Extension Service

2006 Annual Report of Accomplishments and Results

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Contents

Overview

Oregon State University Extension programs are conducted in all thirty six counties of the state. Faculty are housed in county Extension offices, at Experiment Stations, on campus, and with partner agencies such as the Oregon Food Bank and Portland Public Schools District. Programming is in five areas: Agriculture, 4-H Youth Development, Forestry, Family and Community Development, and Sea Grant. In addition, faculty perform multidisciplinary activities such as the statewide watershed program.

This report documents the rationale for programming, activities conducted, and impacts of programming during 2006.

Response to Review of 2005 Report of Accomplishment
The review of Oregon's 2005 Report of Accomplishments contained some specific comments regarding extension programming. Because of the planning and reporting cycle, the 2006 report may not fully reflect our response to the reviewers' comments. However, there are several significant efforts currently underway to help ensure that future planning and reporting efforts reflect the comments raised in the 2005 review.

1. First and foremost, is the development of an on-line planning and reporting systems – SOARS (Stories Outcomes and Accomplishments Reporting System). SOARS is a significantly revised version of Oregon's first attempt at an on-line reporting system described in the 2007-2011 plan of work. Parts of the revised system were developed specifically to capture information commented on in the review of the 2005 report. Specifically:
    - *Reported Multi- and Joint Extension Activities focus mostly on agriculture and natural resources; community development and social science programs are poorly represented.* We believe the new SOARS system will help tremendously in identifying and reporting on a broader range of Multi- and Joint activities. In the past, and is still the case for this 2006 report, the Multi- and Joint activity reports were generated directly from the list of such programs we tracked to satisfy Sections 105 and 204 of AREERA. As such, very little effort had been conducted to identify other Multi- and Joint activities taking place. Beginning with the 2008 plan of work extension faculty will be required to complete an estimate of planned time specifically dedicated to Multi- and Joint programming efforts. For the first time ever, we will be able to have a clear picture of these efforts, and target programs for evaluation and impact reporting of Multi- and Joint activities beyond those officially tracked for AREERA.
    - *Connecting the Report of Accomplishment to the Plan of Work.* It was noted that Oregon could have done a better job connecting the report more back to the 5-year plan of work. Reviewers wondered if there is a long-term plan guiding programs. We agree that a clearer connection between the plan and report would strengthen the understanding of our accomplishments as they relate to the outcomes articulated for the planned programs. Until now, there has been no systematic or easy way to make these connections explicit. With the advent of the rolling plan of work, and the

commencement of reporting against that plan (2007) we anticipate being able to articulate connections between the plan and report more clearly.
In addition, the new SOARS system has connected Oregon Extension's planning and reporting cycle in a deliberate and methodical manner. An annual program planning and reporting calendar has been established. Each program area will provide annual updated program plans, including identification of program need, stakeholder input, and articulated outcomes. Faculty will then plan specific programs using logic models that connect their programming efforts directly to the long-term outcomes for each area. Faculty will also generate evaluation plans and reports, all of which will be available and easily searchable on-line for better coordination of evaluation and impact measurement. The report of accomplishment will be drawn directly from the results of these plans, and used to further shape the next cycle of the rolling plan of work.

2. Another area of concern identified in the review of Oregon's 2005 report was the lack of programs designed to meet the needs of under-served audiences in the state, and that the report would be stronger if more attention could be made to describing the populations for Oregon and how Extension is reaching those audiences.

    - The 2006 report still does not adequately address the results of Extension programming that directly reaches underserved audiences. We believe this is due not to a lack of effort in this area, but to an insufficient ability to identify programming in a central location. The new SOARS system will allow faculty members to identify all programming that is conducted with underserved audiences, greatly increasing our ability to identify and document the impact of this programming.
    - The Extension Family and Community Development program has hired a 1.0 FTE social demographer for Extension. This person began work in 2006, and is currently developing on-line resources to help Extension better understand the different populations of Oregon in order to ensure Extension programming serves the needs of all its citizens.

3. Finally, the Stakeholder Input section of this report reflects changes Oregon Extension has made to be more specific about the way we solicit and use stakeholder input to determine program plans.

    - One specific way this has been improved is through the use of "Local Service Extension Needs" matrix developed by asking members of the Extension Citizens Advisory Committee to identify five pressing issues their county faces in the next two years. These issues, and the response that Extension is making to them is being carefully tracked.
    - The SOARS system provides opportunity for each program area to articulate the way citizen input was gathered and used to shape program priorities and outcomes. This will be the first time such information will be available in a searchable database, and directly connected to program and individual faculty plans of works and reports.

Summary of Program Activities and Impacts

Each program described in the following pages was deemed to be representative of the broader programming conducted by the Oregon State University Extension Service and to have significant and documented impacts on target audiences.

Goal 1: An agricultural system that is highly competitive in a global economy.

A. Key Theme: Agricultural Production Efficiency

1. Title: Improving Economic Efficiency by Optimizing Beef Cattle Winter Feeding

Issue: Supplemental feed is the largest expense for most livestock producers, accounting for up to 50% of variable production costs. A producer with inadequate knowledge of nutrition tends to overfeed (incurring unnecessary cost) or underfeed (jeopardizing reproductive performance and animal health). Most beef producers in Oregon have not fully utilized modern nutritional techniques and technologies to improve their feeding efficiency.

Target audience: Oregon beef cattle producers

What was done: Extension livestock specialists taught producers to feed their animals more scientifically by using: (1) ration formulation software; (2) a library of Oregon feeds and forages, developed for use with the formulation software; and (3) other resources such as the new "Winter Feeding Workbook." Producers are educated about the nutrient content of hay and pasture in classes and workshops in which they are encouraged to analyze hay, learn about feed value, animal requirements, ration balancing, and economics of nutrition. Ranchers who have attended classes may consult with extension professionals on ration balancing in exchange for providing data for impact analysis. Peer reviewed publications on nutrition for use in Extension programs have been written.

Impact: Participating producers report saving an average of $21/head by using these technologies. Examples include a producer who reduced feed cost by $45/cow by substituting low-quality grass seed straw for 25% of his feed; another sold 90 tons of high-quality hay he determined he would not need; a third reduced the cost per pound gain on weaned calves by adding barley to a forage-based program.

Optimizing inputs in relation to outputs has an even greater impact on profitability than reducing costs. For example, a Klamath Falls producer sold his higher quality hay to buy feed that better met his animals' requirements at a lower cost. Another producer on the south coast sold his farm-raised, low-quality hay, bought higher quality hay, and thereby increased his cows' body-condition scores, which potentially increases profitability. In Lake County, a producer weighed his feeders monthly and adjusted feed rations accordingly, reducing alfalfa demand by 50 tons over the previous year. In Malheur County, a producer balanced his mineral program and lowered retained-placenta incidence from 10% to zero, reducing the subsequent calving interval.

To date, 10 programs representing 13 counties have featured the workbook across Oregon. One hundred and twenty ranches, approximately 9% of Oregon's total cattle ranches, are participating in the program with an estimated net profit gain of $7,000/ranch/year. Total savings for participant ranches is approximately $840,000. As other ranches join the program, benefits statewide will increase. Most recent data available show 645,900 head of beef cattle in the state. If $21/head were saved on only 10% of Oregon cattle ranches, producers would save almost $1.35 million/year.

Scope of impact: Oregon Statewide

Funding: Smith Lever 3(b)(c)
State Extension funds
County Extension funds

2. Title: Stewardship Certification for Vegetable Crops in the Pacific Northwest

Issue: In the early 1990s, there was growing public concern about the safety of food produced on farms and concern about the possible negative impacts of farming on the environment. There also seemed to emerge price incentives and/or increased market-share opportunities for a food production and processing system that could be certified as "environmentally friendly."

Target audience: Vegetable producers
Food processors
Food buyers and distributors
Food consumers

What was done: In 1994, the multistate Marketing and Production Alliance for Sustainable Agriculture (MAPASA) began with support from a $1,006,000 grant from the W.K. Kellogg Foundation. This has since evolved into the Food Alliance. The Alliance has actively supported development and certification of stewardship-based farming programs that may lead to soil, water and wildlife conservation. From 2003-2004, Extension faculty collaborated with the Food Alliance and a group of ten processed-vegetable growers to craft a Food-Alliance-certified environmental stewardship program for NORPAC Foods, the largest farmer-owned vegetable processing cooperative in the Northwest.

Impacts: In 2005, the NORPAC Foods Stewardship Program was recognized by SYSCO Foods, one of the nation's largest institutional food buyers, as one of the best stewardship programs in the processed vegetable industry. Other food processors are looking at this program for use with their producers. As participation in this program is growing, producers see improved prices and marketability while the public has assurance of food safety and preservation of environmental quality.

Scope of Impact: Willamette Valley

Funding: Smith Lever 3(b)(c)

State Extension funds
County Extension funds

3. Title: Oregon Sustainable Agriculture Resource Center (OSARC)

Issue: Agriculture in the 21st century faces dramatic and far-reaching changes: the raised expectations of the marketplace are reflected in both changing consumer demands and tightening distributor standards. Markets are evolving rapidly to reflect a growing focus on stewardship and sustainability. Wholesalers and retailers are requiring suppliers to meet sustainability standards. Retailers and producers want to tell the story behind their sustainably produced products. Growers and producers are caught in the middle, and need complex information to proceed. Consumers want to shop their values, and are willing to pay more: 25% of the adult population of America already makes buying decisions based on sustainability and locally grown considerations. Public agencies are providing incentives and rewards to producers who supply public goods such as reduced soil erosion, increased water quality and quantity, fish and wildlife habitat, and greater energy efficiency. Producers and consumers are committed to sustaining Oregon's agricultural and natural resource legacy. OSARC is the next logical development of the work that has resulted in I.A.2. "Stewardship Certification for Vegetable Crops in the Pacific Northwest."

Target audience: Producer and commodity co-ops, federal and state agencies, certification programs, and nonprofit organizations

What was done: The Oregon Sustainable Agriculture Resource Center (OSARC) presents a unique vision for problem-solving in changing circumstances. Currently hosted by the Institute for Natural Resources at Oregon State University, OSARC represents a marginal investment that enhances the use and effectiveness of the resources already available from public and private partners. Twenty-seven private and public collaborators have agreed to integrate and present the tools they offer onto the same web site, providing direct access to informational, financial, and technical resources related to sustainable agriculture. OSARC focuses on six key areas: soil and water, pest and disease management, fish and wildlife habitat, energy, animal health, and safe and fair working conditions.

OSARC is a service directly to producers, but also to those who serve producers. It provides Extension, Farm Bureau, and all those who work with producers with more complete and comprehensive information than they have had in the past. OSARC has made available these resources for Oregon's Farmers and Ranchers:

- A single website for farmers, ranchers, and resource professionals
- Access to all financial incentive programs in Oregon
- Access to technical assistance for planning, permits, and on-the-ground work
- Certification programs, standards, and self-assessment tools
- No fault assistance with achieving compliance to regulations; training opportunities
- Staff to answer producer requests for information or other resources
- Evolving resources based on input from users

Impact: Environmental NGO's, the agribusiness community, government service providers and government regulators have convened into a combined effort to provide information on sustainable agricultural production, techniques, technologies and certifications.

Scope of Impact: Oregon statewide

Funding: Smith Lever 3(b)(c)
State Extension funds
Agricultural Experiment Station
County Extension Funds

4. Title: Nutrient Recommendations for Seed Carrots

Issue: Because of Oregon's latitude and relative geographic isolation, it is one of the few prime seed production areas in the world. Specialty and vegetable seeds are high value crops yielding growers some $18 million on less than 6,000 acres of production. Seed production requires very different management from the same crops grown for commodity markets. When asked, the priority of industry representatives was nutrition research to support hybrid carrot seed production; little such research is reported in the literature. A request for management information was made to France and New Zealand, two carrot seed producing areas. None was received.

Target audience: Carrot seed growers and field men throughout the world.

What was done: A three-year project was conducted to determine the nutrient uptake and optimum nutrient management of carrot seed production from 2000-2003. These research results were used for the Extension bulletin Nutrient Management Guide, Hybrid Seed Carrot (Central Oregon) published in November 2004. Annual presentations of research results were made to the industry and to peer researchers. A survey was conducted in 2004 to evaluate the impact of this project. A subsequent survey of carrot seed industry representatives was conducted during 2006 to re-evaluate the adoption of the information.

Impact: Carrot seed generates $6.8 million for central Oregon growers. Accurate crop nutrient information can reduce fertilizer costs, and protect the environment from over application of fertilizers. Growers found an increase in yield resulted from as much as a 40% reduction in nitrogen (N) fertilization of seed carrots. Using average hybrid carrot seed yield and price for 2004 and 2005, the yield depression from as little as 20% additional N costs approximately $1,000 / acre from seed yield loss. Extrapolating the economic impact to all 2300 acres of carrot seed produced, this project potentially saved hybrid carrot seed growers in central Oregon $2.3 million annually. One hundred percent of field representatives responding to a fall 2004 survey indicated that they were aware of the research. Eighty-eight percent said that these results have influenced recommendations, and 72% of the acreage for which they make recommendations is managed according to the research results. A conducted in 2006 indicates that over 90% of growers have adopted the fertilizer management recommendations based on a 2006 survey of Oregon carrot seed contractors. Leaders in the industry report that these results have given growers the confidence to reduce fertilizer rates despite their concern that lower nitrogen rates would reduce yields. New Zealand carrot seed contractors tested the recommendations, and now use this guide. French agronomists eventually provided a 1992 publication that promotes similar recommendations.

The project began with no information about nutrient management for carrot seed production. A cooperative project was initiated and finished with the support and participation of growers, the central Oregon seed grower organization, field representatives, carrot seed buyers, a local extension agent and an extension specialist. The effort resulted in adoption of nitrogen management information that provides the Oregon carrot seed industry a considerable savings annually. In addition, the management information has been adopted internationally.

Scope of Impact: Carrot seed growers state wide.

Funding: Smith Lever 3(b)(c)
State Extension funds
Agricultural Experiment Station
County Extension funds

B. Key Theme: Plant Health

1. Title: The Center to Expedite Specialty Crop Registrations

Issue: The variety of climate and landscape promotes diversity of crops in Oregon. Oregon produces more than 50 horticultural food crops with combined annual sales exceeding $500 million, yet each is a "minor" crop in terms of total U.S. production. Minor crops are defined as less than 300,000 acres in production total for US. Growers of minor crops have limited pest-management options due to (1) the 1996 federal Food Quality Protection Act (FQPA), and (2) the economics of manufacturing and registering pest control products for crops with relatively small acreage. Because economic returns might be minimal for pest management products needed in minor crops, agrochemical companies are often reluctant to undertake the research required for a pesticide registration. As such, research to identify safe and effective pest management strategies, and the field trials required to generate residue data required by EPA for pesticide registrations is conducted by University personnel in an effort to assist growers of minor crops. Limited availability of approved chemicals for safe and effective control of agricultural pests increases potential for crop damage and/or failure, directly impacting this important segment of Oregon agriculture.

Target audience: Oregon producers of "minor" crops

What was done: Oregon grower groups and commodity commissions work with agrochemical manufacturers, state agencies, IR-4 (USDA's Interregional Research Project No. 4) and the U.S. Environmental Protection Agency to maintain pesticide registrations and obtain new ones. The Center to Expedite Specialty Crop Registrations was established in 1995 to expedite registration of minor crop pest management products. The Center develops performance data to support grower requests to the IR-4 Project, and it monitors the progress of requests. It also conducts magnitude of residue field studies to determine whether a substance meets EPA standards for food products. It also prepares Section 18 (emergency registration) and Section 24c (Special Local Need or State Registrations), requests to submit to the Oregon Department of Agriculture.

Impacts: Impacts are in three areas—environmental, economic, and social.

Environmental: Given the FQPA, more emphasis is on new pesticides that are more environmentally friendly. Many are target specific, rather than broad spectrum, and are suitable for Integrated Pest Management (IPM) programs. Unlike older products, new compounds have short residual lives and thus are not likely to persist in the environment or pollute water sources. Most are not toxic to beneficial insects and contain significantly less, or no, organophosphates or carbamates, thereby meeting an important EPA goal. Therefore, employment of new pest management products using IPM methodologies greatly reduces potential negative impacts to the environment.

Economic: Without some of these newly registered substances, crops yields would fall or be lost entirely. Section 18 (emergency registration) and Section 24c (Special Local Need or State Registrations) registrations alone document potential losses to growers of $34 million annually if minor crop pesticides and herbicides are not available. Re-registered herbicides avoid costly hand weeding and crop losses from weed competition. Other products avoid losses from insects and diseases while generating gains in higher quality produce. Examples of annual savings include:

- Section 18: Fipronil (Regent) for Turnip and Rutabaga. 2006 This insecticide helped growers manage cabbage maggot during the 2006 field season. In some fields, currently registered pesticides were achieving only about 25% control of the cabbage maggot. With the use of fipronil, control reached nearly 90%, yields increased by an average of 3 tons per acre, and about $1.3 million was saved in the two industries.

- Section 18: Fenbuconazole (Indar) for Blueberries. 2006 This fungicide provided excellent control of mummy berry disease. Without the use of Indar, some growers were losing nearly 50% of their crop to this disease. The total farm gate value of the 2006 Oregon blueberry crop, valued at $53.1 million, might have been reduced by about $13.9 million without the use of fenbuconazole.

- Section 18: Sulfentrazone (Spartan) for Strawberries. 2006 Spartan provided excellent weed control, especially those weeds apparently resistant to simazine, at planting time, after renovation, and during dormancy. The farm-gate value of the 2006 strawberry crop increased by about $3.4 million with the use of Spartan, which helped reduce yield losses and hand-weeding costs.

- Section 24c: Metolachlor (Dual Magnum) for Rhubarb. 2006 Dual provided effective broadleaf weed control for many Rhubarb growers, saving them about $160 per acre by reducing the amount of hand-weeding needed to achieve maximum yields. Weeding costs without the use of Dual was nearly $250/acre; with Dual, hand-weeding costs were reduced to about $90/acre.

- Re-registration of 2,4-D for sucker control on 28,000 acres of hazelnuts: saves growers nearly $1.8 million each year.

- Command (clomazone) in cucurbit crops: saves growers $149,500 annually.

- Goal (oxyflurofen) for transplanted cauliflower, broccoli, Brussels sprouts and cabbage: If weed competition were to reduce yields by 25%, loss to growers would be $4 million.

- Poast (sethyoxydim)for grass control in 1,000 acres of rhubarb: saves growers $428,000 annually.

- MCPA re-registered for weed control on 1,000 acres of pea seed and 2,500 acres of processing peas: without this, these crops would not be grown. The value of these two crops approached $6.5 million in 2005.

- Oxyfluorfen (Goal) on 6,400 acres of blackberries for primocane suppression: without Goal, an 18% yield reduction would mean a loss of $530/acre, or about $3.4 million each year.

- Outlook (dimethanamid-p) herbicide Section 3 registration in bulb onions in 2005 on 25,000 acres in eastern and western Oregon: reduced weeding cost.

- Outlook (dimethenamid-p) section 18 for weed control in Golden Delicious squash in 2006 was used on 2300 acres to control nightshade.

- Select (clethodim) herbicide approved for grass weed control in clover grown for seed. The 2005 farm gate value of the clover seed crop was $6.5 million. The value of seed crops is dramatically reduced when the crop is contaminated with weed seed.

- Endura (boscalid) fungicide approved for white and gray mold control in snap beans, section 3. Fresh and processed snap beans represent $25.3 million annually at farm gate for growers.

Conservatively, at least half the almost $34 million/year saved can be attributed directly to the Center's work. This estimate does not consider the additional value of higher quality produce, with reduced pesticide residual levels.

Social: The sustainability of Oregon's minor crops production depends on the diversity and value of this sector. This program keeps farms profitable at a time when growers experience pressure to sell their land for development. The traditional character of Oregon's agricultural heritage is maintained because of programs such as this one. Public benefits, beyond those to growers, are seen in the variety and quality of food available to consumers in Oregon, other states and abroad. Long-term health benefits accrue to rural communities in the state; new pest control materials are more environmentally friendly than older products, and rural residents are less exposed to environmental toxins. Finally, the food supply is safer because of this work on behalf of Oregon's minor crops.

Scope of impact: Oregon Statewide

Funding: Smith-Lever 3(b)(c) funds
State Extension funds
County Extension funds

Goal 2: A safe and secure food and fiber system.

A. Key Theme: Food Safety

1. Title: Food Safety/Food Preservation Hotline

Issue: Improper food handling can result in foodborne illness and food waste. Inadequate processing of low-acid home-canned food can result in botulism, a sometimes fatal foodborne illness. To address these safety challenges, a consumer hotline can provide research-based "just in time" food preservation advice.

Target audience: Oregon home food preservers

What was done: A statewide, toll-free Food Safety/Preservation Hotline operated for 3 months (July 17-October 13, 2006). The topics of the calls related to safe food handling and preservation, including canning, pickling, freezing, drying and making jams/jellies. Through the Hotline, Extension volunteers, faculty and staff responded to 4,922 consumer calls.

Impact: To evaluate the impact of the Hotline program, about six callers per day were invited to participate in a follow-up survey. The survey was sent to a sample of 100 callers who had asked questions with food safety implications. Sixty-three surveys were returned (63% response rate) from callers in 16 Oregon counties and out-of-state locations. Description of the sample is as follows:

- 87% were female
- Average years of education completed: 14.0 +/- 2.2 years.
- Age of callers: The majority were 31-49 years (29%), 50-64 years (35%), and 65-79 years (22%).
- Hotline contact: 47% had called the hotline once; 26% had called twice; 27% called three times.
- 62% had recommended the Hotline to someone else.

Survey results:

- Ninety percent were "very satisfied" with the assistance they received
- 84% had shared the information with a mean of 2.1 +/- 1.1 people.
- 97% of respondents had used the information they received from the Hotline
- Of those who used the information they received, 65% had changed their behavior as a result. Those behavioral changes included checking pressure canner gauges for accuracy, using the correct size of canning jars, processing for the correct length of time, and using a pressure canner when needed for safety.

Scope of impact: Statewide

Funding: Smith Lever 3(b)(c)
State Extension Funds

County Extension Funds

Goal 3: A healthy, well-nourished population.

A. Key Theme: Human Health

1. Title: Strong Women Exercise Program

Issue: Americans tend to be relatively inactive. In 2002, 25 percent of adult Americans did not participate in any leisure time physical activities in the past month. Regular physical activity makes an important contribution to one's health, sense of well-being, and maintenance of a healthy body weight. People with higher levels of physical fitness are also at lower risk of developing chronic disease. Conversely, a sedentary lifestyle increases risk for overweight and obesity and many chronic diseases, including coronary artery disease, hypertension, type 2 diabetes, osteoporosis, and certain types of cancer. Overall, mortality rates from all causes of death are lower in physically active people than in sedentary people.

As women age there is significant loss of strength and balance, as well as a loss of bone Starting in their mid-forties, women lose one-quarter to one-third of a pound of muscle per year and gain that much, or more, in fat. One in two women will experience an osteoporosis-related fracture.

Scientific research has demonstrated that exercise with weights (strength training) will increase strength, muscle mass and bone density in middle-aged and older women. Yet only 7% of older women do strength training exercise.

Target audience: Midlife and older women

What was done: In May 2006, 58 *Strong Women* program leaders from Oregon, Washington, California and Idaho were trained in Ashland Oregon. Oregon State University Extension sponsored the program, bringing in trainers from Tufts University. The 58 individuals (56 women and two men) became certified to lead *Strong Women* classes in their own communities during the day-long training.

In 2006 over 372 women participated in one of 29 programs offered two or three times weekly in six Oregon Counties. The programs were led by a mixture of Extension staff and trained volunteers.

Impact:
Jackson and Josephine Counties: These counties are involved in a formal, multi-state evaluation. Thus far, there have been measured increases in strength, flexibility, balance, and endurance using the Human Kinetics Senior Fitness test parameters. In addition, attendees in the classes report:

- Improved bone density readings
- Decreased depression
- Improved ability to sleep
- Better pain management

Malheur County: A survey of the participants (with 97% response) revealed that all respondents found the class useful for improving:

- strength
- overall feelings of well-being.

Tillamook County: Participants in the fall 2006 programs (38 participants) were asked to complete the evaluation that accompanies the program. Twenty-three participants completed evaluations. They ranged in age from 40 to over 70 years in age. Participants indicated that they were very satisfied with the program (4.91 on a scale of 1 [not at all] to 5 [very much]). Participants were asked if the program had made an impact on their lives. On a scale of 1 (not at all) to 5 (very much), They indicated:

- Their health was better because of the program (4.6)
- They felt physically stronger (4.5)
- They had more energy (4.2)
- They slept better (3.5)
- They had become more active (3.8)

They also reported receiving the following benefits from the program:

- Improvements in strength (8 people)
- Social contacts (8)
- Improved balance (5)
- Pain management (4)
- Improvement in overall health (3)
- Improvement in bone density (2)
- Increased flexibility (3)
- Improved stamina (2)
- Toning up
- Improved mobility
- Weight loss
- Improved self-esteem.

Several commented on the value of the program. One wrote, "Besides feeling like I'm doing the best thing for my body, I also enjoy and have a great hour with the other ladies in the class." Another wrote, "I made good friends, lost weight/inches . . . overall, I feel good!

Wasco County: Participants reported being able to do activities that they could not do before participating in the program, including: shopping for a longer period of time, picking up grandchildren, picking up a cast iron plan, improved sleeping, improved flexibility, and commitment to the program because of the camaraderie.

Physicians in the area have prescribed the class for patients, and two of those participating can use the class as physical therapy for surgeries, as the movements are identical to those they would be doing. This is of particular significance for these patients because other options would require a considerable amount of travel for them.

Union County: Pre and post measures of balance were collected for morning and evening participants during the third program. The morning participants had a 50% increase in balance and the evening class had a 60% increase in balance.

Scope of impact: Seven Oregon counties: Jackson, Josephine, Malheur, Tillamook, Washington, Wasco, Union

Funding: Smith Lever 3(b)(c)
State Extension funds
County Extension funds
Modest participant fees, for purchase of ankle weights, dumbbells, and other supplies

2. Title: High School Yoga Program

Issue: Many adolescents experience a high degree of stress in their lives, without having learned strategies or techniques to manage stress. Stress can be linked to depression and other negative mental health conditions, as well as to high-risk behaviors that pose a threat to adolescents' healthy development. Yoga is an effective, non-pharmaceutical way to manage stress, but there has been little investigation of the effects of teaching yoga to adolescents.

Target audience: High school students

What was done: 82 ninth-grade students (51% Caucasian, 49% Hispanic) participated in four yoga sessions over 2 weeks. Each session lasted 45 minutes and was taught by a certified yoga teacher. Students were taught about stretches, postures, breathing, concentration, and other aspects of yoga. Approximately 45% of the school's enrollment were English as a Second Language learners, and 56% of the school's students were eligible for Free and Reduced Lunch.

Impact:
The program was evaluated using a randomized design, in which 2 classes were randomly assigned to either the intervention group or the control group. The intervention group received the yoga sessions, while the control group received their regular physical education classes. Following the program, numerous statistically significant differences were found between the two groups, which established that the yoga program produced measurable impacts on the adolescents' health. The pre-post changes for the yoga group and the control group were as follows. All of the following differences in gain scores are statistically significant. (The control group received the yoga program later on, after this phase of the study was completed).

- Overall health-related quality of life: 13% gain (vs. 1% in control group)
- Physical health: 26% gain (vs. 6% in control group)
- General feelings: 10% gain (vs. -4% in control group)
- Self-esteem: 22% gain (vs. -10% in control group)

- Improvement in perceived stress: 14% gain (vs. 2% in control group)

Scope of impact: Malheur County

Funding: Smith Lever 3(b)(c)
State Extension funds

3. Title: Chronic Disease Self-Management Education

Issue: For people living with chronic health conditions and diseases such as diabetes, arthritis, cancer, heart disease and asthma, lifestyles changes that involve eating, activity level and other behaviors will make an enormous difference in slowing the progression of the disease. However, these lifestyle changes are very hard to make. For these audiences, there is an acute need for education and a supportive social environment to promote success. Recent research has highlighted the potential effectiveness of a series of classes that focus on chronic disease management.

Target audience: Individuals living with chronic diseases

What was done:

- Two Stanford-trained Master Trainers (one whom is an Extension faculty member in southern Oregon) piloted three 6-class series (2003-2005) in chronic disease self-management
- Since that time, twenty-two new instructors have been were trained, and nine instructors are currently available to deliver classes. The instructors included VA clinical staff, local health agency administrative staff, Public Health administrative staff, a local gerontologist, La Clinica (clinical and non-clinical) staff, and retired educators.
- Eight 6-class series were held during 2006. Each session in the series lasted two and one-half hours. Ten series are currently in progress or have been scheduled.
- Eighty-two people were trained. On the average, participants completed 5.7 of the 6 sessions. The conditions with which the participants were dealing included arthritis (31 individuals), hypertension (23), high cholesterol (22), diabetes (14), heart disease (12), cancer (9), asthma (6), emphysema (4), stroke (3), and others. The average age was 63.8 years.
- A website was established: www.sohealthyoregon.org
- A grant from a local private foundation was acquired to launch an effort with Hispanic populations. Five Spanish-speaking leaders were trained. Master Trainer certification and licensing for delivery of *Tomando Control de su Salud* are underway. In the fall of 2006, additional funding was received from the Centers for Disease Control and Prevention (CDC) to implement a chronic care collaboration between public health, a local clinic and Extension faculty and volunteers training in this approach. It will examine the specific impact of this training for asthmatic and diabetic patients who are being regularly seen in a clinical setting. Later in the fall of 2006 funding was acquired from the Administration on Aging (AoA) (Empowering Older Adults to take Control of their Health) to expand the evidence-based chronic disease self-management program

and incorporate another evidence-based approach (Tai Chi for Fall Reduction), originally developed at the Oregon Research Institute. Programs are underway

Impact:

- Original clinical trials at Stanford University demonstrated that the chronic disease self-management program had the following effects: (1) decreased emergency room use; (2) improved health status, as determined through both self-report and physician's report; and (4) improved self-efficacy.
- To date in southern Oregon, the program has been found to help participants improve their health-promoting behaviors, including:
  - exercise
  - cognitive symptom management
  - coping
  - communications with physicians
- The program also helps improve participants' health status (as determined through self-report), including positive effects on fatigue, disability, social activities, and health distress, as well as fewer days spent in the hospital.
- Participants reported significant increases in their confidence about self-management of their chronic condition(s) following the workshops.

Scope of impact: Three counties: Jackson, Josephine, and Klamath

Funding: Smith Lever 3(b)(c)
State and local Extension funds
The Gordon Elwood Foundation
Centers for Disease Control and Prevention
U.S. Administration on Aging

B. Key Theme: Human Nutrition

1. Title: Expanded Food and Nutrition Education Program (EFNEP)

Issue: Poor nutrition is linked to chronic illnesses such as obesity and diabetes. In 2004, 59% of adult Oregonians were obese or overweight, and 22% of 8th graders were overweight or at risk of overweight. Only 28 percent of Oregonians reported eating five or more servings of fruits and vegetables per day in 2004. There is a clear need for high-quality nutrition education for Oregon families. Low-income families are a particularly important target audience.

Target audience: Parents and youth from low-income households

What was done: Participants were recruited through community centers, Head Start, WIC, churches, public housing, rehabilitation centers, and halfway houses. Classes on nutrition and physical activity concepts were taught to adults, teen parents, and youth in pre-school, elementary, middle and high schools at their school sites, after school, Boys and Girls clubs, and during summer programs.

People reached: EFNEP directly reached 2,918 participants with 10,355 contacts in federal FY 2006. Another 323 contacts with individuals were made through public events (food or activity demonstrations), and 1603 adults in the home were reached as a result of sending nutrition education materials home with youth participants.

Impact: Evaluation results from **adults** completing a series of classes:

- 81% of participants (151 of 187) improved nutrition practices, including: *planning meals, making healthy food choices, preparing foods without adding salt, reading nutrition labels, having children eat breakfast*
- 78% of participants (174 of 223) improved food resource management practices, including: *planning meals, comparing prices, using grocery list, not running out of food before the end of the month*
- 56% of participants (121 of 216) improved food safety practices (e.g., thawing and refrigerating perishable foods)
- 44% of participants (80 of 183) more often ate at least two kinds of vegetable each day
- 37% of participants (70 of 187) more often ate at least two kinds of fruit each day
- 37% of participants (62 of 166) more often were physically active for at least 30 minutes a day
- 34% of participants (57 of 168) more often ate whole grain foods like whole wheat bread
- 20% of participants (39 of 161) more often let children choose how much to eat.
- 90% of those who completed 24-hour diet recalls (207 of 230) showed a positive change in any food group at exit

Evaluation results from **youth** completing a series of classes:

- 48% of participants (344 of 716) increased nutrition knowledge
- 77% of participants (123 of 158) improved practices in food preparation and safety

Evaluation results from homemakers in the Portland Metro Area:

- Changes made about choosing food: 18 ate more fruits and vegetables, or more colors of fruits and vegetables
- Changes made about managing a food budget: 16 used coupons to save, and 11 checked and compared prices
- Changes made about preparing foods: 12 learned how to cook with less fat, 12 learned how to cook with less sugar, and 14 learned how to cook with less salt
- Changes made about handling food safely: 19 put leftovers in the refrigerator within 2 hours/cooled foods soon, and 7 kept their kitchen clean
- Changes made about shopping for groceries: 18 read/looked at the nutrition facts label, and 8 made/used a shopping list

Results from adults completing a series of classes:

- 151 (81% of 187) improved nutrition practices *(i.e. plans meals, makes healthy food choices, prepares foods without adding salt, reads nutrition labels or has children eat breakfast)*
- 174 (78% of 223) improved food resource management practices *(i.e. plan meals, compare prices, uses grocery list and does not run out of food before the end of the month)*
- 121 (56% of 216) improved food safety practices*(i.e. thawing and refrigeration of perishable foods)*
- 80 (44% of 183) eat at least two kinds of vegetable each day.
- 70 (37% of 187) eat at least two kinds of fruit each day.
- 62 (37% of 166) are physically active for at least 30 minutes a day
- 57 (34% of 168) eat whole grain foods like whole wheat bread
- 39 (20% of 161) let children choose how much to eat
- Of those who completed 24-hour diet recalls, 207 (90% of 230) showed a positive change in any food group at exit

Scope of impact: Metro area (Washington and Clackamas Counties)
Lane County

Funding: CSREES (federal EFNEP funds)
Local Extension funds

2. Title: Oregon Family Nutrition Program (OFNP)

Issue: Poor nutrition is linked to chronic illnesses such as obesity and diabetes. In 2004, 59% of adult Oregonians were obese or overweight, and 22% of 8th graders were overweight or at risk of overweight. Only 28 percent of Oregonians reported eating five or more servings of fruits and vegetables per day in 2004. In addition, hunger rates are considerably higher in Oregon than the national average.

Target audience: Low-income adults and youth; the majority of this population receives some type of public assistance, such as Food Stamps, TANF, WIC, Head Start, Free or Reduced Price Meals, and emergency foods.

What was done: Adults learned practical skills in food budgeting and feeding young children on a limited budget. Adults and youth learned about food safety, food preparation and other topics. NEP staff and trained volunteers reach adults and youth through series of classes, single events, public events, exhibits, and newsletters. They used a variety of community settings, such as state agency offices, community centers, churches, schools, low-income apartment complexes, food pantries, migrant camps, family shelters, teen-parent programs, and USDA Summer Food Service sites. Extension and NEP community partners pledged $2,672,045 in match funding in federal FY 2006 to support programming efforts. This resulted in equivalent support from the federal Food Stamp program representing $5,396,060 in total effort.

People reached: OFNP directly reached 24,782 (2,951 adult, 179 family, 21,652 youth participants) with 131,024 contacts in federal FY 2006. Another 140,077 contacts with individuals were made indirectly through public events – food or activity demonstrations, displays, and newsletters.

Impact:

Evaluation results from **adults** completing a **series** of classes:

75% of participants (110 of 147) improved nutrition practices, including: *planning meals, making healthy food choices, preparing foods without adding salt, reading nutrition labels, having children eat breakfast*

73% of participants (263 of 360) improved food resource management practices, including: *planning meals, comparing prices, using grocery list, not running out of food before the end of the month*

59% of participants (257 of 436) improved food safety practices (e.g., thawing and refrigeration of perishable foods)

34% of participants (150 of 437) more often were physically active for at least 30 minutes a day

33% of participants (108 of 324) more often let children choose how much to eat

94% of participants who completed 24-hour diet recalls (118 of 126) showed a positive change in any food group at exit

Evaluation results from **adults** in a **single class** show intention to improve these practices:

39% of participants (248 of 634) to eat at least two kinds of vegetable each day.

43% of participants (267 of 614) to eat at least two kinds of fruit each day.

6% of participants (280 of 422) to follow the My Pyramid recommendations to plan family meals

Evaluation results from **youth** completing a series of classes:

38% of participants (1423 of 3746) increased nutrition knowledge

86% of participants (278 of 323) more often ate a variety of foods

40% of participants (101 of 253) increased ability to select low-cost, nutritious foods

79% of participants (358 of 453) improved practices in food preparation and safety

Scope of impact: Thirty of 36 Oregon Counties

Funding: USDA – Food and Nutrition Service
State and local Extension Funds
Community partner matching funds

3. Title: "Happy Home" Meals

Issue: Eating meals as a family and having a positive parent-child feeding relationship can influence young children's food habits.

Target audience: Low-income parents and guardians of young children

What was done:
A bag of "Happy Home Meals" educational materials was developed, originally in English and then translated into Spanish and Russian. In addition to fact and activity sheets, the bag included an imprinted magnet, cookie cutter, and crayons. About 4,700 bags of materials were distributed to faculty/program assistants for distribution to Nutrition Education Program clientele in 21 counties.

Impact: A retrospective evaluation was conducted in 5 counties between March 2006 and January 2007. Evaluation forms were completed by 148 participants (61% Spanish-speaking; 39% English-speaking). Respondents compared their behaviors before the class and their intentions afterwards, as follows:

- 86% reported planning children's meals ahead of time "some of the time" or "most of the time" before the class; 95% reported that they would do this after the class.
- 73% reported following MyPyramid recommendations to plan and prepare their child's meals "some" or "most" of the time before the class; 93% would do this after the class.
- 79% let their child choose how much to eat "some" or "most" of the time before the class; 92% would do this after the class.

In addition, as a result of the class, respondents reported the following intentions for behavioral change:

- 58% planned to schedule at least one family meal each week.
- 53% planned to find a place to sit together for family meals.
- 53% planned to turn off the TV during family meals.
- 54% planned to keep mealtimes calm and peaceful.

Scope of impact: Statewide

Funding: Smith Lever 3(b)(c)
Oregon Department of Justice (settlement funds)
State Extension funds

Goal 4: An agricultural system that protects natural resources and the environment.

A. Key Theme: Forest Resource Management

1. Title: Tree Schools: A Model for Woodland Owner Education

Issue: Providing quality educational experiences for family forest owners—that increase knowledge, improve skills, and change practices on the ground—is an ongoing challenge for Extension. The diversity of individual landowner needs and interests suggests many different class/course offerings should be provided. Motivating landowners to action may be enhanced where a larger profile community event is offered that attracts outstanding instructors, brings in equipment and service sector providers, and creates a networking opportunity where sharing information can occur.

Target audience: Approximately 7,500 family forest owners located in three regions of Oregon.

What was done: Three Tree Schools were designed and delivered in Oregon during 2006. These one-day "back to school" events featured concurrent educational field and indoor sessions generally 90 minutes to 180 minutes long. The table below summarizes the key elements of these events.

Event Region	Tree School Location	# Attendees	# Classes
Portland Metro- North Willamette Valley	Oregon City	595	62
Northeast OR	La Grande	119	23
Southwest OR	Rogue River	125	24

Impact:
Attendees in southern Oregon give Tree School high marks for the *quality of the information* they receive at the event—with an average rating of 2.9 (1 → 3 scale with 3 being top rating). Also, participants report the greatest value to them of this program was, "Tree School helped me make better decisions" (64 "yes"; 1 "no") and "It has made me more confident in managing forestland or conducting forest management activities and consulting" (60 "yes"; 2 "no").

In the Portland Metro region, attendees reported the following behavior change information about their Tree School educational experiences:

- 1/3 of Tree School attendees have successfully reforested land as a result of attending this educational event. The median number of trees planted was approximately 2,000 per landowner.
- 20% of Tree School attendees have thinned their forests using information specifically learned at Tree School, with an average project size of nine acres.

- 21% of Tree School attendees have harvested timber successfully, using information learned at this event. Median project sizes were about 10 acres and harvested about 200,000 board feet of timber volume—including values of nearly $100,000 per landowner.
- 28% of Tree School attendees reported having saved money or increased the profitability of their forest operations by using information learned at Tree School. The average financial gain reported was approximately $5,000 per landowner.

Scope of impact: Regionally in state

Funding: Smith Lever 3(b)(c)
State Extension funds
County Extension funds

2. Title: Women Owning Woodlands Network (WOWnet)

Issue: Women are increasingly gaining a role as primary land managers of family forestlands, yet they often lack the confidence and knowledge to make informed decisions regarding their forestland management. A study of forestland owner offspring conducted by Catherine Mater (2005) for the National Association of State Foresters showed that 83% of women sampled where interested in managing their family forestland when transfer occurred, but only 34% were currently involved in making decisions regarding forestland management. In addition, this study showed significant differences in land management objectives between male and female offspring. Although a recent survey by the Oregon Forest Resources Institute (2004) showed 39% of primary manager respondents were women and OSU College of Forestry Extension (2004) data reported 34% of all off-campus contacts, there is a lot of room to grow so that these women as well as others take leadership and decision-making roles on their properties and in the greater forestry community.

The objective of the WOWnet program is to recognize the growing role of women forestland managers, raise basic forestry and decision-making skill levels among women woodland managers through hands-on, group-based educational opportunities, provide women with opportunities to work together and utilize available technical, educational, and financial resources for their decision-making and active management of their properties, and to encourage communication among Oregon's women woodland managers through the development of statewide and local networks. Volunteer "Local Hosts" work with OSU Extension forester Nicole Strong to form small regional groups. These groups aim to become self-directed and prioritize the topics of their sessions, as well as where and when to hold them. Most often, WOWnet participants take turns hosting sessions on their properties. OSU Extension Service serves as a technical resource and facilitator of this process.

Target audience: Currently active and inactive women woodland managers, inactive woodland managers (siblings, wives, widows and the next generation)

What was done: From December 2005 – January 2007, 188 women have participated in 14 workshops and tours around the state of Oregon. There are currently six county-based WOWnet groups, located in Benton/Linn, Polk/Yamhill, Lane, Douglas, Clackamas and Coos/Curry counties. Participants range from those who had never attended a forestry event before to very knowledgeable women who seek networking and mentoring opportunities. One woman said it this way: "I feel so alone and isolated about what I am doing on my land." A WOWnet listserv and website has been developed: http://groups.yahoo.com/group/wownet, where members can establish personal profiles, ask the group questions, post their own events, upload files or photos, or ask for help on a project, and even collaborate on the purchase of equipment. A statewide retreat for WOWnet leadership is tentatively being planned for winter 2007 - 2008.

Impact: At the end of every introductory session, the facilitator asked five open-ended questions. The responses to these questions were tabulated and compiled according to theme. The top three anwers to "Why women only?" were: 1. To meet other women in a similar situation, 2. To learn in a more comfortable environment, and 3. To recruit/prepare to be the next generation of woodland managers. Most frequent responses to "What do you want from your WOWnet?" were: 1. Collaborative Problem Solving and Networking, 2. A "Safe" Place to learn how to use tools and other technical skills and 3. Opportunity to work with forestry professionals / to find women forestry professionals. WOWnet coordinator Nicole Strong has initiated a collaborative research project with the University of Maine and Vermont Extension Service to develop a formal impact and evaluation study to assess why participants are interested in women based networks and how they utilize these programs.

Scope of impact: Inactive and active women woodland owners of forestland in the state of Oregon.

Funding: Oregon Forest Resources Institute
State Extension funds
Smith-Lever 3(b)(c)

3. Title: Oregon Wood Innovation Center (OWIC)

Issue: Oregon's forest products industry has undergone dramatic changes in recent years. The industry has responded to reductions in raw material supply and the forces of globalization by consolidating, retooling production systems, and by focusing on improving efficiencies in manufacturing processes. However, it is clear that focusing solely on process innovation will be insufficient to maintain future competitive advantage. Firms must also focus on product and business systems innovation. OWIC was developed to help foster such innovation by serving as a 'clearinghouse' to connect manufacturers to the research community, to other organizations that provide assistance to businesses, and to facilitate networking within the industry.

Target audience: Oregon wood products manufacturing firms.

What was done: OWIC was created in late 2005. Scott Leavengood was hired as Director in December and Chris Knowles as Program Assistant in August. Activities in the first year focused on building awareness of the new center, communicating with stakeholders, assisting entrepreneurs, and developing new resources and educational courses. Specific activities include: presentations about the center at community forums, creation of the OWIC website, development of a monthly newsletter, creation of web-based discussion forums, development and delivery of two new educational workshops, and consultation with several firms on new product and process development.

Impact: Indicators of success in building awareness and facilitating communication with stakeholders include over 640,000 website hits in the first 11 months, requests for presentations in 9 locations around Oregon, increase in newsletter subscriptions from 450 to over 600 in the first 4 months, and initiation of new product/ process development projects with 5 companies. With respect to the latter, while project details are confidential, impacts include: product testing services for a plywood firm enabled the firm to successfully sell their new product into the marketplace; recommendations made to a new wood composite firm (specifically, suggestions to consider a higher-value market segment) are likely to improve the firm's chances of success (project is in early stages); and a market assessment provided to a woodland owner cooperative resulted in the co-op seeking grant funds to implement recommendations made in the assessment.

Scope of impact: Oregon Statewide.

Funding: Smith Lever 3(b)(c)
State Extension funds

B. Key Theme: Water Quality and Water Quantity

1. Title: Waterwise Horticulture Results

Issue: Research published by the American Water Works Research Foundation[1] indicates that 40-60% of water used by single family households is applied to home landscapes, which are over watered by as much as 40%. There is no reason to assume that Oregon households are an exception to this finding. Reducing water usage is critical to the preservation of valuable water resources. Six specific water related landscape issues were identified and addressed:

- The need for drought-tolerant plant materials for home and commercial landscapes
- The lack of current publications for extension audiences addressing water wise gardening and landscapes
- The need for current curriculum materials for classroom use
- The need to address post-construction landscaping and water conservation
- Outreach to homeowners at risk of loss from wildfire and
- The need for outreach education for members of Oregon's green industry.

Target audience: Oregon homeowners and commercial landscape managers.

What was done: Four new publications for the identified audience provide information about plant selection, plant adaptability and water wise gardening in Oregon. Two target Western Oregon and two target Eastern and Central Oregon. Classroom curriculum materials and demonstration gardens have been developed and used in Western, Central and Eastern Oregon to increase public awareness of drought tolerant plants and their landscape uses .A post-construction soil quality evaluation is being conducted so that landscaping materials can be matched to disturbed post-construction soils, resulting in well-performing landscapes requiring minimal water and fertilizer after establishment. Additionally, Oregon is experiencing growth at the urban-wildland interface, putting homes at risk of wildfire damage. For homes at the wildland urban interface, two pictorial plant guides were written to promote selection of landscape materials that contribute to reduced fuel, and defensible space around dwellings. Outreach efforts to green industry professionals have taken the form of an annual two-day event in the high desert regions, and the form of weekly seminars during November and December in the Willamette Valley. Participants are exposed to current and environmental horticultural practices, water conservation techniques and technology, business management skills, pest management, plant health, landscape design and care and landscape contracting skills.

Publications promoting water wise gardening provide gardeners climatically appropriate information, which, as applied, will result in pleasing landscapes and water conservation. EC 1546 *Water Efficient Landscape Plants* has received as many as 50 web hits per week since this data has been collected. Grant funds totaling $4500 have been secured from three sources. These funds will permit post-construction sampling for various chemical and physical soil quality parameters. Results of these tests will permit appropriate soil remediation prescriptions and plant selection for the tested sites. The URL for PNW 590 *Fire-resistant Plants for Home Landscapes* has averaged 20 – 25 hits per week since such data have become available. Extension has instituted outreach education to green industry professionals. In the Willamette Valley, this takes the form of seven weekly daylong programs in November and December over the last four years. Typically these programs address issues of sustainability, integrated pest management, resource management and soils management. Green industry professionals have been very receptive to these presentations, and registration is usually 60-70 people per week. On the east side, this outreach effort takes the form of a two day conference which completed its 15th year in 2006. Attendance last year increased significantly, from about 100-120 to almost 250. This was due to expanded sponsorship which permitted broader advertising and an all-inclusive conference website supported by the university.

Scope of impact: Oregon Statewide

Funding: Smith-Lever 3(b)(c) funds
State Extension funds
County Extension funds

2. Title: Reusing Water from Food Processing to Extract Nutrients

Issue: Food processing plants in Oregon produce nutrient-laden wastewater containing nitrates and other compounds that threaten the quality of surface and groundwater resources. For example, a single potato-processing plant in Umatilla County produces 800,000 pounds of elemental nitrogen annually. Similarly, onion, vegetable, milk and cheese processors produce wastewater with high nitrogen contents. This program is regionally implemented, and serves some 15 processing plants and dairies. Statewide, it has the potential to serve more than 100 large food processors and dairies.

Reused water can be a valuable resource for crop production because the growing plants can extract and utilize nitrogen and other processing byproducts. The challenge is to apply nutrients to the crops at rates matching their ability to take up the nutrients, leaving no excess to leach to ground water or run off to surface water.

Target audience:

- Food processors
- Growers who irrigate
- Power generators applying waste water to land
- Regulators from the Oregon Department of Environmental Quality

What was done: This program is part of a statewide effort to appropriately use processing wastewaters while avoiding environmental damage. The main goal is to determine optimum agronomic rates at which to apply the wastewater to various crops, and disseminate this information to growers. Extension has played a key role in developing the Water Reuse Consortium. This group meets 2-6 times annually to determine nutrient and water needs for particular crops and to discuss various regulatory issues. Representatives from as many as 4 farms and 6 processing plants attend each of these meetings. OSU Extension specialists have contributed to the development of science-based plans to optimize waste water use while minimizing environmental impacts. This program further promotes effective communication among participants and educates them about the value and appropriate use of the resource. It also establishes a framework for current and future research needs.

Impacts: Wastewater from food processing plants was applied at agronomic and environmentally sustainable rates to 45,000-50,000 acres of Oregon cropland in 2006. When the program was implemented in 2000, some 20,000 acres received such waste waters. This has turned nutrient-rich wastewater, formerly an environmental liability, into plant-nutrient assets valued at almost $1 million a year. Estimated costs of regulation -imposed wastewater treatment technology, would have added $4.5 to $6 million of annual operating costs to the larger wastewater producers. Growers receiving the effluent enjoy a triple benefit: it benefits their crops, it saves fertilizer costs, and it helps keep growers' markets viable by eliminating a threat to the processors with whom they contract. Additional environmental benefits accrue from this program. Although they have not been assigned dollar estimates, they are considerable.

Scope of impact: Oregon Statewide

Funding: Smith-Lever 3(b)(c)
State Extension funds
County Extension funds

3. Title: Fruit Production and Water Quality in the Columbia Basin

Issue: The Hood River Basin is habitat for threatened winter steelhead and is a major tree fruit production region. Organophosphate insecticides detected in Hood River tributaries exceeding water quality standards led to a 4-year monitoring program and to the development of pesticide best management practices.

Target audience:

- Fruit packers in Hood River County
- Growers who apply pesticides to fruit crops
- Native Americans
- Regulators from the Oregon Department of Environmental Quality
- Oregon Department of Agriculture
- Soil and Water Conservation Districts
- Hood River Watershed Group

What was done: A community-based water quality monitoring effort was established in the Columbia Basin. This program included the target audience listed above. OSU worked closely with the Department of Environmental Quality (DEQ) and the Soil and Water Conservation Districts to seek and analyze stakeholder input and to develop the monitoring plan. Monitoring data were a focal point for a series of stakeholder forums and educational meetings conducted by Extension faculty.

Impact: This monitoring effort established the relationship between monitored pesticide use and stream loading throughout the watershed. Producers volunteered to adopt improved management practices, eliminating the need for regulatory enforcement. The OSU-DEQ partnership sharply reduced the adversarial relationship prevailing between this regulatory agency and the regulated fruit production industry. At the end of the 4-year period, DEQ reported improved water quality associated with reduced chemical inputs resulting from application of improved management practices. In 2001, 18% of water samples contained detectable levels of chlopyrifos residues. In 2002, that had fallen to 10%, and to 6% by 2003. Stakeholder communication was enhanced. Fruit growers were surveyed at the end of the monitoring program; results showed a 12% increase (to 100%) in awareness of the monitoring program and resulting management practices in pesticide use. Ninety-five percent of respondents indicated they had adopted one or more management practices to protect water quality, contrasted with the pre-monitoring effort's survey result of 77%, an increase of 18%. Producers have benefited from significant savings in materials and labor for reduction in spray application. No new pesticide regulations have been imposed on area fruit growers by the DEQ, which considers the experience a success. Workers and broader communities have benefited from reduced exposure to organophosphate pesticides. Further, integrated fruit production is a means of "branding" Mid-Columbia tree fruits, and adding to their market value. The production methods may open the door to export markets which are

highly sensitive to detectible pesticide residues. This success story has been presented locally, nationally, and internationally, and is being used nationwide as an example of what can be achieved when producer groups, environmental groups, regulatory agencies and land-grant institutions work collaboratively to solve common problems. The approach is now employed in 6 other Oregon watersheds. This effort has been presented in multiple regional and national arenas, and has been presented to the Food and Agriculture Organization of the United Nations, at the 2005 meeting in Rome, and is considered a model for FAO sponsored monitoring, risk assessment and outreach in two river systems spanning five countries in West Africa. Monitoring results will be used to assess human health and environmental impacts in 30 villages and in farmer-field-schools in which IPM practices will focus on reducing pesticide loading of aquatic resources.

Scope of impact: Pacific Northwest

Funding: Smith-Lever 3(b)(c)
State Extension funds
Agricultural Experiment Station
County Extension funds

4. Title: Protecting Groundwater while Optimizing Nitrogen Applications for Pasture Forage Production in Oregon

Issue: Early season pasture forage for livestock grazing is lacking in Oregon, and producers must purchase harvested feed to supplement animals on sparse pasture.

Target audience: Livestock and forage producers

What was done: Experiments were conducted across Oregon to determine whether early nitrogen (N) application to pastures would stimulate early season forage growth without loss of N to the environment. Presentations have been made at scientific meetings, producer meetings, and an Extension conference. Trade magazine articles and an Extension publication have been published on the early N application work.

Impact: Early application of N to pastures increased yield and protein content of forage early in the growing season without significant loss of N, and provided economical supplemental feed early in the growing season. Early forage was produced at a savings of $0.03 per pound of feed when compared to harvested forage. Livestock producers pastured animals about three weeks earlier than traditionally, and saved $16 in feed costs per cow during that period. Many producers have adopted this practice, and are pasturing animals earlier and saving money. On a resource base of 850,000 acres of cultivated or improved pastureland, good management can increase forage production 2,000 lbs/yr of dry matter, that can be valued as much as $30/ton, for a potential increase of $25.5 million/year. Assuming 5% of this dry matter potential is reached by better informed landowners making the necessary management changes, their gross income increase would be $1.275 million/year. Another $25 per acre savings can be expected due to the reduced amortized cost of pasture reestablishment totaling a potential $21.25 million savings. Producers would

realize over $1 million/year if 5% of this savings is achieved. Adding these potential estimated benefits and deducting the increased management costs involved nets Oregon livestock producers around $2 million/year. As more land managers adopt the recommended management changes, benefits should increase.

Scope of Impact: Oregon statewide

Funding: Smith Lever 3(b)(c)
State Extension funds
County Extension funds

5. Title: Using a Nitrogen Mineralization Soil Test to Predict Spring Fertilizer Nitrogen Rate for Soft White Winter Wheat Grown in Western Oregon.

Issue: Winter wheat production in Western Oregon benefits from an early spring nitrogen (N) application, but the high-rainfall nature of the region's climate combines with N to threaten surface and groundwater quality.

Target audience: Winter wheat and grass seed growers in the Willamette Valley.

What was done: Ten years of research at OSU identified the relationship between the mineralizable N soil test and available N. The test has been calibrated only for use with winter wheat; it has not yet been adequately refined to predict mineralization for the N demands of grass seed, with which wheat is often grown in rotation. Results of this breakthrough have been presented in an international journal, at an international conference, and in an Extension publication for winter wheat growers.

Impact: This test is successful in adequately predicting available nitrogen in winter wheat cropping systems in Western Oregon. Growers have reduced spring nitrogen fertilization of winter wheat in conventional and no-till production, by 30% or more. A base level of 80 lb / acre for winter wheat has been established; there is no recommendation below this rate. Field men and growers have enthusiastically adopted this test for winter wheat and have reduced N inputs by as much as 60 pounds per acre of urea, valued at about $15 per acre in materials and labor. Willamette Valley winter wheat cultivation has averaged some 51,000 acres per year over the past five years. Potential annual economic impacts to growers approaches $750,000 in savings per year, with additional deleterious environmental impacts avoided from excess N application during high rainfall periods.

Scope of Impact: Willamette Valley

Funding: Smith Lever 3(b)(c)
State Extension funds
County Extension funds

6. Title: Geographic Origin of Food Commodities

Issue: Research on determining geographic origins of food commodities is of increasing and timely importance. Economic incentives drive some processors or retailers to misidentify the geographic origin of raw commodities and of food products. False claims of origin can have profound economic impacts to industries with established reputations for quality and food safety. For example, the value of the California pistachio crop for 2005 exceeded $573 million. Imported pistachios are at risk of contamination with aflatoxins, known human carcinogens.

Target audience: General public, food processors, and producers

What was done: Using trace element and data analyses, geographic origins for samples of potatoes, apples, and coffee beans have been determined with a high degree of accuracy. Current work is with Oregon strawberries, blueberries and pears, and California pistachios. These analyses provide enforcement options for the food industry, protect consumers from deception and overpayment, and protect growers' market shares and reputations for quality.

Impact:

Pistachios The European pistachio market is highly lucrative for the California industry, but the crop is subject to contamination with aflatoxins. This has been true historically for product of Middle Eastern origin. A market basket survey of pistachios sold within the European Union in 1997 found unacceptably high levels of these toxic fungal byproducts on nuts labeled as "California pistachios." Subsequent research determined that the farm of origin was non-existent. Consumer suspicion of pistachios of California origin quickly generalized to the full crop, resulting in a 40% reduction in retail sales for one 3 month period; losses accrued to growers and distributors alike. Analysis with these methods determined that the contaminated nuts had been grown in the Middle East, and had been mis-labeled. The information was disseminated throughout the European Union to distributors and consumers and the reputation of California pistachios as a safe food product was re-established.

Idaho Potatoes Several packing houses were discovered to be purchasing very small quantities of Idaho potatoes, which were mixed with potatoes of other geographic origin, and sold at a premium under the Idaho label to high-end East Coast restaurants. The Idaho Potato Commission initiated legal action against these packing houses. The Commission prevailed in their suit; the identity protocols established by this line of research contributed strong evidence on behalf of the Commission's claim. The Commission believes that there is less product substitution in their industry since this action, resulting in an increase in sales of high-quality potatoes at premium prices.

Washington Apples Apples are highly regarded in the Taiwanese culture, and Washington apples have enjoyed a premium market there. In 1998, apples of Chinese origin were imported into Taiwan in boxes labeled with a characteristic "Washington State" logo. Testing, using these analytic techniques, showed the difference in what came to be a watershed legal case. Following this suit, labeling laws strengthened after this, as were the

legal repercussions for mis-labeling apples of US origin. Since this case, each apple of US origin sold at retail anywhere in the world bears an individual label.

Scope of impact: Worldwide

Source of Funding: Grants
Smith Lever 3(b)(c)
State Extension funds

C. Key Theme: Community and Social Benefits Tied to Agricultural and Natural Resources

1. Title: Master Gardener Program

Issue: Urban and rural residents have a increasing interest in gardening and ornamental plantings. Home horticulture activities provide recreation, increase property value and reduce home cooling costs. OSU Extension Service Master Gardener volunteers expand the university's ability to reach out and assist the citizens of Oregon with sustainable gardening information. When the Master Gardener program began in Washington state in 1973, its focus was primarily directed at diagnosing plant problems and offering solutions. Since that time, the state's population has grown with a commensurate increase in demand for services from the county-based horticulture faculty. At the same time, the funding base for all public services has severely eroded, including fiscal support for home horticulture.

What was done: The OSU Extension Service Master Gardener program began in 1975. After receiving extensive training from OSU Extension Service faculty, staff, and industry professionals, Master Gardeners are certified to provide non-biased, science-based information. Currently there are Master Gardener programs in 30 of Oregon's 36 counties. While problem diagnosis is still a major focus, Master Gardeners are now designing and presenting proactive educational programs that address critical issues such as safe pest management practices, food safety, water quality protection, yard waste management, and composting. Some programs are designed to meet the needs of special populations such as, youth at risk, children, senior citizens, and persons with disabilities. Master Gardeners are encouraged to find educational opportunities, or to help plan and develop outreach activities and programs, that will help extend OSU's education mission more effectively to all Oregonians. The title, "Master Gardener," is widely recognized by Oregonians as identifying an advisor who represents Extension and Oregon State University. Thus, for many Oregonians, the OSU Extension Service Master Gardener program provides a window to the university.

Impacts: Master Gardener volunteers have achieved a high degree of community credibility in three decades of service. The impacts of this program are economic, environmental and social.

Economic Impacts: The economic impacts of this highly regarded extension program are noteworthy. More than 2,000 trained volunteers provide research-based information and

outreach education services to the citizens of Oregon, and give about 145,000 hours per year. This amounts to some $2.375 million in services or the equivalent of about 70 FTE's. Recipient communities further benefit from beautifications projects, horticultural therapy projects, demonstration gardens and other hobby-gardener centered learning opportunities.

Environmental Impacts: Training is the keystone of the Master Gardener program. Since the 1990's, this training has become increasingly oriented toward least toxic pest solutions and practices, which enhance soil and water quality. While such impacts are not readily quantified, it is generally agreed that the amount of pesticides sold to home owners, even if used according to label instructions, is enough to impact watersheds. This "softer" program philosophy reduces the risk of exposure to environmental toxins by gardeners, their families and the broader watershed community. It further reduces the University's liability from volunteer recommendations on the use of broader spectrum materials.

Social Impacts: Master Gardeners benefit directly from the leadership training which is an inherent part of the program, and from their teaching experience. More than 50% of these volunteers are retired from other careers, and bring a wealth of skills and experience to the program. Outreach to schools is a project in almost every county with a Master Gardener presence. Beneficial spillover impacts from the trained volunteers themselves to their neighbors, and indirectly to the broader community, reduce poor practices by less-informed gardeners.

Scope of Impact: Oregon statewide

Funding: Smith Lever 3(b)(c)
State Extension funds
County Extension funds

2. Title: OSU Extension Service Rural Community Vitality Efforts through the OSU Rural Studies Program

Issue: Rural people and rural communities are facing new challenges to their livelihoods and are increasingly concerned about their economic futures and the viability of the communities they have chosen. Many social and economic indicators (unemployment, personal incomes) show the relative disadvantage in rural places.

Target audience: Oregon statewide

What was done: In collaboration with the Rural Studies Program, OSU Extension Service has extended its reach to communities across the state of Oregon. The outreach program focuses on empowering local communities through professional development and community-specific research to make informed decisions about economic well-being and community vitality.

Impact: The OSU Extension Service provides community leaders with research-based information about their local social and economic conditions and effective strategies for

achieving community development objectives. Throughout 2006, the program has helped state policymakers understand the implications of policy choices, supplied local leaders with information about policy impacts, and gathered information from city officials about their needs and concerns. The program is also involved in OSU efforts to educate local official and community leaders to give them the tools to understand both the constraints faced by rural communities and the impacts of policy choices on rural sustainability.

A new extension position in the Department of Agricultural and Resource Economics has provided the resources for OSU to actively support community economic development efforts of rural communities. This faculty member works closely with rural communities to explore economic impacts of government policies on local economies, and explores with them the economic alternatives being considered by rural Oregon communities. One of the most recent projects is explained in a report for the National Renewable Energy Laboratory titled "Umatilla County's Economic Structure and the Economic Impacts of Wind Energy Development: An Input-Output Analysis" This report examines impacts of wind farm investment to Umatilla County's existing economic structure and how rural communities can use economic modeling to maximize wind energy investment. The developer of a local ethanol plant used some of the data developed in this report in a presentation to local investors, and may have contributed to increased interest by this group. Some local farmers expressed interest in wind energy and the study may have helped them gain better access to electrical transmission systems, always a barrier in alternative energy systems.

Other projects in 2006 included an “Economic Impact Study for Detroit Lake and the Upper North Santiam Canyon” which contributed to a more modest proposal of critical habitat to an endangered species, reducing impacts on irrigators. It further supported community discussion of the value of investment in sewer systems and other infrastructure. “Economic Effects of Fairs and Fairground Activities” contributed to one county’s greater allocation of resources for their county fair and was used as justification by another to upgrade their fairground facilities and improve its safety, based on the social capital developed by the fair. A seven month “County College” program has been developed for newly-elected county commissioners and is designed to help county officials with local governance, issues, and programs. The curriculum includes topics such as public education, public works, and human services. The 2006 session involved 20 commissioners from around the state, both rural and urban. This educational outreach has proven valuable to new and seasoned county commissioners.

The OSU Rural Studies Program has partnered with the Ford Family Foundation and University of Oregon’s Public Policy, Planning, and Management program on a community indicators project. This project will help local government and community development organizations access uniform and consistent social, economic, environmental, and institutional indicators to evaluate the performance of their communities. The Rural Studies Program has created a website with an inventory and characterization of existing sources of information about rural social, economic, and environmental community indicators, and links to various resources for all 36 counties in Oregon. This project led to a partnership with OSU Libraries to create a prototype of a portal for rural communities.

Scope of Impact: Oregon statewide

Funding: Smith Lever 3(b)(c)
State Extension funds
University General funds
Agricultural Experiment Station
County Extension funds

Goal 5: Enhanced economic opportunity and quality of life for Americans.

A. Key Theme: Youth Development/4-H

1. Title: 4-H Foods and Nutrition Education Program

Issue: The 4-H Foods and Nutrition program is one of the oldest programs in the 4-H curriculum. Over 100 year ago 4-H programs began with the intent of teaching home economics skills to girls and young women. Today, the 4-H foods program helps girls and boys learn about this important subject matter. From learning about the basics of safe cooking, to selecting foods for nutritional value, to preparing complete meals, youth in the foods program are developing important skills; skills that will enhance the quality of their life and the lives of their families through the practice of sound nutrition and eating habits. It is the adoption of the skills by youth that leads to the achievement of the long term goals of the 4-H foods and nutrition program: that young people participating in 4-H will be physically fit, adequately nourished, and free from preventable disease as a result of maintaining a healthy diet and active lifestyle. As with all 4-H programs, the specific skills learned in the foods and nutrition project also set the stage for learning other important life skills, such as communication, problem solving, and organization.

Target audience: Youth ages nine to 19 statewide in Oregon.

What was done: Youth participate in the 4-H foods and nutrition project through club based programs. Clubs meet once a month on average to learn nutrition and cooking skills. Youth also participate in a variety of foods and nutrition events, such as meal preparation and cooking contests, judging events, cooking exhibits, and presentations.

Impact: A statewide impact evaluation of 430 youth revealed that youth participating in the 4-H foods and nutrition project learned specific skills, reported learning skills as a result of being in the 4-H program, and reported specific actions and behavior changes.

Learning

- 98% of youth reported knowing how to make a healthy snack- 57% learned this skill in 4-H
- 93% of youth reported knowing how to make a complete meal- 61% learned this skill in 4-H
- 84% of youth reported knowing how to make a casserole or main dish- 54% learned this skill in 4-H

In addition, data analysis revealed that youth who participated in the 4-H foods and nutrition project for more than three years reported statistically significantly greater levels of knowledge and skill development than those who participated for less than three year.

Action

Youth reported the following actions as a direct result of participating in the foods and nutrition project:

- 96% report that they handle and store food safely

- 83% report that they choose healthy foods to eat on a regular basis
- 82% report that they have purchased healthy food to cook and/or eat
- 81% report that they cook meals using a recipe, rather than relying on pre-packaged foods
- 74% report that they have purchased food to cook for their family
- 58% report that they have asked their parents to purchase healthy food for their family

Scope of impact: Almost 9,000 youth, ages nine to 19 participate in the 4-H foods and nutrition project in statewide in Oregon.

Funding: Smith Lever 3(b)(c)
State Extension funds
County Extension funds

2. Title: 4-H Oregon Outreach Project-2006

Issue: With a rapidly expanding population of Latino youth in grades K-12, county 4-H programs, desiring to be inclusive of all youth, face multiple challenges in the design, implementation, and evaluation of culturally responsive programs that will attract Latino youth participation. Paramount among needs to address these challenges are having bilingual/bicultural staff in place, increased cultural competency on the part of all staff with regard to Latino culture, and knowledge of programming strategies to meet the needs and interests of Latino youth. The 4-H Oregon Outreach Project is designed to provide support in all these areas.

The Oregon Outreach Project is an initiative of the Oregon 4-H program focused on expanding the participation of Latino youth in 4-H. The project began in 1997 supported by a grant from USDA CSRESS under the Children, Youth and Families at Risk State Strengthening Program. The project provides leadership and resources to county 4-H outreach programs in support of their efforts to connect with and engage Latino youth and families.

Target audience: The 4-H Oregon Outreach Project works with youth in grades K-12. These youth were either born outside the United States or born in the U.S. with one or both parents born in a foreign country (first or second generation). For the most part they are not involved with other community-based youth organizations. Overwhelmingly they are of Mexican origin.

What was done: Fund development by the project supported bilingual/bicultural staff in six counties in 2006. In two counties the staff were full-time employees, in the other four counties outreach positions were half-time. In two additional counties, bilingual/bicultural staff positions established in earlier years as part of the project were supported by funds raised locally. Out-of-school 4-H activities for Latino youth included dance and other performing arts, computers, videography, GIS/GPS, soccer, arts and crafts, natural

resources, and exploration of Latino culture. Program delivery modes included 4-H clubs, after school programs, day and overnight camps, special events, and conferences.

Staff development efforts by the project to increase cultural competency with respect to Latino culture included three project meetings, dissemination of pertinent research reports to faculty and staff, writing related monthly articles for the 4-H newsletter, and holding a book discussion on U.S. and Mexican cultural differences. Staff development efforts beyond Oregon included two presentations at the 2006 NAE4-HA conference. Altogether approximately 220 faculty and staff were reached through these activities.

To help counties in the development of culturally responsive programs, the project provides technical assistance in programming and evaluation. During 2006 sixteen counties received assistance. The project director and evaluator worked one to one with faculty and staff to provide assistance, and county personnel also received assistance through the project network itself.

Over seventy local organizations collaborated in support of 4-H Latino programs. Principal collaborators included public school programs, other community-based youth organizations, other Extension programs, city and county agencies, churches, and the business community.

Impact: Twelve counties conducted ongoing outreach activities, while another five counties began to gear up for outreach. This reflected the involvement of 27 faculty and staff. As a result:

- An additional 3,000 Latino youth participated in 4-H.
- 90 Latino adults served as 4-H leaders contributing over 20,000 hours.
- Another 86 Latino adults helped with 4-H activities contributing an estimated 3,300 hours.
- 94 Latino youth contributed 8,800 hours as program volunteers.

Five formal evaluations of specific outreach programs revealed that Latino youth increased knowledge and skills in targeted areas and parents were very positive about resources 4-H offered to youth.

Scope of impact: Currently approximately 3,000 Latino youth in 13 Oregon counties are participating in 4-H outreach programs

Funding: Smith Lever 3(b)(c)
State Extension funds
USDA CSREES New Communities Program
Meyer Memorial Trust
Weyerhaeuser Company Foundation

3. Title: County 4-H Fairs

Issue: Despite its almost universal presence in county 4-H programs, very little research has been done to understand the contribution 4-H fair makes to the development of the youth

who participate. As the program theory for positive youth development becomes clearer, it is becoming more and more important that we understand the relative contributions particular elements of the 4-H program make to positive youth development.

The larger goal of positive youth development programs like 4-H is to encourage and facilitate the growth of developmental outcomes that result in thriving and well being throughout adolescence, with the ultimate goal of helping youth develop into productive and positive adults. Developmental outcomes such as *competence*, *character*, *connection*, *confidence*, and *caring*, commonly called the "5 C's."

The theory of change for the 4-H program is described in the following manner: 1) youth ages five to 19 participate in intentional educational programs (engagement strategies) that; 2) offer opportunities for the learning content and developing life skills in settings that incorporate the four essential elements of belonging, mastery, independence, and generosity; 3) as a result, youth develop the important characteristics of competence, confidence, connection, character, and caring, that leads ultimately to; 4) well-being in adulthood that includes healthy family and social relationships, positive contributions to the community, and economic self-sufficiency. We know fair is fun- but does it play a role in the development of youth, and if so, in what ways?

Target audience: Approximately 2,600 youth ages nine to 19 enrolled in 4-H animal science projects and participating in county 4-H fairs statewide in Oregon.

What was done: Youth participated in 4-H animal science clubs during the 2005-06 school year. Clubs met once a month on average, and worked with youth to teach knowledge and skills related to animal science, including care and feeding, breeding, training, and showing. Youth then exhibited their animal science projects at the county 4-H fair, participating in herdsmanship, competition, and in some cases the market animal auction. Youth also participated in the "temporary" community of fair- a component of fair that leads to significant life skill development.

Impact: A sample of 557 4-H animal science members participating in six county fairs in Oregon participated in an impact evaluation. The evaluation focused on life skills developed through participation in fair, and on significant changes in self-esteem (confidence) and coping skills (competence) over the course of the 4-H year.

<u>Results</u>

1) Life Skill Development- Different aspects of participation in fair led to different life skill development:

Herdsmanship

- 93% reported an increase in "responsibility"
- 93% reported an increase in "cooperation with others"
- 91% reported an increase in "teamwork"

Competition

- 93% reported an increase in "responsibility"
- 91% reported an increase in "sportsmanship"
- 90% reported an increase in "cooperation with others"

Life at Fair

- 93% reported an increase in "responsibility"
- 92% reported an increase in "helping others"
- 89% reported an increase in "communication skills"
-

2) Developmental Outcomes- Established valid and reliable instruments were used to measure levels of self-esteem and proactive coping skill. Statistically significant differences from the beginning of the school year to after participation in the 4-H fair were found for both developmental outcomes.

	Pre	**Post**	**SME**	**t**	**df**	**Sig.**
Self-Esteem	20.82	22.08	.156	-8.13	399	.000
Proactive Coping	40.42	43.41	.23287	-12.84	430	.000

The results of this impact study show that participation in 4-H animal science projects and the 4-H county fair leads to an increase in important life skills and developmental outcomes. Research shows that developing these skills and achieving these outcomes leads to the long-term success of youth as they transition to adulthood.

Scope of impact: Statewide

Funding: Smith Lever 3(b)(c)
State Extension funds
County Extension funds

4. Title: Skills for Youth Civic Engagement: The 4-H Coastal Futures Program

Issue: Ah… the beautiful Oregon Coast with its pounding surf, fresh breezes holding colorful kites aloft, and historic lighthouses dotting the shoreline. Despite its beauty, rural communities on the Oregon Coast have struggled in recent years with the decline of fishing and timber industries that has impacted the economy of these once prosperous communities. As retirees pour in and real-estate values increase, tourism (including casinos) is becoming one of the main economic drivers on the Oregon Coast This change has impacted the economic, environmental, and social structures of Oregon's coastal communities, and youth are witnessing the devastation that poverty and drugs create in their communities. Despite the growing concerns about rural communities on the coast, many locations also possess a wonderful sense of community- where high school sports are the town's focus, and youth are not anonymous in their towns. In the best sense, rural communities on the Oregon coast provide a "village" for the successful development of the youth who grow up there. Youth growing up in these communities have a vital voice that needs to be heard- a voice that can help shape communities now and in the future. Youth growing up in these communities have

a vital voice that needs to be heard- a voice that can help shape communities now and in the future. The 4-H Coastal Futures Program was designed to help youth and communities develop skills to engage in community deliberation regarding the future of the Oregon Coast.

Target audience: Youth ages 15-19 and adult partner/mentors who work with them

What was done: Youth and adult teams from five communities on the Oregon Coast participated in one of several two-day training. Teams learned about youth/adult partnerships, skills for planning, hosting, and recording community forums, data organization and analysis skills, and action planning. Following participation in the training youth and adult teams planned and held forums in their communities and planned a community action project based on what was learned at the forums. $2,000 was available to each site to help fund the action project.

Impact: Over 60 youth and adults partners attended the training in 2006.

Learning
End of training evaluations showed significant increases in skills for:

- Creating youth/adult partnerships (98%)
- Hosting community forums (94%)
- Planning a forum (88%)
- Creating an action plan (81%)

Action
Youth put the community action skills learned in the training to work almost immediately. Too date, community forums have been held at four sites, with an additional 124 people attending one of the forums and participating in community visioning with the youth leaders. One site has created an action plan for a series of teen community nights and was granted $2,000 to help implement the project in the community.

Scope of impact: Five communities under 10,000 population in four of Oregon's rural coastal counties.

Funding: Smith Lever 3(b)(c)
State Extension funds
National 4-H Council EYSC4 Rural Communities Grant

B. Key Theme: Family Resource Management

1. Title: Financial Literacy

Issue: Several populations are at risk for problems relating to personal financial management, including:

(a) Low-income adults and families: Many families have a great deal of difficulty obtaining and maintaining appropriate housing, for reasons that can include difficulties

involving personal finances. St. Vincent DePaul has developed an eight week renter's rehabilitation program, geared for low-income families who are unable to obtain housing due to previous evictions and credit problems. The program's educational section on basic financial management is provided by Extension.

(b) Seniors: With the statistical increases in longevity in the U.S., individuals now have the potential of living 20 to 25 years past their retirement age. The challenge is to make sure their retirement funds last as long as they do. Research shows that the median income of the retired population was $13,588 in 1999. Most retirees are counting on Social Security for 40% of their income; pension and retirement plans account for 20% and lastly, income from investments makes up that difference. In Lane County, retired seniors make up 13.3% of the population. Longer lives increase the chances of experiencing poverty and outliving available income and assets. The challenge for seniors today is to maximize their investments, to support them throughout their lifespan. Increased cost of living, insurance and health care expenses are escalating, and seniors worry whether there will be enough money to cover their future expenses.

(c) Working women: Retirement is a significant challenge for working women. National statistics show that over two out of three working women earn less than $30,000 a year. Half of all women are employed in relatively low wage jobs without pensions. As a result, women retirees receive only half the average pension benefits received by men.

Target audience:

- Low-income adults
- Seniors
- Working women

What was done:

- Classes for low income families were delivered to 90 participants.
- Long-term evaluation of a 2005 educational program for seniors
- Retirement planning classes for working women were delivered to 16 participants.

Impact:

Participants in the program for low-income families reported the following intentions for the future:

- Establish and use written goals: 51%
- Determine wants vs. needs: 55%
- Set a budget: 7%
- Determine debt: 7%
- Determine expenses: 25%
- Develop a spending plan: 37%
- Identify the value placed on money: 14%
- Check credit report: 33%
- Negotiate payment plan on debts: 7%
- Use rule of 3/consumer skills: 22%
- Organize records: 22%

- Establish an emergency account: 11%
- Spend wisely: 14%
- Increase income: 14%

Participants in the program for seniors reported having made the following changes in their personal financial lives, four months after the program had ended:

- Calculated their net worth: 68%
- Checked their credit report: 42%
- Adjusted their asset allocation: 26%
- Changed their contributions: 11%
- Consulted a professional: 58%
- Prepared a power of attorney: 58%
- Established an advanced directive: 63%
- Prepared an up-to-date beneficiary list: 47%
- Planned for potential changes in status: 53%
- Established an emergency reserve account: 37%

Participants in the program for seniors also reported the following benefits from the program:

- Gained confidence in making financial decisions: 95%
- Increased knowledge about strategies when saving for retirement: 73%
- Acquired financial resource materials: 95%
- Understood the risks needed to insure for their future retirement: 95%
- Estimated the amount of income they need in retirement: 32%
- Identified sources for retirement income: 42%
- Investigated their pension plans: 63%
- Felt their financial resources adequately met lifespan expenses: 53%
- Felt that investments were adequately diversified: 89%
- Felt that their "legal house" is in order: 63%
- Had their risks adequately covered: 85%
- Had their health options adequately covered: 74%
- Had a plan to protect and distribute their assets: 95%
- Made and communicated their plans for later-life events: 79%
- Felt adequately aware of potential consumer scam/fraud: 100%
- Understood where to locate senior resources: 100%
- Had made decisions for housing options now and in the future: 90%
- Had organized their personal records: 63%
- Participants in the program for working women reported the following intentions, following their participation in the program:
- Get more organized: 75%
- Talk to family member about finances and later life events: 50%
- Work on saving more: 50%
- Establish a written plan for goals, savings, and a spending plan: 75%

- Check their credit report and financial records: 25%
- Check their insurance: 25%
- Actively plan their retirement: 50%
- Reallocate and diversify their investments: 25%
- Review their available resources: 50%

Scope of impact: Lane and Washington Counties

Funding: Smith Lever 3(b)(c)
State Extension funds
County Extension funds

C. Key Theme: Parenting

1. Title: Enhancing the Skills of Parents Program

Issue: Parents play a crucial role in shaping the development of their children mentally, socially, physically, and emotionally. Parents also face many challenges in properly raising their children due to factors like economic insecurity, geographic and social isolation, and limited access to services. Providing access to parenting education is an important step toward strengthening the effectiveness of parents. In rural areas, the resources available to parents are often especially limited.

Target audience:

- Families with children from 0-8 years of age.
- Agencies that conduct parenting education programs in rural communities.

What was done:
In this multi-agency collaboration, the Extension FCD program took leadership for program evaluation, data collection and reporting, quality assurance, and technical support; the local community agencies delivered the educational programs. A cluster evaluation strategy was used. The program consisted of parenting education workshops, series, home visits, and family activities. The following activities occurred in 2006:

- 955 parent education classes were taught, and 2,814 parents and youth attended these classes.
- 1,503 home visits with families were conducted.
- To build the capacity of communities for providing parent education, 316 parent education facilitators were trained.
- The sites had 8,878 indirect contacts with community members to build awareness about their programs.
- 605 program activities were conducted in collaboration with schools.

The FCD activities on the project included the following:

- Revised the measurement instruments

- Created a web-based reporting and data collection system.
- Gathering information on the numbers of participants and the numbers of site activities, using focus groups, phone interviews, and written surveys. The data came from site coordinators, project staff, and parents.
- Two networking conferences
- Development of resource notebooks, subcommittee meetings and an email listserv.
- Logic model development for each site and for the overall evaluation plan
- Site visits to each project
- Provision of programming tools, such as a 2007 parenting calendar.
- Phone and e-mail consultations throughout the year on a variety of topics, such as selection of curricula and programming challenges.

Impact:
Fifteen sites provided survey data from parents using the Parenting Skills Ladder (*N*=368). The retrospective t-test design revealed statistically significant improvement in parenting skills, including the following:

- Knowing normal behavior for their children's age level
- Showing their children love and affection frequently
- Listen to their children to understand their feelings
- Setting and sticking to reasonable limits and rules
- Knowing fun activities to help their children learn
- Finding positive ways to guide and discipline their children
- Playing with their children frequently
- Protecting their children from unsafe conditions
- Talking with other parents to share experiences
- Dealing with the day-to-day stresses of parenting
- Understanding their goals and values as parents

The survey data also revealed significant improvement in the children's skills for the following items:

- Showing concerns for others
- Being willing to follow limits and rules
- Getting along with others

Scope of impact: Eighteen rural communities in Oregon and California

Funding: Smith Lever 3(b)(c)
The Ford Family Foundation ($500,000 over four years)

Summary of Faculty FTE and Funding Sources for Goals 1–5

National Goal	FTE	Smith Lever 3(b)(c) Funds	State Appropriated Funds	County Appropriated Funds
1	59	$980,000	$2,600,000	$1,200,000
2	8	$130,000	$360,000	$160,000
3	8	$130,000	$360,000	$160,000
4	66	$1,060,000	$2,900,000	$1,300,000
5	63	$900,000	$3,000,000	$1,200,000
Totals	**204**	**$3,200,000**	**$9,220,000**	**$4,020,000**

Stakeholder Input Processes

The Oregon State University Extension Service utilizes numerous approaches to garner input from stakeholders statewide. These are summarized as follows:

A. The Extension Citizen Advisory Network.

Actions taken to seek input and encourage participation.

The Network is composed of stakeholders from each county in the state and includes both representatives with specific program foci and elected representatives from county government. The Network meets twice annually with Extension leadership (Dean and Director, Assistant Directors, and Program Leaders) to provide input on programming and Extension policy issues. Extension provides travel reimbursements, meals and a desirable meeting location to encourage participation. In addition, members are contacted throughout the year by email to solicit input on critical issues. In late 2006, a statewide assessment of issues was conducted through the network with implications for internal operations and program needs.

Process used to identify individuals and groups that are stakeholders and to collect input from them.

Members are nominated for service on the Network by county Staff Chairs in consultation with local stakeholders. Often these consultations include conversations with recipients of Extension programming, local political leadership, and representatives of organizations with linkages to Extension. Care is taken to assure that membership is capable of representing the broad interests of Oregon society and that they are capable of providing input from very divergent viewpoints such as youth and adults, urban and rural, agriculture/forestry/fisheries and environmental stewardship, large production systems and small production systems, small county government and large county government, traditional audiences and new, emerging (including ethnic) audiences, etc. In addition, special efforts are employed to assure that meetings are relevant to each member. The Network is involved in very key discussions related to the management, funding, and impacts of Extension in Oregon.

How input from the Network is considered in decision-making processes.

Input comes to Extension from the Network through several processes. During the semiannual meetings, key decision makers within Extension and the university are invited to participate. Discussions are very active, and input is often immediate as issues are discussed. In addition, input is solicited throughout the year on key issues. This often is done through email and telephone contacts. Finally, local faculty and Staff Chairs have close contact with Network members in their counties. This permits local feedback on issues. Input from the Network frequently is considered by the Dean and Director, the Extension Cabinet and Program Leaders in guiding the development and execution of programming statewide.

B. College-based Advisory Structures.

Actions taken to seek input and encourage participation.

Because Extension at OSU is integrated into colleges and respective academic departments, there are numerous mechanisms used to garner stakeholder input at this level. Most colleges and many departments with Extension faculty have a formal advisory council that is charged with providing input on research, teaching and Extension programs. These meet at least once per year with additional input sought via email and teleconferences between meetings. Specific attention is paid to cross-referencing needs and issues common to other mission funding of the University—especially the Agricultural Experiment Station and Forest Research Laboratory. In addition, there are more Extension-specific advisory structures for the 4-H, Forestry, Sea Grant, and FCD programs. These are highly targeted efforts that seek specific input on Extension programs. In addition, the Forestry Extension Program has listening sessions in at least one county per year. The general public is invited to these sessions.

Process used to identify individuals and groups that are stakeholders and to collect input from them.

Generally, a broad representation of individuals is sought for these committees and advisory forums. Membership is often based on a desire to have representation from key stakeholder groups that include agricultural, forestry, and marine commodity producers; federal, state, and local agencies; persons with keen understanding about the needs of ethnic minorities and other diverse audiences; representatives of various environmental groups; educators; local government leadership; and OSU faculty and staff. In many cases, strategic planning processes have been used to identify appropriate representation on respective advisory committees.

How input from advisory groups is considered in decision-making processes.

Input from these groups has been used in university wide strategic planning efforts, in program design and in allocation of resources. In addition, feedback from advisors has been used to better understand political realities and steps necessary for garnering support from local, state and private sources.

C. County-based Advisory Structures.

Actions taken to seek input and encourage participation.

Each faculty member is encouraged to maintain an advisory function for their programming. In addition, most counties maintain a formal advisory committee. Most structures utilize regularly scheduled meetings with stakeholder representatives to garner input.

Process used to identify individuals and groups that are stakeholders and to collect input from them.

Staff Chairs and faculty members are encouraged to identify stakeholders that represent the needs and perspectives of a broadly defined community. Membership tends to represent current clientele, potential clientele, other agencies, county leadership, and representatives form the private sector. Input is collected during regularly scheduled meetings, special meetings, and through periodic contact via email, telephone, mail and personal interaction.

How input from advisory groups is considered in decision-making processes.

Input from local stakeholders is utilized to develop local priorities. These are reflected in local programming designs and outcomes. Additionally, input flows up through the organization and is considered and utilized in the development of statewide and regional efforts. Input from local groups is also extremely valuable in developing administrative structures and delivery systems that are compatible with local needs, customs and skill sets.

Program Review Process

There have been no significant changes in the program review process submitted in the 5-Year Plan of Work.

Evaluation of Success of Multistate and Joint (Integrated) Activities

Oregon State University has longstanding interactions with surrounding states, and each Extension program area and every Extension faculty member is expected to develop a professional network that includes peers in other states. These networks, whether formal or informal, involve information sharing, opportunities for professional development, curriculum and educational material development, and joint program development and delivery. Additionally, Oregon State University was a pioneer in integrating Extension with the teaching and research functions of the institution. All Extension faculty are members of campus-based departments. They actively participate in departmental activities including planning and promotion and tenure processes. Many faculty now have joint Extension–research appointments.

Processes are in place to gather important input from key stakeholders and to assure that critical issues are recognized and addressed. Input from stakeholders is incorporated into the development of both outreach and research programs. For example, advisory committees meet regularly with Extension faculty, faculty and staff at agricultural research stations, and with departments and college and Extension leadership. Stakeholders are very engaged in exchange of ideas, evaluating effectiveness of existing projects and in the creation of new efforts. As a result of this collaboration, Extension and research efforts are very responsive to the needs of society. Integrated programs are

very commonplace in Oregon with Extension faculty engaged in applied research trials throughout the state in collaboration with Experiment Station and Forest Research Laboratory scientists. Multistate programs are addressing key issues such as disease problems in potatoes and onions; erosion and weed control in dryland cropping systems; adding value through introduction of new crops, varieties and root stocks; water usage and protection of threatened and endangered species; reducing pesticide use through integrated pest management strategies; and development of new irrigation techniques. Additionally, multistate programs are improving the efficiency of outreach processes through the joint production of educational materials and other resources such as plant disease, weed and insect control handbooks.

Planned programs are designed to meet the needs of both under-served and under-represented populations of the state. Specific steps have been taken to reach out to Latino populations through the development of Spanish-language materials, providing training in both English and Spanish, and by developing programs that are sensitive to the specific cultures within the Latino communities. Latino mid-managers also have been leveraged to educate farm workers about proper handling of pesticides and other hazardous materials. Watershed restoration efforts have involved Native American tribal leaders to assure that educational efforts are pursued in manners that are culturally sensitive and compatible with tribal goals and objectives. For example, research and outreach efforts initiated in response to the water crises in the Klamath Basin not only examined the natural resource and economic issues associated with reduced water availability but also closely examined both legal and cultural issues from tribal perspectives.

Efforts have been made to assure that outcomes and impacts from both multistate and integrated programming are well documented and communicated to key stakeholders. For example, multistate efforts focused on improving disease and pest management in key fruit and vegetable species have reduced production costs dramatically (by $300/acre in onions, $60/acre in potatoes, and $50/acre in cherries). New introductions of root stock, varieties and species have resulted in improved production efficiency. For example, new root stocks have reduced the time needed to achieve return on investment associated with planting new cherry trees from 15 years to only 7 years. Fully 70% of all new cherry trees in Oregon are on these new root stocks. New fruit and vegetable varieties are also improving the bottom line for producers by enhancing product quality and yields. Changes in cherry varieties as a result of efforts by OSU and WSU Extension and research faculty have resulted in increases of $.08 to $.81 per pound in cherry prices in the Mid-Columbia region. More specific examples of impacts are described in the following sections.

Planned programs have also resulted in tremendous improvements in programming efficiency. Expertise is readily shared across state borders with Washington, Idaho and California. In addition, the Pacific Northwest Publications series generate tremendous efficiency by jointly publishing Extension materials with Washington and Idaho. The integration of Extension faculty into academic departments also creates improved efficiencies by enhancing communication between Extension and research faculty. As a result, research is more targeted to the needs of society and Extension programming is more effectively tied to the latest science.

Multi-State Activities and Impacts

The following summarizes the Multi-State activities for which Oregon State University Extension Service has created an audit trail for funds supporting these activities. As noted in the overview section of this report, we were prepared to report only on these activities in 2006. With the implementation of the SOARS system in 2007, Oregon should be able to provide reports on multi-state efforts beyond those tracked for audit in the future.

1. Pacific Northwest Cooperative Publishing

The Pacific Northwest Publishing Cooperative, operated by the Extension Services of Oregon State University, Washington State University and the University of Idaho, addresses important economic, environmental and social issues in Oregon, Washington and Idaho by helping individuals and groups of potential authors from the states' Land Grant universities produce educational materials that inform and educate multi-state audiences. In 2005, the cooperative venture published educational materials on managing nitrogen for hard winter and summer wheat crops, identifying control measures for new noxious agricultural weeds (field bindweed and oxeye daisy), introducing a new herbicide for weed management in potatoes, helping older family members handle finances, and providing guidelines for 4-H members, leaders and judges in competitive horse activities. The tri-state effort, the sole remaining cooperative publishing program in the national Extension network, is designed to share expertise among states, prevent conflicting recommendations in bordering areas, prevent duplication of effort, ensure wider review and distribution, increase the quality of educational materials, and save money. Since it was created in 1949, the Pacific Northwest Publishing Cooperative has provided the public with more than 580 printed and online publications, software packages, videos, CD-ROMs and DVDs that address important Northwest issues.

2. Northwest Berry and Grape Information Network

From 1998 to 2005, Oregon's harvested acres of blueberries have increased by 32%. Exports to Japan alone over the past decade have increased to 5-8 million pounds per year. Ninety-five percent of Oregon's blueberry crop is irrigated by overhead sprinkler. OSU researchers, in cooperation with USDA_ARS and a corporate producer, developed a water demand model for this crop that potentially reduces applied water by 20% and reduces electricity costs by 15-18%. Fully 95% of Oregon's processing blueberries are trellised and machine picked according to recommendations developed by OSU researchers. Closer in-row spacing recommendations have more than doubled yields per acre. The Northwest Berry and Grape Information Network is a regional cooperative program delivered by OSU, Washington State University, the University of Idaho, and the USDA. It offers a comprehensive information and communications resource for researchers, Extension educators, processor field representatives, and growers. They can access market reports and production statistics, search databases and libraries, and discuss issues with one another. Environmental impacts of production practices are among the issues discussed on the Internet—e.g., ways to reduce pesticide applications, recommendations about "softer" pesticides, use of biological control agents, ecological and economic benefits of cover crops. Computer predictions of pest problems from degree day models allow growers to reduce pesticide applications, spraying only when necessary rather than on a regular basis. Growers can monitor changes in daily market prices

and storage volumes, giving them better knowledge of current market conditions and the value of their crop. Latest research updates are also online, encouraging more rapid adoption of research results. Email discussion groups synthesize the collective wisdom of those with similar interests from all over the world and facilitate group learning. Two of these email-groups have more than 300 subscribers from at least 20 countries. Oregon and Washington are very active in this effort. This site averaged more than 345,500 hits and about 30,400 visitor sessions per month in 2006. More than 23.7 gigabytes of files were downloaded for 2006. Timely newsletters on grapes and berries disseminate latest information on production as well as industry events.

3. The Pacific Northwest Plant Disease, Weed, and Insect Control Handbooks

The Pacific Northwest Plant Disease, Weed and Insect Control Handbooks are Extension's primary method of delivering pest control information to clientele in the Pacific Northwest. This is a collaborative effort among Oregon, Washington, and Idaho. The clientele, which includes university faculty (both state and county personnel), consultants, field scouts, Oregon Department of Agriculture inspectors, field and nursery people, Master Gardeners, and chemical industry representatives, consider this publication series their primary source of pest management information. Home gardeners and Master Gardeners use the information in the Plant Disease and Insect handbooks, generally in consultation with their county Extension agent. Using the handbooks, growers can more efficiently treat weeds, insects, and diseases affecting their plants, thereby improving yields, saving crops, and reducing production costs. Correct identification of plant problems aids in using the best and most efficacious management tactics. Although chemical tactics are recommended, nonchemical cultural control tactics are highlighted including organic techniques. Evaluation of type and level pesticide sales indicates that use of these books throughout the Northwest (WA, ID, OR) has reduced the amount of pesticide applied by improving efficiency and efficacy of pesticide applications. A survey has been drafted to guide decisions on information organization and delivery. The results of this survey will be summarized in next year's report.

4. Reducing Herbicide Drift in the Walla Walla Valley

Wineries in the Walla Walla Valley of Washington and Oregon increased from four in 1991 to 75 in 2006. This represents about 1,400 acres, including about 25 vineyards or 500 acres in Oregon. Walla Walla Valley premium wines are becoming known worldwide. The 2006 grape harvest for the Oregon portion of the Walla Walla Valley amounted to some 1375 tons, which is equivalent to about 85,000 cases of wine. At a conservative estimate of $100 per case, this region produces some $8.5 million dollars worth of wines. The grape crop is sensitive to synthetic auxin-type herbicides, which may drift from traditional wheat production into the vineyards. Damage to grape vines from these herbicides can be expressed for more than one growing season. The issue is compounded by the fact that adjacent farmers—traditional wheat farmers and newcomer grape growers—may not know one another. Each sees the other as impeding his right to earn a living. Extension county-based faculty have brought together both parties for discussion and improved communication. A Drift Task Force made up of representatives from grape growers, wheat growers, pesticide applicators, and crop consultants has formed. As a result of the work of the taskforce and Extension county faculty, pesticide drift is being reduced. In fact, during the period 2004-2006, no significant drift damage to grapes was documented. This is a testimony to the efficacy of this approach.

5. Onion Production

Significant onion production occurs in the Snake River Basin that straddles the Oregon–Idaho border. Regional Extension personnel and researchers collaborate to deliver joint programming in the region. This includes a joint newsletter, an Idaho–Oregon annual educational meeting, and individual crop consulting across state lines. One area of focus has been control of onion thrips in the region. An alternative strategy for controlling thrips using biological insecticides that are safe to predator insects has been developed by OSU Extension faculty and researchers. Thrips are a vector in the spread of an important virus of onions. These softer pesticides allow predator populations to build up, so that natural enemies supply most of the thrips control. The strategy has lead to reduced use of more potent pesticides, lowered risk of pesticide resistance in onion thrips, and fewer thrips problems with stored onions. Efforts have resulted in improved yields and reduced pesticide costs. Those growers who were able to use this program had additional benefits in 2006 of 700 CWT per acre or gross returns of some $3,000 per acre increased gross returns. Approximately 3,000 acres were managed under this program. One product, Carzol, used in 2005-2006 showed efficacies in controlling thrips. A number of states, including Idaho, Colorado and New York, have used OSU data for Section 18 approvals of this product for the same problem in their states.

6. Cherry Production

The Integrated Fruit Production (IFP) program for sweet cherries is a multi-state effort shared with Washington researchers, educators and growers. Establishment of population densities within orchards and determination of threshold levels for control of major cherry pests fosters use of softer pesticides and precision applications, resulting in reduced environmental and health impacts, and reduced inputs and labor costs for crop production. The ultimate goal of this project is to reduce the hazard to endangered fish and wildlife species. Grower education and adoption of these measures and materials reduced contamination in an EPA cited waterway below the critical level in only one calendar year. Another collaborative effort erected forty-five weather stations to accelerate implementation of IFP practices, and reduce broad-spectrum organophosphate pesticides use. A degree-day model has been developed that predicts first emergence of pests. Control efforts based on this model permit growers to time applications with precision and apply much less material. Benefits include reduced pollution risk and significantly less disruption of beneficial insects. Growers save up to $50/acre by not spraying for secondary pests. Application methods with lower risk than aerial sprays are used, especially near waterways, housing developments, and schools. This system also significantly reduces potential for frost damage, which impacts crops about once every 5 years. With increased weather data, growers can save at least 20% of their crop every 5 years. The north-central cherry production area of Oregon, with 10,400 acres of sweet cherries in 2006 and production valued at more than $44 million, should save growers an average of $1.76 million per year in cold losses. OSU and WSU faculty have cooperated in the introduction of new varieties for the region. Production of these varieties from Wasco County, Oregon, alone demands up to 87¢ per pound more than ‘Bing’. Estimated total returns to farmers in the region have increased by over $7.2 million annually as a result of these new varieties. Widely accepted dwarfing root stocks are seen on 70% of new trees in Oregon and 30% of new trees in Washington; return on investment is achieved 7 years earlier with dwarfing root stock than with non-dwarfing root stock.

7. Water Allocation and Endangered Species

As a result of 2000 drought conditions and an Endangered Species Act (ESA) process to protect three endangered fish species in the Klamath Lake and River, the U.S. Bureau of Reclamation determined that farmers would not be provided irrigation water for the 2001 growing season. About 1,200 families, farming over 190,000 acres, were without their normal irrigation water. This sudden and unexpected decision was met with a strong reaction from the farmers and farm-dependent businesses and communities. Decision makers at local, state, and federal levels were at a loss to estimate the likely impacts and how best to mitigate them. In the "information vacuum," caused by the lack of impact assessment required for ESA processes, a group of Extension faculty from Oregon and California met to form a working group. Three study areas were defined: environment, community, and economy. Draft chapters for public review were prepared, using several hundred questions and comments to revise them into a final report. It was obvious that more research would be needed to understand the environment, community, and economy of the area and to establish an information base for problem solving. At a subsequent symposium, the working group - with participants - continued to identify research questions that will support more effective decisions in the future. The Klamath Impact Assessment Report and subsequent studies have clarified resource and economic issues and have resulted in more informed and science-based policy decisions. Off project irrigators, in response to power cost issues associated with irrigation, are now considering their options, including selection of sustainable enterprises, production methods, or type of irrigation they will use. One outstanding social impact is the degree to which people have progressed in their level of trust and seeing others as people, rather than as “them.” A Klamath Falls television station created a 24-minute clip of interviews up and down the river; the common thread was that all stakeholders want a better future for their grandchildren and that all have customs and cultures that are dear to them. The National Academy of Science, when reviewing project-generated documents, stated that monitoring a single species will not achieve the goal of recovering any individual species, but rather that such a goal is achieved by monitoring at the watershed scale, and is dependent on local stakeholder involvement. The way business is done in the Klamath Watershed has substantially changed, and OSU has levied an important influence in bringing so many disparate stakeholder groups toward a resolution of issues of common concern, based on relationships rather than litigation.

8. Irrigated Agriculture

The Columbia River Basin encompasses a large region of north-central Oregon and south-central Washington. Most issues in the region transcend state boundaries. Extension specialists at the Hermiston Agricultural Research and Extension Center work closely with counterparts from Washington (WSU, USDA/ARS, and industry representatives) to resolve issues in the region. Virtually all aspects of the irrigated agriculture program at the station have multi-state components. This includes development of joint publications soil acidification (OR, WA), and onion production (OR, WA, ID). In addition, the Pacific Northwest Vegetable Association is a consortium of organizations that supports research and outreach efforts in the tri-state region. OSU faculty serve as advisory members and have collaborated with other states on projects funded by PNVA. This organization also hosts tri-state meetings for producers. These events attract approximately 450 growers from Oregon, Washington and Idaho. OSU faculty also participate in regional grants that assist in developing improved varieties, organic, and non-organic production technologies for

potatoes (ID, OR, WA). The latter has already yielded impacts in Idaho where there have been documented reductions in fertilization and pesticide usage by program participants.

Potatoes and Onions**:** Each year for the past 6 or 7 years, potato and onion production irrigated with drip irrigation has expanded slightly. Growers have come to realize the benefits associated with this irrigation strategy and adopt it. In the 2006 growing season, 3000 acres valley-wide were in drip, 1700 of them in Malheur County, Oregon. These figures represent 15 to 20% of the acreage under irrigation. Ten years ago, during the 1996 growing season, none of this production area was under drip irrigation. A significant surge is expected during the 2007 growing season, because the impacts of iris yellow spot virus, a relatively new disease of onions and very severe during 2006, seem to be less in onions irrigated with drip systems, and yield remains unaffected. Growers using furrow irrigation lost 25% of their crop, while those using drip lost no more than 15% of their yield to this virus.

Vegetable Seed: Vegetable seed is grown on 20 percent of Jefferson County acreage, but accounts for 40 percent of gross income. Central Oregon produces estimated 80 to 85% of domestically used hybrid carrot seed. Research to evaluate drip irrigation on carrots grown for seed was conducted from 1999-2001 at the Central Oregon Agricultural Research Center. Results: a significant increase in seed yield, lower water use, and reduced disease pressure under drip irrigation when compared to sprinkler irrigation. International seed companies exert considerable pressure to produce seed lots with bacterial blight (*Xanthomonas*). Drip irrigation improves seed quality by lowering disease levels, increasing yields and reducing water use. Water saving were near 50 % compared to sprinkler and 75 % compared to furrow irrigation. Sampling results for *Xanthamonas* indicate less pressure under drip irrigation compared to sprinkler or flood irrigation. When surveyed, 78% of fieldmen have found the research helpful in advising growers. Two Extension bulletins have been published on drip irrigation in carrot seed production. Research provides the data needed to register pest control tools for specialty seed crops. Products in the process of being registered based on this research include Zeal (miticide on carrots), Prowl and Galligan (herbicides on carrots), and Capture (insecticide on carrots). For the 2006 season, the fungicide Laredo was registered for powdery mildew control on seed carrots. Laredo is the only product that can reduce the disease after it is present. Before Laredo, a substantial number of spray applications were applied as a preventative measure. Laredo can be applied only when and where needed, eliminating the need for preventative applications. This change will amount to substantial savings to carrot seed growers and reduce environmental impacts of production. A fieldman survey showed that Orthene is applied to all the carrot seed fields to control lygus that feed on the seed and reduce germination. Industry representatives estimate that uncontrolled lygus feeding would reduce the price by 30% on almost two-thirds of the contracts and result in complete rejection of the rest. Conservatively assuming a 30% yield reduction across all contracts, growers would experience an average of $2 per pound in reduced revenue. Also, based on this research, Caparol is now used by carrot and parsley seed producers in fields with the most difficult weed control. Without Caparol, the cost of additional hand weeding is estimated at $100 per acre.

Grass Seed**:** Roundup Ready® creeping bentgrass seed was produced on 200 acres in central Oregon during 2003. Fields were removed from production during the spring of 2004 due to concerns about pollen and seed movement from these fields. There were also concerns about the possibility of cross pollination with existing related species growing along canal banks inside and outside the control

district. Seed collected from related *Agrostis* species was found to carry the Roundup Ready® gene indicating that cross pollination had occurred in 0.36 % of the seed collected. Seeds tested positive from as far as 3,717 feet from any pollen source. Herbicide evaluations identify methods for removing escaped seedlings from Kentucky bluegrass fields and non-crop areas. Herbicide and tillage combinations for removal of commercial plantings were developed. The major insect pest on Kentucky bluegrass seed fields in central Oregon has been the winter grain mite. However, cutworms can reach treatable levels and there is increasing concern about sod webworm, with some fields being treated each of the last several years. Billbugs are not currently a concern in central Oregon, but are considered a developing pest in the Grande Ronde Valley. Sod samples provided better data than pitfall traps. There was a large amount of variability in the presence of cutworms and sod webworms between locations. Billbugs were only occasionally observed. All fieldmen responding to a written survey indicated that they were aware of this project and that the research results have influenced their insect control recommendations. Under irrigation, Oregon growers produced over 22.6 million pounds of Kentucky bluegrass seed, valued at over $20.6 million dollars.

9. PNW Potato Project

Production: OSU research and Extension personnel at the Hermiston Agricultural Research and Extension Center, along with USDA/ARS scientists from Prosser and Wapato, Washington and a private contractor, have conducted outreach and applied research leading to integrated pest management strategies for potato producers. Conventional control of the Colorado potato beetle, beet leafhopper, potato tuber worm and the green peach aphid cost approximately $200/acre. Today, IPM strategies reduce the cost to about $120/acre, saving producers $80/acre. Concurrently, yields have increased by 4.5 tons/acre. Estimated net impact in 2005 of the program in two counties in northeastern Oregon is $3 million. Under this project, potato growers have enjoyed significant increases in yield and quality. For example, Umatilla Co. potato yields show a substantial and steady increase from an average of 518 cwt/acre for 1990-94, including a low of 490 cwt/acre in 1990 and 1991, to 580 cwt/acre from 1999-2003, including a high of 630 cwt/acre in 2000 and 2001. From 2003-2006, potato yields increased to an average of 620 cwt/acre, including a high of 700 cwt/acre in 2005.

Potato Improvement and Variety Development**:** The project evaluates the performance of new potato varieties under local conditions and investigates the response of established and new varieties to changes in cultural management practices. New varieties with superior performance are identified, with appropriate management practices to optimize their performance. Three fresh market varieties were released from the Oregon program in 2000. Since 2002, added emphasis has been placed on screening and evaluation of niche market selections with pigmented flesh with nutritional benefits associated with antioxidants not found in white-fleshed selections.

Seed Potato Management**:** Approximately 2,800 acres of seed potatoes were certified in 2006, which is roughly enough seed to plant 42,000 acres in 2007. Effects of seed treatment fungicides on crop performance and disease control have been evaluated and found to reduce production losses. Effects of seed-borne virus content on new varieties have been documented. Commercial seed cutting practices were surveyed and found to have poor size uniformity, along with a high percentage of smaller-than-optimum size. Significant economic benefits can be realized by more

careful quality control of seed cutting operations.

10. Dryland Crop Production and Solutions To Environmental and Economic Problems (STEEP) Solutions

Research and Extension personnel in Oregon, Washington and Idaho are doing long-term research and outreach to reduce erosion in the region (northeast Oregon, eastern Washington and northern Idaho). This effort seeks to address the non-sustainable status of the winter wheat/summer fallow monoculture cropping system of Oregon's Columbia Basin. This production method had been determined to be neither biologically nor economically sustainable, due to tremendous erosion problems. In addition, summer fallow has decreased the soil organic matter to half or less of original levels. The effort includes long-term research trials, demonstration projects, a website, publications and other educational programming. Outcomes and impacts of this program are:

1. Adapted soil erosion prediction technology for the climate conditions, soils, landscape and production systems unique to the PNW.
2. Developed and tested many of the conservation options producers are using to meet conservation compliance requirements of recent Farm Bills.
3. Documented the impacts of cropland soil erosion on long-term soil productivity, environmental quality and farm and regional economics, and increased producer and public awareness of the problem.
4. Chemical fallow gives an estimated soil loss savings of 2.5 tons/acre/year. Winter wheat acreage under chemical fallow in Morrow County alone has increased from 2,000 acres in 2001 to 8,000 in 2003, to 25,000 acres in 2006. Assuming a $6/ton value on soil lost from wind erosion, soil savings with chemical fallow are worth $375,000 per year in Morrow County alone.
5. Increased producer use of conservation tillage systems and supporting conservation practices in the PNW. An incentive program partially covered equipment rental or purchase costs. Approximately 215 farming operations participated with 40,921 acres receiving the incentive.
6. Developed technology and prototype equipment for improving residue placement, fertilizer use efficiency, seed placement and overall success of conservation tillage systems.
7. Increased number of agricultural service industries and producers building or modifying their equipment for direct application of fertilizer with little or no prior tillage under "shank and seed" minimum tillage systems, which provides cost-effective conservation options.
8. An improved understanding of the interactions between crop pests and tillage systems, crop rotations and other production practices has lead to the development of more successful pest management systems in conservation tillage and reduced the reliance on pesticides.
9. Breeding of new crop cultivars with improved pest resistance has facilitated the adoption of conservation practices and reduced pesticide use.
10. Adaptation and evaluation of predictive models has helped develop effective pesticide and nutrient management practices for increased protection of surface water and groundwater quality.
11. Development of alternative crops and their production practices has improved the success of conservation tillage systems through improved pest control and economic stability.

12. Increased producer access to new technologies has improved effectiveness and profitability of conservation farming systems.
13. A Direct Seed Breakfast Group was formed by OSU Extension and Umatilla County SWCD, meeting during winter months to discuss direct-seeding topics. Twenty to 25 individuals attend each meeting, with about 55 total participants. Growers have assumed leadership and plan to continue meeting into the future.
14. On-farm research comparing seed zone water and soil profiles for no-till, reduced till, and conventional till will continue through 2007.

11. Weed Control in Dryland Crop Production

Extension faculty at the Columbia Basin Agricultural Research Center work with counterparts at Washington State University and the University of Idaho to provide research-based information to producers about effective and sustainable weed control processes. Cooperative studies are conducted throughout the three-state region. This project has increased efficiency of herbicide use and reduced losses from weed competition in wheat. As a result, wheat farmers in the Columbia Basin in Oregon and Washington are realizing an average 1% yield increase for winter wheat. An additional improvement has resulted from enhanced quality due to use of newly developed herbicide-resistant wheat. This quality differential has provided producers with approximately 0.5% enhancement in net returns. In 2006, the region had 726,600 acres in wheat, yielding 52 bu/acre, sold at $4.28/bu. A 1% yield increase and a 0.5% in value due to improved quality result in an estimated increase in revenues of $2.4 million/year.

12. Small Fruits

Oregon researchers and Extension professionals working closely with counterparts at Washington State University are conducting variety trials, optimizing water usage, developing mulching strategies, optimizing nitrogen fertilization rates, and developing mechanical harvesting strategies for blueberries and cane berries. Efforts to expand markets for blueberries in China have been successful. Additionally, research and outreach efforts have focused on introduction of hardy kiwifruit.

As a result of these programs, blueberry growers in Oregon are not using as much surface sawdust mulch and are saving over $350/acre or $175,000/year ($350 x 500 acres). Blueberry growers in the Pacific Northwest also use the bilingual video *A Grower's Guide to Pruning Highbush Blueberries* (VTP002) to train pruning crews. Due to efforts over the past few years by OSU Extension, Oregon now has a 3 million pound market for blueberries in China. This is up from nearly zero just a few years ago. Hardy kiwi, despite high production costs, is showing economic promise on land that was formerly pasture, grass seed, or other berries. A newly revised Extension publication, *Growing Kiwifruit* (PNW 507), also is helping the commercial kiwi industry, whose current gross production/sales value is about $600,000/year.

13. Pacific Northwest Pest Alert Network

Rapid delivery of pest outbreak information in the highly diversified irrigated valleys of southeastern Oregon and southwestern Idaho has been difficult, but is crucial to producer sustainability. The Pacific Northwest Pest Alert Network, an interactive internet-based site, was

designed to receive information from any subscriber. University of Idaho or Oregon State University Extension agents check submissions and post them to the web page. All subscribers who are interested in the affected crop are automatically notified. Weekly alerts are automatically linked to complete control information. Since its inception in 2001, the area served by this network has continued to expand. This site delivers timely crop pest information to growers throughout the region. While it is difficult to quantify the overall economic value to Oregon growers, one example will provide an indication of annual value to growers. Sugar beet growers, in response to a cutworm alert, took appropriate action when needed; instead of 50% yield reductions, losses were limited to approximately 5%, resulting in $334,300 loss averted. This example is one crop in one week's alert; new alerts are posted throughout the season for all the region's crops, yielding benefits very conservatively estimated at $2.5 million/year. The sugar beet example highlights a sporadic problem, which may not occur every year. Cautious growers could pro-actively apply many unnecessary pesticides. The network helps growers avoid such activity, holds production costs to a necessary minimum and reduces environmental impacts from unnecessary pesticide applications.

14. National Pesticide Information Center

The National Pesticide Information Center (NPIC) is a direct education/information service for any who call with pesticide questions or make contact through the internet. Users include farmers, ranchers, and homeowners across the United States, Puerto Rico, and the Virgin Islands. Careful use of selected pesticides to eliminate undesirable or harmful pests enhances living conditions and reduces loss to structures and crops caused by insects and plant disease organisms. NPIC information allows people to make better decisions about which pesticides to use and can allay potential fears often associated with pesticides. NPIC offers objective, science-based information on pesticide products, recognition and management of pesticide poisoning, toxicology, environmental chemistry, and related topics. Among NPIC's important services are those relating to human health—toxicological advice, investigation of pesticide incidents of mishandling, emergency treatments, and teaching safe handling practices. Staff specialists provide knowledgeable responses. Information provided by National Pesticide Information Center encourages the application of sound pesticide management practices, and help prevent pesticide misapplications, thereby protecting the environment. NPIC is of significant economic value to Oregon farmers and ranchers; however, this value is not quantifiable. Their website received 1.1 million hits in 2005 and responded to nearly 25,000 telephone inquiries.

Joint (Integrated) Activities and Impacts

The Oregon State University Extension Service has created an audit trail for funds supporting the following integrated activities. Descriptions of these activities and outcomes/impacts are listed in the following narratives.

1. NRSP-4 Pesticide Registration for Minor Crops

After implementation of the 1996 Food Quality Protection Act, critical pest management substances became unavailable to many minor crop producers. Many of the high-value crops in Oregon fall into this category. Sales of these crops contribute more than $500 million to the Oregon economy annually and represent a significant part of the agricultural production of the state. A center was established at the North Willamette Research and Extension Center to expedite specialty crop

pesticide registrations. The Center has facilitated approval of numerous materials for application in minor crops in a responsible and sustainable manner. Section 18 (emergency registration) and Section 24c (Special Local Need or State) registrations alone document that $34 million/year would be lost if these materials were not available to farmers. Approximately half of this amount can be directly attributed to the efforts of the Center and its expedition of registration of pest management substances for minor crops. Recently the Oregon Department of Agriculture chose to invest in this program, enhancing the funding base by an additional $75,000. (See section B. 1. for a detailed list of the financial impacts from registrations.)

2. Integrated Pest Management for Nursery

The OSU Integrated Plant Protection Center has developed an online database of Integrated Pest Management (IPM) resources (http://ippc.orst.edu/dir/). This database is continuously updated and expanded. As a retrieval and referral system, it links researchers and practitioners world-wide. The system disseminates IPM information, raises awareness about new and emerging techniques in pest control, and supports IPM decision making. Integrated Pest Management promotes judicious use of pesticides and generally reduces the amount of agricultural chemicals used. Thus, this database has indirect, but substantial, environmental benefits. When agricultural or forest operators obtain and apply relevant information from the IPM resources database, farm and forest workers experience less risk of exposure to potentially toxic chemicals, and consumers benefit from reduced pesticide residue on food. The North Willamette Research and Extension Center is researching integrated management of *Phytophthora* species, honey locust pod gall midge, and lygus bug. Results are communicated to growers through newsletters, presentations and websites. The lygus bug is a pest of many crops worldwide. Its damage to the red maple, a major tree crop for Oregon, makes it of interest to these researchers. Oregon produces 700,000 red maples each year; they are the single largest component of bare root production, valued at about $180 million for 2006. Lygus bug damages young trees so that they become unmarketable or require hand pruning to repair damage. Trap counts were monitored in 2006 and correlated with tip damage, giving growers a decision-making tool regarding chemical application and timing. Application of the trapping strategy reduced damaged trees from 10% to 2%. At a loss of $2.50 per damaged tree, this amounts to $140,000 per year in loss averted. Plans for 2007 include similar work on another major tree crop. *Phytophthora* is a foliar rot of economic significance in Oregon. The program worked with two *Phytophthora* species on crabapple and on rhododendron. Some of the emphasis here has been with labeling, and an IR-4 project is underway. Many materials labeled for use against this fungal-like organism are not effective against *Phytophthora,* or are effective only against specific species of *Phytophthora*, or only at a specific time of year. The project is seeking to increase efficacy of fungicides against this disease pest, providing both economic and environmental benefits. This fungicide research may also contribute to the solution of *Phytophthora ramorum* or Sudden Oak Death. The focus of this work for 2007 will include the impact of cultural practices on fungicide efficacy. Growers estimate that this line of research has, saved them $540,000 per year in damage averted, and that number continues to grow.

Roses in Landscapes and Rose Production Nurseries: Roses are the #1 woody ornamental for home landscapes in the US. Rose midge can be a key pest of roses in production and retail nurseries. Damage to blooms occurs when larvae of this soil-borne pest destroy or distort rose buds; an 80% to 100% reduction in blossom occurs with established infestations, posing a grave threat to public

gardens, retail establishments, and home landscapes. Estimated value of retail sales of rose bushes in Oregon for 2006 was $2.5 million. Cutting edge research conducted by OSU faculty to address this emerging problem compared control of the midge using one pre-larva-emergent application of a pesticide with the standard practice of applying 12 to 14 applications of another pesticide throughout the season. No statistically significant difference between the two control methods was found. Research results show promise for successfully managing this midge while greatly reducing insecticide applications. An added benefit is that the experimental control, Merit, is a systemic that provides control of other major rose pests as well. It does not disrupt the life-cycle of beneficial insects, giving rise to secondary infestations, as the standard treatment does. Subsequent research evaluates management of the soil-based larval/pupal stage prior to emergence and is investigating biological controls of the rose midge. Given the significance of midge species' affect on nursery, berry, and landscape production in the Pacific Northwest, these research results highlight the importance of pre-larva-emergence insecticide applications. The web site featuring preliminary research results on rose midge control received almost 5,000 page views in 2005.

Perennial Container Nursery Stock**:** One-third or more of Oregon's $978.4 million nursery sales for 2005 represents perennial container-grown plants. An interregional multidisciplinary forum of scientists share potential solutions to container nursery problems and communicate about plant production and management practices and share research findings to address problems facing these producers. The exchange of information, through a variety of print and electronic media, results in reduced losses, improved efficiency and production of high quality plant material while avoiding environmental risk. Information is readily transformed into practice. Douglas fir bark, a primary growing substrate for producers of 85% of Oregon's container crops, has been analyzed for applicable chemical and physical parameters, providing growers with guidelines to manage this important resource, which can have significant water quality impacts. Other research explores the causes of the widespread chlorosis problem of boxwood observed throughout the United States and Europe. Boxwood is in the top 5 crops for Oregon's container nursery industry; for some growers this one genus represents as much as 5 to 10% of the value of their sales. A solution to the chlorosis problem will give Oregon producers an advantage in this competitive market. Herbicides are under evaluation for safety, appropriate labeling, application method and effectiveness on woody weed species, including the butterfly bush. Northern willow herb (NWH) is one of the top five perennial weed problems for Oregon container nurseries; infested containers must be hand weeded at a cost of $1400 per acre. In 2006, there were 8,700 acres of container production. Assuming 5% of the container crop were infested with this pest, it would cost producers $610,000. Research supports management recommendations to control this pest.

3. Water Wise Plant Materials and Approaches for Home Gardeners and Professional Landscapers.

The Central Oregon Horticulture Program home segment evaluates new landscape strategies and conducts workshops, provides educational materials on such topics as fire-resistant materials and encourages home gardeners to develop "defensible space" around their homes that may help protect their homes in case of wildfire. Xeriscaping results in more efficient use of water in landscaping and is being adopted at an increased rate in Central Oregon and in the Willamette Valley. Applied research in the Willamette Valley is helping us identify new plant materials that are drought resistant and of commercial production interest to the nursery industry. The research-based

information on gardening and plant health distributed by this program educates consumers about appropriate, timely use of pesticides fertilizers, and irrigation water, discouraging their overuse. This research and outreach allows home gardeners to achieve their gardening goals with more environmentally friendly methods. Post-construction soil evaluation paradigms have been developed to promote appropriate landscaping choices, and ongoing educational outreach to green industry professionals promotes water, fertilizer and pesticide conservation in landscape design, execution and maintenance.

Most varieties of *Ceanothus* are native to western North America, though few have been grown in Oregon. Some varieties may not be sufficiently cold-hardy for western Oregon. *Ceanothus* are extremely drought-tolerant plants, so developing a list of cold-hardy clones will allow their successful use in water-efficient landscapes. They are a nectar source for many beneficial insects, and some fix nitrogen. In cooperation with the Oregon Garden, Master Gardeners volunteers have been evaluating *Ceanothus* species and cultivars for suitability in landscapes since 2001. These volunteers benefit from learning and leadership development, while they provide FTE. A list of proven varieties for gardeners, landscapers, and nursery producers is available. These plants are best suited to poor, dry sites, which are often difficult to landscape effectively. Adoption of these plants in Oregon landscapes will reduce labor and inputs, as these attractive groundcovers suppress weeds and require fewer water and fertilizer inputs. Approximately 250 *Hebe* clones are under evaluation for growth rate, flowering and cold hardiness. *Hebe* is a diverse group of flowering evergreen shrubs native to New Zealand. These characteristics make *Hebe* an attractive subject for ornamentals: small stature, a great range of foliage and flower effect, root easily from cuttings almost year-round, grow quickly, and flower at a very young age. The Oregon nursery will benefit industry from a range of new varieties of proven adaptation to the conditions in the Willamette Valley and the Oregon Coast.

4. Berry Production Systems

Blueberry is one of the most rapidly expanding berry crops in the Pacific Northwest; acreage has increased almost threefold since 1992. Over the last few years, an average of 350 acres/year has been established, at a cost of $9,225/acre. In 2006, Oregon harvested 4,000 acres with a total production of 35.0 million pounds and a farm gate value of more than $54 million. About 50% of this high-value crop is hand harvested, although 95% of all new plantings are designed for machine harvest..

The Extension Berry Production Program develops new knowledge and disseminates research-based information to members of the strawberry, raspberry, blackberry, and blueberry industries through newsletters, articles, publications and presentations. Related research emphasizes biological, rather than chemical, control of berry pests; though newer pesticides with more targeted impacts are recommended when chemical solutions to production problems are warranted. Disseminating research results and associated recommendations to growers can have profound environmental benefits as well as impressive economic results. For example, the cost per acre for each of the registered herbicides was compared to the benefits such as quality of weed control and the range of weeds controlled. Growers who adopted the recommendations are now saving money by making sound weed control choices and by applying each product at a time and rate most effective. Farm workers and consumers alike benefit from reduced exposure to pesticides and their

residues. Fenbuconazole (Indar) provided excellent control of mummy berry disease in blueberries. Without Indar, some growers lost nearly 50% of their crop to this disease. The total farm gate value of the 2006 Oregon blueberry crop, valued at $53.1 million, might have been reduced by about $13.9 million without the use of fenbuconazole. Section 18: Sulfentrazone (Spartan) provided excellent weed control in strawberries at planting time, after renovation, and during dormancy, especially for those weeds apparently resistant to simazine. The farm-gate value of the 2006 strawberry crop increased by about $3.4 million with the use of Spartan, which helped reduce yield losses and hand-weeding costs.

Appendix A

U.S. Department of Agriculture
Cooperative State Research, Education, and Extension Service
Supplement to the Annual Report of Accomplishments and Results
Actual Expenditures of Federal Funding for Multistate Extension and Integrated Activities
(Attach Brief Summaries)
Fiscal Year: 2006

Select One: ☐ **Interim** **x Final**

Institution: Oregon State University Extension Service

State: Oregon

	Multistate Extension Activities (Smith-Lever)
Established Target %	3%
This FY Allocation (from 1088)	$3,176,625
This FY Target Amount	$95,299

Title of Planned Program Activity

Pacific Northwest Publications				$36,858
NW Berry and Grape INFONET				$7,061
National Pesticide Info. Network				$6,879
Pea Production and Walla Walla Watershed				$11,637
Onion Production				$18,723
Water Allocation and Endangered Species				$23,866
Cherry Production				$18,682
Pacific NW Potato Production				$19,330
Dryland Crop Production and STEEP				$18,028
Weed Control in Dryland Crops				$17,496
Small Fruits				$26,150

Total	$204,710
Carryover	

Certification: I certify to the best of my knowledge and belief that this report is correct and complete and that all outlays represented here accurately reflect allowable expenditures of Federal funds only in satisfying AREERA requirements.

A. Scott Reed

Dean and Director

Appendix B
U.S. Department of Agriculture
Cooperative State Research, Education, and Extension Service
Supplement to the Annual Report of Accomplishments and Results
Actual Expenditures of Federal Funding for Multistate Extension and Integrated Activities
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Fiscal Year: 2006

Select One: ☐ **Interim** **X Final**

Institution: Oregon State University Extension Service

State: Oregon

				Integrated Activities (Smith-Lever)
Established Target %				3%
This FY Allocation (from 1088)				$3,176,625
This FY Target Amount				$95,299

Title of Planned Program Activity

NRSP-4 Pesticide Registration for Minor Crops				$33,184
IPM for Nursery and Berry Crops				$60,310
New Landscape Plant Introductions				$77,376
Berry Production Systems				$76,183
Greenhouse Systems				$30,520
	Total			$277,573
	Carryover			

Certification: I certify to the best of my knowledge and belief that this report is correct and complete and that all outlays represented here accurately reflect allowable expenditures of Federal funds only in satisfying AREERA requirements.

A. Scott Reed
Dean and Director