaking and multilateral trade negotiations as it pertains to reduction of trade barriers and subsidies.

2. Outcome Type : Change in Action Outcome Measure

2010 :1 **2011 :** 1 **2012 :** 0 **2013 :**1 **2014 :**0

3. Associated Institute Type(s)

•1862 Research

4. Associated Knowledge Area(s)

- 601 - Economics of Agricultural Production and Farm Management
- 602 - Business Management, Finance, and Taxation
- 603 - Market Economics
- 607 - Consumer Economics
- 803 - Sociological and Technological Change Affecting Individuals, Families and Communities

Outcome #12

1. Outcome Target

Change Indicator 1 - Ecological / Environmental o Landscapes will impact the way Oregonians use and manage plants to create beauty, modify environment, and improve health and well-being of individuals and communities. This program will change the way people use plants to modify their environment such as moderating temperature on buildings, improving water infiltration on surfaces, contributing to ecosystem services at landscape or watershed scales, etc. o Food/farm systems reduce surface and/or groundwater or other pollution in the environment, while improving nutrient and water budgets, and organic production systems. o New reduced risk, environmentally safer pest control tools will be available that are target pest specific will facilitate the implementation of IPM programs. o Environmental change will occur from temperature modifications; enhanced water conservation and wildlife; reduced runoff, fire incidence and pests; improved nutrient use and recycling; and other ecosystem services. o Better ecological methodologies will lead to more social, economic, and environmental benefits and cost effective and sustainable restoration. Improved valuation of ecological services associated with restorations will greatly facilitate market-based conservation practices such as mitigation banking and effluent trading. Better conservation bio-control strategies will decrease the costs associated with insect losses and the use of insecticides. o enhance the nation's natural resource base and environment by revealing cost-effective means to control plant diseases and reduce the need for pesticides. o Biocontrols will reduce environmental damage and costs of

grape growing and facilitate the development of the table and wine grapes with improved quality and nutritional value and therefore to increase competitiveness of the US grape growers and wine makers at the world markets. o Improved soil, water, and crop management practices and strategies that protect Oregon resources o Management of public and private rangelands will sustain and improve ecological values as desired by the public and the rural communities that depend on the natural resources. o Strategies for avoiding invasive pests will be in place o Plant disease resistance will lower the amount of pesticide use, resulting in a more healthful environment and reduced exposure of humans to hazardous chemicals.

2. Outcome Type : Change in Condition Outcome Measure

2010 0 **2011 :** 0 **2012 :** 1 **2013** 0 **2014 :** 0

3. Associated Institute Type(s)

•1862 Research

4. Associated Knowledge Area(s)

- 102 - Soil, Plant, Water, Nutrient Relationships
- 111 - Conservation and Efficient Use of Water
- 121 - Management of Range Resources
- 202 - Plant Genetic Resources and Biodiversity
- 205 - Plant Management Systems
- 206 - Basic Plant Biology
- 216 - Integrated Pest Management Systems
- 302 - Nutrient Utilization in Animals
- 307 - Animal Production Management Systems
- 601 - Economics of Agricultural Production and Farm Management

Outcome #13

1. Outcome Target

Change Indicator 2 - Societal o Social change will occur through new perceptions of green technologies and social value or capital of horticultural landscapes to enhance human health, therapy, wellness, and social networks. o Social impacts include consumer awareness and appreciation of the abundance of locally grown ornamental plant materials and native species for use in landscapes will increase; also awareness of invasive species. o Social change will enhance quality of life in rural areas by improving economic stability of family farms, wineries, wine tasting, and tourism with new practices and cropping systems and/or livestock management practices/systems. o Social change will improve economic stability of families and quality of life with improved cropping systems. o Worker safety with bio-based pest control and dwarf rootstocks (short ladders) will be improved; farm workers will find other employment with increased mechanization. Local and community markets increase social networking in rural communities. o Increased opportunities for rural community marketers and processors will be developed; o Public health will be improved through the use of crops with improved nutritional value o Sustainable and economically viable wheat and dryland cropping industry for vibrant rural economy in eastern Oregon o The public has access to an ongoing research data base that allows for natural resource/land management decisions to have a fundamental basis in science.

2. Outcome Type : Change in Condition Outcome Measure

2010 0 **2011 :** 0 **2012 :** 0 **2013** 0 **2014 :** 1

3. Associated Institute Type(s)

•1862 Research

4. Associated Knowledge Area(s)

- 216 - Integrated Pest Management Systems
- 601 - Economics of Agricultural Production and Farm Management
- 602 - Business Management, Finance, and Taxation

- 603 - Market Economics
- 607 - Consumer Economics
- 803 - Sociological and Technological Change Affecting Individuals, Families and Communities

Outcome #14

1. Outcome Target

Change Indicator 3 - Economic o The economic value of landscapes will increase. Cost and benefit analyses of plants usage to modify environments with green technologies will reveal positive economic impacts and improved health and wellness from horticultural therapy. o Economic impacts include reduced costs, increased benefits, and production efficiencies from use of water and nutrient budgets in recycled water systems, improved pest management, and diagnosis of plant problems to increase sales of quality products. Costs of regulatory procedures will be reduced with water and nutrient budgets and management systems. o Profitability of berry crops in Oregon is expected to improve as new cropping systems, cultivars, practices, and efficiencies are implemented. Machine harvest technologies will be adapted or developed for Oregon to reduce production costs and improve competitiveness in global markets. o Profitability of vegetable and specialized seed crops is expected to improve as new cropping systems, cover crops, nitrogen management, reduced tillage, and cultivars are adopted by growers. Communication networks will enable timely communication and utilization of technologies to alert growers of weather related pest incidence, educational events, and practices. o Profitability of viticulture in Oregon is expected to improve as new cropping systems, cultivars, practices, and efficiencies are implemented. Niche markets, wine tasting, and tourism are primary outlets for Oregon wines. o Profitability of tree fruits and nut crops in Oregon is expected to improve as new cropping systems, cultivars, practices, and efficiencies are implemented. High density orchards are expected to improve production efficiencies and increase markets. o Agricultural producers will realize greater economic return in their cropping enterprises; Plant nutrient and other production input use will be optimized o Producers maximize the control of postharvest decay within the various production and marketing objectives of producers. o Biocontrols will reduce environmental damage and costs of grape growing and facilitate the development of the table and wine grapes with improved quality and nutritional value and therefore to increase competitiveness of the US grape growers and wine makers at the world markets. o Higher-value niche markets will be established o Beef producers in the Intermountain and Great Basin areas remain completive on a regional, national, and global basis. o Producers greatly improve their reproductive efficiency by removing bad genes thus increasing productivity and economics of the industry. Industry thus has improved resource and economic sustainability through reduced costs and/or increased productivity. o Better understanding of the costs, benefits, and potential impact of legislation on the dairy industry, and thus more economically and environmentally sustainable systems for dairy and beef production. o Intense selection reduces needs for assistance in pasture lambing conditions. o Economic viability of farmers markets will be enhanced o Agricultural producers will realize greater economic return in their enterprises; o Increased potato yield will increase potato farmers' income as well as the stability of potato production of the world. The potential increase from 29,000 acres to as much as 100,000 acres will increase Oregon's market share and economic benefits.

2. Outcome Type : Change in Knowledge Outcome Measure

2010 : 0 **2011 :** 0 **2012 :** 1 **2013 :** 0 **2014 :** 1

3. Associated Institute Type(s)

•1862 Research

4. Associated Knowledge Area(s)

- 205 - Plant Management Systems
- 216 - Integrated Pest Management Systems
- 601 - Economics of Agricultural Production and Farm Management
- 602 - Business Management, Finance, and Taxation
- 603 - Market Economics
- 607 - Consumer Economics
- 803 - Sociological and Technological Change Affecting Individuals, Families and Communities

Outcome #15

1. Outcome Target

KNOWLEDGE, Indicator 1b - landscape management systems. * Professional turf/landscape managers, nursery retailers, gardeners, and people associated with restoration/conservation projects will learn about sustainable gardening practices (eg. fertilizers, water, and pest management including organic), turf management, horticulture and aboriculture principles and practices, streamside gardening, native plants, invasive species, fire prevention, methods to minimize water runoff and use, wildlife enhancement, conservation and stewardship, and add value and beauty.

2. Outcome Type : Change in Knowledge Outcome Measure

2010 :1 **2011 :** 1 **2012 :** 1 **2013 :**1 **2014 :**1

3. Associated Institute Type(s)

•1862 Research

4. Associated Knowledge Area(s)

- 102 - Soil, Plant, Water, Nutrient Relationships
- 111 - Conservation and Efficient Use of Water
- 205 - Plant Management Systems
- 206 - Basic Plant Biology
- 216 - Integrated Pest Management Systems
- 602 - Business Management, Finance, and Taxation

Outcome #16

1. Outcome Target

KNOWLEDGE, Indicator 1c - dryland production management systems. * Producers, NRCS, conservation districts and environmental agencies learn about whole farm nutrient management. * Basic agronomic practices for commercially promising alternative crops under reduced tillage systems.

2. Outcome Type : Change in Knowledge Outcome Measure

2010 :2 **2011 :** 2 **2012 :** 2 **2013 :**2 **2014 :**2

3. Associated Institute Type(s)

•1862 Research

4. Associated Knowledge Area(s)

- 102 - Soil, Plant, Water, Nutrient Relationships
- 111 - Conservation and Efficient Use of Water
- 202 - Plant Genetic Resources and Biodiversity
- 204 - Plant Product Quality and Utility (Preharvest)
- 205 - Plant Management Systems
- 206 - Basic Plant Biology
- 216 - Integrated Pest Management Systems
- 601 - Economics of Agricultural Production and Farm Management

Outcome #17

1. Outcome Target

KNOWLEDGE, Indicator 1d - irrigated production management systems. * Growers and the public sector are made aware that environmentally friendly drip and micro sprinkler irrigation systems produce increased crop yield and crop quality and

that less nitrogen is required when crops are irrigated than with furrow and regular sprinkler irrigation

2. Outcome Type : Change in Knowledge Outcome Measure

2010 :1 **2011 :** 1 **2012 :** 1 **2013 :**1 **2014 :**1

3. Associated Institute Type(s)

•1862 Research

4. Associated Knowledge Area(s)

- 102 - Soil, Plant, Water, Nutrient Relationships
- 111 - Conservation and Efficient Use of Water
- 204 - Plant Product Quality and Utility (Preharvest)
- 205 - Plant Management Systems
- 216 - Integrated Pest Management Systems

Outcome #18

1. Outcome Target

KNOWLEDGE, Indicator 1e - marketing approaches * Improved marketing approaches for local markets and community food systems.

2. Outcome Type : Change in Knowledge Outcome Measure

2010 :0 **2011 :** 1 **2012 :** 0 **2013 :**0 **2014 :**1

3. Associated Institute Type(s)

•1862 Research

4. Associated Knowledge Area(s)

- 601 - Economics of Agricultural Production and Farm Management
- 603 - Market Economics
- 607 - Consumer Economics

Outcome #19

1. Outcome Target

KNOWLEDGE, Indicator 2b - animal reproductive genetics. * genetic causes of early embryonic failures, * developmental biology of the early bovine embryo * factors affecting establishment of extraembryonic endoderm * sire genotype effects on embryonic loss * understanding genetic basis for fertility in male poultry including sperm cell function

2. Outcome Type : Change in Knowledge Outcome Measure

2010 :1 **2011 :** 1 **2012 :** 1 **2013 :**1 **2014 :**1

3. Associated Institute Type(s)

•1862 Research

4. Associated Knowledge Area(s)

- 301 - Reproductive Performance of Animals

Outcome #20

1. Outcome Target

KNOWLEDGE, Indicator 4b - plant attributes for health. * Antioxidant effects of various carotenoids and flavonoids, and impact of flavonoids on antioxidant effect * Stakeholders learn about human health benefits, disease resistance, and breeding for organic systems of vegetables.

2. Outcome Type : Change in Knowledge Outcome Measure

2010 :1 **2011 :** 1 **2012 :** 1 **2013 :**1 **2014 :**1

3. Associated Institute Type(s)

•1862 Research

4. Associated Knowledge Area(s)

- 204 - Plant Product Quality and Utility (Preharvest)
- 206 - Basic Plant Biology

Outcome #21

1. Outcome Target

KNOWLEDGE, Indicator 5a - weed control * factors affecting herbicide activity * herbicides registered, * natural herbicides to control weeds in organic and/or no-till wheat production, * improved weed control in no-till fallow systems, including optimum inputs

2. Outcome Type : Change in Knowledge Outcome Measure

2010 :2 **2011 :** 2 **2012 :** 2 **2013 :**2 **2014 :**2

3. Associated Institute Type(s)

•1862 Research

4. Associated Knowledge Area(s)

- 202 - Plant Genetic Resources and Biodiversity
- 204 - Plant Product Quality and Utility (Preharvest)
- 205 - Plant Management Systems
- 206 - Basic Plant Biology
- 216 - Integrated Pest Management Systems

Outcome #22

1. Outcome Target

KNOWLEDGE, Indicator 5c - disease biology, control and resistance * Facilitate future planned activities in functional genomics and provide a more robust sampling of the Pleosporales for comparative genomic studies by the fungal research community. * Efficacy of various orchard, postharvest, and storage methods for control of postharvest decay of pear * Molecular mechanisms responsible for closterovirus reproduction and transport in plants and develop model to predict risk * Functions of the GLRaV-2 proteases in virus reproduction and spread, as well as characterize mechanisms of BYV Hsp70h interactions with actin cytoskeleton and targeting to plasmodesmata; approaches to engineering GLRaV-2 gene expression vectors. * Elucidate the underlying molecular mechanisms of pathogenicity (virulence) and disease susceptibility (compatibility) and disease development. * Technologies for efficient application of viral vectors in grapevine. * Disease resistance discoveries, including gene evolution, plant lines * Information for the development of resistant wheat germplasm to tan spot. * relationships between disease susceptibility and disease resistance. Characterize genes involved in Victoria Blight Disease susceptibility, and uncovered

2. Outcome Type : Change in Knowledge Outcome Measure

2010 :3 **2011 :** 3 **2012 :** 3 **2013 :**3 **2014 :**3

3. Associated Institute Type(s)

•1862 Research

4. Associated Knowledge Area(s)

- 202 - Plant Genetic Resources and Biodiversity
- 204 - Plant Product Quality and Utility (Preharvest)

- 205 - Plant Management Systems
- 206 - Basic Plant Biology
- 216 - Integrated Pest Management Systems

Outcome #23

1. Outcome Target

KNOWLEDGE, Indicator 6b - trade * We expect to show that international trade will be an important vehicle by which adaptations can be made to global climate change. * Researchers will uncover key relationships that tie climate change to the distribution of crop yields, comparative advantage, geography, and international trade. * Policy makers will understand that climate change will be related to changes in comparative advantage in international crop production, and in turn the pattern and volume of trade. * Numerical estimates will be provided regarding how climate change will affect crop prices, production costs, and the economic welfare of producers, consumers, and society at large.

2. Outcome Type : Change in Knowledge Outcome Measure

2010 :1 **2011 :** 1 **2012 :** 1 **2013 :**1 **2014 :**1

3. Associated Institute Type(s)

•1862 Research

4. Associated Knowledge Area(s)

- 205 - Plant Management Systems
- 601 - Economics of Agricultural Production and Farm Management
- 603 - Market Economics
- 803 - Sociological and Technological Change Affecting Individuals, Families and Communities

Outcome #24

1. Outcome Target

KNOWLEDGE, Indicator 6c - community education. * Ways to integrate agricultural education into high school curriculums

2. Outcome Type : Change in Knowledge Outcome Measure

2010 :0 **2011 :** 1 **2012 :** 0 **2013 :**0 **2014 :**1

3. Associated Institute Type(s)

•1862 Research

4. Associated Knowledge Area(s)

- 803 - Sociological and Technological Change Affecting Individuals, Families and Communities

Outcome #25

1. Outcome Target

1ACTION Indicator 3b - plant management tools used by private and public sector * Farmers will more strategically plan for crop production * Crop rotation sequences and Green manure crops in combination with reduced or no nematicide use, particularly for short season potato crops to suppress nematode populations. * End users adopt new pesticide and pest management systems and strategies for working with invasive pests * District-specific control programs will reduce usage of fungicides with low efficacy and emphasize integrated control practices.

2. Outcome Type : Change in Action Outcome Measure

2010 :1 **2011 :** 1 **2012 :** 1 **2013 :**1 **2014 :**1

3. Associated Institute Type(s)

•1862 Research

4. Associated Knowledge Area(s)

- 102 - Soil, Plant, Water, Nutrient Relationships
- 111 - Conservation and Efficient Use of Water
- 205 - Plant Management Systems
- 216 - Integrated Pest Management Systems

Outcome #26

1. Outcome Target

ACTION Indicator 3c - post harvest tools used by private sector * Growers, packers and extension faculty incorporate practices to lower decay risk, including reduced fungicide usage, and identify high risk fruit lots and to market these before decay has time to develop in storage. * Interaction of program components and the overall efficacy of various combinations of orchard, postharvest, and storage factors will be the guides to the description of programs for implementation in the pear industry. * Determine packinghouse water system contamination by fungal pathogens. Commercial service lab can apply PCR technology to maintain sanitation determine most effective fungicides for each species. * Customized decay control program for each unique pathogen complex.

2. Outcome Type : Change in Action Outcome Measure

2010 0 **2011 :** 1 **2012 :** 0 **2013** 0 **2014 :** 1

3. Associated Institute Type(s)

•1862 Research

4. Associated Knowledge Area(s)

- 216 - Integrated Pest Management Systems

Outcome #27

1. Outcome Target

ACTION Indicator 3d - land and invasive species management tools used by private and public sector * Land management protocols will be used in public land management policy decisions. * Understand pollen flow mechanisms between wheat and its wild relative jointed goatgrass

2. Outcome Type : Change in Action Outcome Measure

2010 0 **2011 :** 0 **2012 :** 1 **2013** 0 **2014 :** 0

3. Associated Institute Type(s)

•1862 Research

4. Associated Knowledge Area(s)

- 111 - Conservation and Efficient Use of Water
- 121 - Management of Range Resources
- 202 - Plant Genetic Resources and Biodiversity
- 205 - Plant Management Systems
- 216 - Integrated Pest Management Systems
- 601 - Economics of Agricultural Production and Farm Management
- 803 - Sociological and Technological Change Affecting Individuals, Families and Communities

V(J). Planned Program (External Factors)

1. External Factors which may affect Outcomes

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

Description

The level of funding or relative importance that our collaborating agencies, e.g., USDA FS or BLM, put on research will be important for our continued success.Likewise, we are also dependent on competitive grant funds such as USDA SARE/NRI. As a result, our continuing success and productivity will depend on the success of each subprogram in remaining competitive.Success with competitive grants will depend on our publication track record, relevance of proposed research and the ability of the federal government to continue funding these important research programs.

Government subsidies and programs can dramatically affect crop production.If subsidies exist for the production of a particular crop, despite long-term economic projections, acreage can be driven toward that crop. As fuel and fertilizer prices climb, growers may be forced to make production decisions based on available dollars versus any other factors. US immigration policy will affect the labor force available for field and processing work. US immigration policy affects the ability of students to come to the US for advanced study.

Where plans of work include field studies (resistance tests, pesticide trials, seed bulking, etc.), weather can always affect outcomes. Where plans of work include laboratory studies, results can be influenced by building infrastructure and repair of equipment. Turnover of personnel can disrupt progress, but can also bring opportunities for new investigators with different skill sets.

Economics and public policy are the critical. Changing or stricter rules on domestic productivity versus marketing (for imported commodities) create hardship for domestic growers in a global market.

Public concerns may result in the untimely removal of certain classes of pesticides from use before effective alternatives are identified.

The unintended introduction or identification of internationally quarantined pests could result in wholesale loss of the value of some agricultural enterprises – recent examples in other areas include Karnal bunt in wheat and mad cow disease

Niche marketing to foreign countries is dependent on the balance of trade between the US and that country.If many goods are being shipped by container to the US and empty containers are available for the return shipment, shipment of small quantities of bulk materials can be affordable.

V(K). Planned Program (Evaluation Studies and Data Collection)

1. Evaluation Studies Planned

- During (during program)
- Retrospective (post program)

Description

Most evaluation will be retrospective. Much of the professional output from the program would qualify as scholarship implying a peer review process, validation and publication in journals. Publications, survey documents to assess adoption and Oregon Ag Invests will be utilized in evaluation.

2. Data Collection Methods

- Sampling
- Observation
- Structured
- Unstructured
- Tests
- On-Site

Description

V(A). Planned Program (Summary)

Program #6

1. Name of the Planned Program

P6-Sustaining Rural Communities

2. Brief summary about Planned Program

Sustainable agricultural systems are economically viable, utilize ecological principles that preserve environmental quality, enhance food safety and security, and promotehealthy communities. A combination of approaches will be needed to ensure production of food, fiber, and fuels in a sustainable fashion, despite decreasing availability of water, labor, and land. Increasing market demand require growers to meet new sustainability standards in order to maintain access to markets, as well as creating new market opportunities for integrated farming and food systemsthat support rural and urban economic development.

The nation is going through many changes in the market, environment, economy, and politics, leading various social changes in the marketplace. Drastic changes in the marketplace, especially in rural America, have threatened the well-being of rural community residents and the economic survival of rural producers and retailers. In order to improve the economic vitality of rural America and thus well-being of the community, research is needed to identify the current problems faced by rural businesses and consumers, and further, to develop the business strategy to assist rural businesses to gain economic competitiveness. Rapid technology development has been a critical change that has threatened the survival of rural communities that lack resources and knowledge to be responsive to changes in technology. Thus, there is a pressing need to address how rural communities can respond to the changes in the marketplace as a result of technological development. As the contribution of agriculture and manufacturing to rural community has declined, the importance of rural retail business to improve the economic well-being of community becomes critical.

3. Program existence : New (One year or less)

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
610	Domestic Policy Analysis	30%		30%	
802	Human Development and Family Well-Being	55%		55%	
804	Human Environmental Issues Concerning Apparel, Textiles, and Residential and Commercial Structures	15%		15%	
	Total	100%		100%	

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

1. Situation and priorities

Over the past two decades, three changes have dramatically affected the viability and health of rural communities and the prospects for ork opportunities of rural populations. First, globalization and macroeconomic policies have led to a major restructuring of the rural economy with many traditional rural jobs in agriculture, forestry, textiles and furniture manufacturing moving overseas. Second, and related to the restructuring, migration patterns – both domestic and international (legal and illegal) – have brought about major shifts in both population numbers and the ethnic composition in rural communities across the

land. Third, public policy related to the social safety net has seen the most dramatic shift in almost seventy-five years. In place of entitlements based on income and family composition, the Federal government and the states have created a set of policies that require work effort from those who would receive public assistance. These underlying challenges and interactions of public assistance and public policy affect the health and quality of life of families and individuals, particularly those who live in poverty.

We have a unique opportunity to learn about how rural community conditions and public policy affect the food, lifestyle, work and residence choices of rural versus urban households, and particularly how public policy can support low-income households in rural communities. Availability of four decades of panel data on household work and migration decisions allow new data sets – particularly the Local Employment Dynamics (LED) data available from the Department of Labor and U.S. Bureau of the Census – allow analysis of household decisions about work and place of residence that were unimaginable a decade ago. Statistical tools for econometric analysis – including tools for spatial analysis and analysis of panel data – have been developed and new statistical software makes these tools widely accessible.

This program addresses the priorities outlined in CSREES Strategic Goal 3: Support Increased Economic Opportunities and Improved Quality Of Life In Rural America, as well as Goal 5: Improve the Nation's Nutrition and Health.. We specifically address Objective 3.2 (improve quality of life, p. 13) and Objective 5.2 (healthier eating habits and lifestyles, p. 23).

The outcomes of the studies have a tremendous impact on populations of great need, i.e., rural populations who face on-going challenges of health and well-being, families and individuals who live in poverty, Latino families in Oregon, and older or disabled adults needing improved thermoregulatory capacity. The project activities will yield important knowledge about the factors that positively or negatively affect physical activity behavior, as well as, how much daily physical activity is critical in maintaining adequate energy balance/energy expenditure issues that affect obesity, and new textile products that improve the quality of life for older or disabled people.

2. Scope of the Program

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

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

1. Assumptions made for the Program

The key assumptions of this research project are that

(1) federal, state and local policymakers seek to understand how individual economic opportunity is affected by local economic and social context,

(2) that such understanding will be useful in designing federal, state, and local policy to support state and local efforts to increase local community capacity

(3) underlying challenges and interactions of public assistance and public policy affect quality of life of families and individuals who live in poverty

(4) daily physical activity is critical in maintaining adequate energy balance/energy expenditure issues that affect obesity

(5) there are thermal qualities of readily available agricultural products that can be used in clothing design and development

2. Ultimate goal(s) of this Program

This program will produce important insights about rural populations who face on-going challenges of health, well-being, and economic opportunities. Research falls into two subareas:

(1) To understand factors affecting the health and economic opportunities of rural people and the economic and social vitality of rural communities.

(2) To understand how federal, state or local policy can affect individual opportunities for rural people, and economic and social conditions in rural places.

5. Program objectives

(1) To understand how local economic and social context affects individual opportunity and household decisions, focusing on factors affecting why US households choose to live in a rural or an urban community. (~~Fisher~~, Weber)

(2) To understand how federal, state or local policy can affect individual opportunities for rural people, and economic and social conditions in rural places (Weber, ~~Fisher~~)

(3)To understand the links between quality of life for individual families and wider community and public policy influences. (HHS1: Richards, MacTavish)

a. To analyze the interactions among public assistance and informal social supports, community context, and individual

and family characteristics and their relation to the functioning and well-being of rural low income families with children over three years time.

. To assess across time the relative effects of economic opportunity, and personal attributes and actions, on employment and self-sufficiency among the rural low income families participating in the study.

c. To assess over time, how families have adapted to policy and economic changes to achieve self-sufficiency (household adaptive strategies and well being that are associated with economic, food security, family functioning and policy).

d. To analyze policy areas connected to each quality of life domain, such as food security, access to mental and physical health resources, economic issues including transportation and childcare, and place-based policies for three specific sub-populations:Latino, non-Hispanic White, and Appalachian.

(4)To examine perceptions of and barriers to physical activity in rural communities. (HHS2: McCubbin)

a. Identify individual attributes and family processes associated with specific patterns of physical activity among by youth within the context of a rural community.

. Identify specific resources, opportunities, and barriers within the social and physical environment that either positively or negatively affect patterns of physical activity among small town youth.

c. Examine how individual attributes, family processes, and characteristics of place shape the capacity of rural youth to develop and maintain healthy patterns of physical activity.

(6)To explore and study environmentally friendly and sustainable agricultural product (e.g., poplar seed hair fibers) in functional textile applications. (HHS3: Chen)

a. Determine the features of the chemical constitution and physical structures of poplar tree seed hair fibers that are relevant to their use in textile thermal insulation applications.

. Quantitatively evaluate thermal insulation and related properties of poplar seed hair fiber textile products.

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
2010	0.1	0.0	0.1	0.0
2011	0.1	0.0	0.1	0.0
2012	0.1	0.0	0.1	0.0
2013	0.1	0.0	0.1	0.0
2014	0.1	0.0	0.2	0.0

V(F). Planned Program (Activity)

1. Activity for the Program

We will survey rural Oregon communities and carry out statistical analyses using primary and secondary data sources to better understand the barriers and opportunities in rural places for low-income and high-income workers, the migration patterns that flow from their work and location decisions, the implications of these changes for rural community vitality, and the effectiveness of public policies in strengthening the viability of rural places.

-determine factors that drive the decisions of educated rural householders to move to an urban locality (fueling "brain drain") through surveys

-examine factors to explain why low human capital people are attracted to rural places or otherwise reluctant (or unable) to leave them (thru surveys)

We will develop an econometric model to study rural-urban migration and rural residential choice.

We will carry out chemical and thermal analyses of agricultural products to determine chemical constitution and physical features for insulation and allergic sensitivity.

In summary:
- Conduct surveys
- Conduct data analyses

- Conduct mixed-methods longitudinal research (interviews,
- Conduct Research Experiments
- Develop models

- Develop Products, Curriculum, Resources.

- Provide Training.

- Assessments.

- Partnering.

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

Extension	
Direct Methods	**Indirect Methods**
• Workshop • Other 1 (professional journals) • Other 2 (policy briefs) • Group Discussion • One-on-One Intervention	• Other 1 (Newspaper articles) • Web sites

3. Description of targeted audience

The primary target audiences for this research/extension effort are (1) federal, state, and local government officials and their staff members; (2) those working in the media who cover federal, state and local economic and social trends and conditions; (3) state and local community leaders who are involved in local public affairs; (4) social scientists who want to understand economic and social transformation of rural people and places.

- extension educators.

- commercial producers.

- youth aged 13-18.

- elderly residents
- rural residents
- Latino populations

- economists.

- policy makers.

V(G). Planned Program (Outputs)

1. Standard output measures

Target for the number of persons(contacts) to be reached through direct and indirect contact methods

	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Year	Target	Target	Target	Target
2010	100	100000	0	0
2011	200	100000	0	0
2012	200	100000	0	0
2013	200	100000	0	0
2014	0	0	0	0

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

Expected Patent Applications

2010 : 0 **2011 :** 0 **2012 :** 0 **2013 :** 0 **2014 :** 0

3. Expected Peer Review Publications

Year	Research Target	Extension Target	Total
2010	10	0	10
2011	10	0	10
2012	10	0	10
2013	10	0	10
2014	0	0	0

V(H). State Defined Outputs

1. Output Target

- OTHER SCHOLARLY ACHIEVEMENTS: panel, awards, presentations

  2010 6 **2011** 5 **2012 :** 3 **2013 :** 1 **2014** 0

- EFFECTS ON AND PROTECTION OF HUMAN HEALTH AND COMMUNITIES. Examine rural health and communities through development and testing of econometric and other models and the compilation and analysis of data on communities, families and individuals: a) Develop models about human capital in rural places - One model will examine the factors that lead highly educated householders to migrate from rural to urban places. - A second model will investigate the determinants of rural residential choice among householders with low educational attainment. b) Compile most comprehensive data set on low-income rural family well being available in the U.S. and conduct analyses of community contextual data c) Develop conceptual models to promote understanding of the processes that account for physical activity and the associated health outcomes among youth across ethnic and class boundaries in the context changing rural communities

  2010 : 1 **2011** 2 **2012 :** 1 **2013 :** 1 **2014** 0

- EFFECTS ON AND PROTECTION OF HUMAN HEALTH AND COMMUNITIES. Examine rural health and communities through development and testing of environmentally friendly agricultural products for textiles a) Conduct laboratory experiments to characterize and assess the fibers' chemical, physical and performance properties that are relevant to textile thermal insulation applications.

  2010 3 **2011** 4 **2012 :** 1 **2013 :** 1 **2014** 0

V(I). State Defined Outcome

O. No	Outcome Name
1	Improved understanding about rural human capital: a) understand why people are more likely to be poor if they live in a nonmetropolitan than in a metropolitan area - provide evidence on the degree to which the disproportionate poverty in nonmetro areas is explained by low social and economic opportunities in rural communities or a sorting into rural places of people with low human capital. b) inform local and state policy discussion about rural brain drain and outmigration
2	Models developed and refined: a) Econometric models will explain the sorting of people with low human capital into rural places. b) Conceptual model will promote understanding of the processes that account for physical activity and the associated health outcomes among youth across ethnic and class boundaries in the context changing rural communities
3	Demonstrate that poplar seed hair fibers possess properties are suitable for textile thermal insulation applications. - high-end bulk thermal insulation material
4	Trained scholars and extension educators
5	Improved strategies in rural policies for - rural family and community welfare - local community vitality - anti-poverty - combinations of human-capital and community-strengthening policies that are most likely to reduce nonmetro poverty and its unfavorable consequences. - maximize physical activity and physical and mental health of rural youth and adults
6	Improved outreach, education, and professional practice in serving the needs of rural low-income families - improved well-being and functioning of rural low-income families - programmatic interventions that reduce the physical inactivity and promotes well-being of lower-income and ethnic minority youth across rural America
7	Affect governmental decisions about rural areas - service cuts and revenue alternatives - reallocations of service responsibilities among state and local governments - revenue sharing formulas
8	Value-added use of poplar seed fibers (e.g., for insulating textiles) will benefit the environment and increase total utilization of this resource
9	Improved well-being of lower-income and ethnic minority youth across rural America
10	Use of poplar seed fibers will positively impact the poplar industry and provide environmentally friendly textiles

Outcome #1

1. Outcome Target

Improved understanding about rural human capital: a) understand why people are more likely to be poor if they live in a nonmetropolitan than in a metropolitan area - provide evidence on the degree to which the disproportionate poverty in nonmetro areas is explained by low social and economic opportunities in rural communities or a sorting into rural places of people with low human capital. b) inform local and state policy discussion about rural brain drain and outmigration

2. Outcome Type : Change in Knowledge Outcome Measure

2010 :1	**2011 :** 1	**2012 :** 1	**2013 :**1	**2014 :**0

3. Associated Institute Type(s)

•1862 Research

4. Associated Knowledge Area(s)

- 610 - Domestic Policy Analysis
- 802 - Human Development and Family Well-Being

Outcome #2

1. Outcome Target

Models developed and refined: a) Econometric models will explain the sorting of people with low human capital into rural places. b) Conceptual model will promote understanding of the processes that account for physical activity and the associated health outcomes among youth across ethnic and class boundaries in the context changing rural communities

2. Outcome Type : Change in Knowledge Outcome Measure

2010 :2	**2011 :** 1	**2012 :** 2	**2013 :**1	**2014 :**0

3. Associated Institute Type(s)

•1862 Research

4. Associated Knowledge Area(s)

- 610 - Domestic Policy Analysis
- 802 - Human Development and Family Well-Being

Outcome #3

1. Outcome Target

Demonstrate that poplar seed hair fibers possess properties are suitable for textile thermal insulation applications. - high-end bulk thermal insulation material

2. Outcome Type : Change in Knowledge Outcome Measure

2010 :1	**2011 :** 1	**2012 :** 0	**2013 :**0	**2014 :**0

3. Associated Institute Type(s)

•1862 Research

4. Associated Knowledge Area(s)

- 804 - Human Environmental Issues Concerning Apparel, Textiles, and Residential and Commercial Structures

Outcome #4

1. Outcome Target

Trained scholars and extension educators

2. Outcome Type : Change in Knowledge Outcome Measure

2010	2011	2012	2013	2014
3	3	3	3	0

3. Associated Institute Type(s)

•1862 Research

4. Associated Knowledge Area(s)

- 610 - Domestic Policy Analysis
- 802 - Human Development and Family Well-Being
- 804 - Human Environmental Issues Concerning Apparel, Textiles, and Residential and Commercial Structures

Outcome #5

1. Outcome Target

Improved strategies in rural policies for - rural family and community welfare - local community vitality - anti-poverty - combinations of human-capital and community-strengthening policies that are most likely to reduce nonmetro poverty and its unfavorable consequences. - maximize physical activity and physical and mental health of rural youth and adults

2. Outcome Type : Change in Action Outcome Measure

2010	2011	2012	2013	2014
0	2	1	1	0

3. Associated Institute Type(s)

•1862 Research

4. Associated Knowledge Area(s)

- 610 - Domestic Policy Analysis
- 802 - Human Development and Family Well-Being

Outcome #6

1. Outcome Target

Improved outreach, education, and professional practice in serving the needs of rural low-income families - improved well-being and functioning of rural low-income families - programmatic interventions that reduce the physical inactivity and promotes well-being of lower-income and ethnic minority youth across rural America

2. Outcome Type : Change in Knowledge Outcome Measure

2010	2011	2012	2013	2014
1	2	3	2	0

3. Associated Institute Type(s)

•1862 Research

4. Associated Knowledge Area(s)

- 610 - Domestic Policy Analysis
- 802 - Human Development and Family Well-Being

Outcome #7

1. Outcome Target

Affect governmental decisions about rural areas - service cuts and revenue alternatives - reallocations of service responsibilities among state and local governments - revenue sharing formulas

2. Outcome Type : Change in Action Outcome Measure

2010 :	2011 :	2012 :	2013 :	2014 :
1	1	1	1	0

3. Associated Institute Type(s)

•1862 Research

4. Associated Knowledge Area(s)

- 610 - Domestic Policy Analysis
- 802 - Human Development and Family Well-Being

Outcome #8

1. Outcome Target

Value-added use of poplar seed fibers (e.g., for insulating textiles) will benefit the environment and increase total utilization of this resource

2. Outcome Type : Change in Knowledge Outcome Measure

2010 :	2011 :	2012 :	2013 :	2014 :
0	1	1	1	0

3. Associated Institute Type(s)

•1862 Research

4. Associated Knowledge Area(s)

- 804 - Human Environmental Issues Concerning Apparel, Textiles, and Residential and Commercial Structures

Outcome #9

1. Outcome Target

Improved well-being of lower-income and ethnic minority youth across rural America

2. Outcome Type : Change in Condition Outcome Measure

2010 :	2011 :	2012 :	2013 :	2014 :
0	0	0	0	0

3. Associated Institute Type(s)

•1862 Research

4. Associated Knowledge Area(s)

- 610 - Domestic Policy Analysis
- 802 - Human Development and Family Well-Being

Outcome #10

1. Outcome Target

Use of poplar seed fibers will positively impact the poplar industry and provide environmentally friendly textiles

2. Outcome Type : Change in Condition Outcome Measure

2010 :	2011 :	2012 :	2013 :	2014 :
0	0	0	0	0

3. Associated Institute Type(s)

•1862 Research

4. Associated Knowledge Area(s)

- 804 - Human Environmental Issues Concerning Apparel, Textiles, and Residential and Commercial Structures

V(J). Planned Program (External Factors)

1. External Factors which may affect Outcomes

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

Description

{NO DATA ENTERED}

V(K). Planned Program (Evaluation Studies and Data Collection)

1. Evaluation Studies Planned

- {NO DATA ENTERED}

Description

{NO DATA ENTERED}

2. Data Collection Methods

- {NO DATA ENTERED}

Description

{NO DATA ENTERED}