PLAN OF WORK
for

United States Department of Agriculture
Cooperative State Research, Education and Extension Service

Oregon State University

College of Agricultural Sciences

Oregon Agricultural Experiment Station

Federal Fiscal Years

1999–2004

September 10, 1999

Oregon Agricultural Experiment Station Plan of Work
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Introduction:

The College of Agriculture Sciences, at Oregon State University, located at Corvallis, Oregon consists of the Oregon Agricultural Experiment Station and the College's academic programs in undergraduate and graduate studies. It does not include the Oregon State University Extension Service, except it is responsible for implementation of agriculturally related extension programs.

This Plan of Work is a comprehensive statement of the College's intended research activities for the next five years, as required by the Agricultural Research, Extension, and Education Reform Act of 1998 (AREERA), and as allowed under the USDA's "Guidelines for Land Grant Institution Plan of Work."

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The College's Mission

Education is the prime mission of the College of Agricultural Sciences. The College is Oregon's principal source of knowledge relating to agricultural and food systems, and a major source of knowledge regarding environmental quality, natural resources, rural economies and communities, and life sciences. The College's role is one of generating, integrating, and disseminating knowledge.

It is a unit of higher education that educates and trains students, and awards baccalaureate and advanced degrees in a number of professional areas.

It is a responsive source of knowledge that provides information, is a source of expertise in integrating and applying that knowledge, and is a provider of extended education programs that enable people to learn and to solve problems themselves.

It is a research enterprise that continually builds a knowledge base as an investment for the future.

It is a source of expertise for agricultural development with benefits that are felt in domestic and international settings.

Values supporting the College's Mission

The College of Agricultural Sciences' history is one of involvement in local, state, regional, national, and global resource planning, development, management, and policy making. It is integral to the economic and social fabric of the state it serves, and beyond. The College's history, tradition, and contemporary role reflect certain values. Among them are:

responsiveness to needs of those whom it serves--its customers;
partnership and cooperation with individuals, communities, industries and businesses, government agencies, and international development organizations;
teamwork and coordination among its elements--and with others--intended for effectiveness in addressing the needs of the state; and
credibility as a source of reliable, research-based information and education--its greatest asset. The College recognizes that credibility must continually be earned from others and is not something it can bestow on itself.

Complementing these values, the College is results-oriented. Its programs are designed to produce measurable, documented results that are, in turn, communicated widely.

Plan of Work
1999-2004
Oregon State University
Agricultural Experiment Station

I. View of Plan of Work

Program Descriptions

1. OSU Program 1: Plant and animal improvement and new agricultural product development (USDA Goal 1)

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II. Program Descriptions

USDA Goal 1: An agricultural system that is highly competitive in the global economy. Through research and education, empower the agricultural system with knowledge that will improve competitiveness in domestic production, processing, and marketing.

OSU Program 1: Plant and animal[1] improvement and new agricultural product development

(RPAs 101, 102, 103, 104, 105, 111, 301, 303, 304, 307, 310, 311, 314, 316, 318, 401, 403, 406, 407, 410, 411, 906)

Statement of Issue

Genetics and Breeding of Crops and Livestock: Significant opportunities exist for enhancing livestock through genetics and breeding. Research is needed on biotechnological techniques such as sexing semen, early pregnancy tests, cryopreservation, cloning by nuclear transplantation, embryonic stem cells, gene mapping, tracking alleles through meiosis, etc. OSU scientists generally utilize these tools in concert with more traditional research approaches. Current efforts in human genome mapping will be invaluable for mapping genomes of farm animals as most of the genome will be the same in both species.

Genetic enhancement of plants for human use through natural or man-made crosses has allowed emergence of agricultural societies. The modern role for genetic enhancement of plants is no less significant and demanding because we expect development of plants and livestock that will increase productivity, improve nutritional and processing characteristics, resist pests, and tolerate stress from heat, cold, salt, drought and other physiological traits. While traditional breeding programs have served us well in the past and will continue to have a necessary role in developing new and improved types, the relatively recent advent of molecular genetics has added a new and powerful tool for plant and animal improvement. Molecular genetics offers opportunities to engineer plants with specific characteristics that might never be practically achieved through traditional sexual hybridization techniques. New research methodologies, in combination with traditional breeding methods, can enhance the many anatomical and physiological aspects of plants and livestock. Molecular and whole plant improvement is one of the most cost effective and environmentally sound methods of enhancing the ability to produce food, fuel and fiber.

Development of new crops utilization of conventional plant and animal materials: The agricultural industries have experienced a decline in profitability because of excess production of conventional commodities, stemming not only from production in the US, but also world-wide.. This situation provides excellent incentive for the development of new food and non-food uses of plant and animal materials. Both the primary products (such as starch, proteins and lipids) and the lower valued by-products (such as straws and slaughterhouse waste) of conventional agriculture may be considered as starting materials for these new uses. Opportunity also exists for the development of new crops that have attractive processing attributes or contain materials having industrial value.

[1]The definition of "animal" in this Plan of Work includes all forms of domestic and "wildlife" food and pack animals and aquatic food animals.

In developing non-food uses, it will be necessary to target existing markets for commodities currently obtained from other sources, such as petroleum. Thus, processing methods must be developed that are competitive with existing technologies. This will include development of effective techniques for purifying existing components and/or derived products. Both chemical and biochemical (i.e., enzymatic and microbial) conversion methods will be explored.

In the processing of non-conventional crops and in the development of new products from conventional plant and animal materials, it will be necessary to develop new and/or improved processing technologies. This work will encompass a variety of operations including extrusion, extraction, fermentation, chemical and biochemical transformations, and the various processes needed to concentrate and purify the high value products that are derived from agricultural materials. Also of importance will be the development of improved methods of process control. This will involve the use of modern control strategies (such as adaptive control , expert systems, and virtual computer programs) as well as the development of on-line sensors for the analysis of key components and/or quality attributes. As in all new product development work, it will be necessary to determine cost/benefit ratios and to analyze marketing and distribution systems in order to assess the commercial feasibility of potential products.

Performance Goals:

1. Develop improved and efficient plant production and performance of crop cultivars through manipulation of germplasm
2. Enhance understanding of animal basic and applied reproduction systems
3. Develop new agricultural commodities and products

Output Indicators:

1. Release of new plant cultivars and germplasm
2. Develop new technologies to enhance animal reproductive efficiency
3. Development of new plant products or alternative uses
4. Peer reviewed publications, patents and licensing agreements as indicators of new technologies developed

Outcome Indicators:

1. Adoption rates of released plant cultivars by producers resulting in greater yields, lower production costs, reduced use of pesticides, and improved environmental quality.
2. Reduced environmental impact by use of pest tolerant plant cultivars.
3. Improved quality of end products from crops.
4. More economical production of feeds and chemicals from agricultural byproducts
5. Improved livestock production by predetermining offspring
6. Improved economic return to producers, production efficiency, product quality and composition, and consumer acceptance

Key OSU Program Components:
Reproductive efficiency of livestock: Develop information and methods to improve reproductive efficiency including increasing pregnancy rate, decreasing embryonic mortality and decreasing prenatal mortality.

Animal genetics and breeding: Determine biological mechanisms required for genetic engineering of animals including embryo stem cell technology, cloning and developing transgenic animals. Develop technology and methods for animal breeding. Determine the biochemical and physiological processes controlling important animal traits.

Plant breeding and gene expression technology: Develop improved varieties of economically important crops. Improve and develop new technologies to facilitate insertion of genes into economically important plants. Determine the biochemical and physiological processes controlling important plant traits.

Genome mapping: Map characteristics of animals and plants to aid in both traditional and molecular genetic methods of manipulating animal and plant germplasm.

Alternative crop, animal , and food enterprises: Identify alternative crops suitable for production in Oregon that contain components of commercial value. Develop production, processing, packaging and marketing approaches for alternative agricultural commodities. Develop chemical and biochemical processes for converting major crop constituents and residues to higher value, alternative products.

Internal and External Linkages:
Oregon Commodity Commissions
Oregon Grower Associations and Leagues
National Cattlemen Association
Oregon Cattlemen Association
Oregon Woolgrowers Association
Oregon Wine Advisory Board
Oregon Department of Agriculture
Oregon Department of Fisheries and Wildlife
Oregon Department of Environmental Quality
USDA-Agricultural Research Service
USDA-Natural Resource Conservation Service
USDA-Forest Service
Oregon Farm Bureau
Oregon Agri-Business Council
National Science Foundation
National Institutes of Health
US Environmental Protection Agency
Oregon State University departments involved include animal sciences, botany and plant pathology, entomology, fisheries and wildlife, chemistry, Center for Gene Research, environmental and molecular toxicology, bioresource engineering, forest sciences, food science and technology, Food Innovation Center, human nutrition, horticulture and landscape architecture, microbiology, physiology, rangeland science, statistics, and crop and soil sciences, and OAES branch research stations.

Multistate Components:

Oregon State University contributes to 12 multistate projects in this program (W-006, W-112, W-150, W-166, W-168, W-171, W-173, W-187, NC-142, NC-191, NE-123 and NE-124).

Integrated Research and Extension Activities:

This program contains integrated research and extension projects in the following areas:
1. Research and development of new crops
2. Plant and animal genetic resources including cultivar development

Target Audiences:

Crop and livestock producers, ranchers, farmers, fishers, foresters, agribusiness firms; local, state, and federal agencies involved in agriculture and forestry.

Program Duration:

Greater than 5 years

USDA Goal 1: An agricultural system that is highly competitive in the global economy. Through research and education, empower the agricultural system with knowledge that will improve competitiveness in domestic production, processing, and marketing.

OSU Program 2: Systems for Producing, Processing, and Marketing of Agricultural Products

(RPAs 106, 109, 110, 112, 113, 114, 302, 305, 306, 308, 309, 312, 313, 315, 317, 402, 405, 409, 501, 502, 503, 506, 507, 508, 509, 510, 511, 512, 513, 601, 604)

Statement of Issue

Integrated livestock, Fishery, Plant. Range and Forest Systems: Efficient animal, fishery and plant production systems are a result of information developed in several disciplines including animal and plant genetics, nutrition, physiology, range and cropland management, economies and marketing. As the complexity of agricultural systems increase, technology must be developed that allows producers to optimize production and profitability using environmentally sound methods. Advances in computer technology and animal and plant biology provide an opportunity to successfully develop realistic models that can be used as information to guide fruitful research avenues for improvement.

Further research is needed to understand interrelationships among individual variables in production, processing, and marketing systems, to develop mathematical models that accurately describe these interrelationships, and to produce models that are effective in real world situations. Of specific importance is the incorporation of biological environmental and economic models to create total decision making tools. This type of technology not only optimizes economic return, but it can enhance natural resource use and environmental sustainability.

Research in integrated systems relies upon research results, data and information developed by other program areas. The development of models to synthesize other research and of systems to deliver research information is the focus of integrated systems objectives and scientist effort.

Biology and Management of Plant Growth: Crop production is vulnerable to environmental stress in Oregon because rapidly changing weather systems combined with a wide range of ecosystems often produce severe fluctuations in temperature and precipitation. Such stresses are an ongoing concern due to severe fluctuations, and especially if predictions about global warming and UV-B radiation materialize. Basic research on the physiology, biochemistry and biophysics of plant stress adaptation and resistance mechanisms is needed to identify specific gene control systems for application to plant biotechnology and to conventional breeding programs. Basic knowledge is also needed to develop new approaches to improve plant management techniques.

Over two thirds of the shortfall between record crop yields and long-term average yields can be attributed to environmental stresses such as drought, heat, cold, and salinity. Adaptation to these stresses exists in some cultivars and species, but breeding for this is hampered by lack of knowledge about how stresses impact plant growth and development. Mechanisms controlling growth and development at the physiological and metabolic levels need to be understood in relation to stress adaptation.

In the major agricultural regions of the state, annual precipitation is less than potential evapotranspiration during the growing season for most crops. Irrigation from developed surface and ground water resources is used to offset this water deficit on a wide range of crops. Although irrigated crops occupy only a minority of the cultivated cropland in Oregon, they account for most of the total value of crop production. High costs of electric power and natural gas, ground water depletion, and declining crop prices and beef have forced reductions in water application in areas where ground water is used for irrigation. Competition by municipalities and industrial interests will likely cause similar reductions on land irrigated with developed surface water. Research to increase our understanding of crop water-use efficiency, plant response to water deficits and microclimate changes, and cultural practices that increase stress resistance will promote more effective and efficient use of water resources and lessen the impact of water conservation efforts on the agricultural economy. This research will also aid in the development of strategies to minimize the impact of water conservation measures on plants in urban settings.

The diversity of plant material in use for other than food crops is relatively narrow compared to the vast pool of woody and herbaceous plant species available. Increasing the diversity of commercially available plants best suited for the region is needed. Plant species that are adaptable, attractive and readily producible must be tested for their suitability to the region, especially in light of the impending needs for water conservation. Water conservation through creative landscaping must be investigated. Germplasm identification and development, including plant exploration, preservation, and characterization will be fundamental for breeding and development of landscape plants. New techniques in plant molecular genetics must be applied. Plant responses to environmental and biological stresses must be understood to create screening techniques, which select for tolerance to these stresses.

Biology and Management of Animal Production: Opportunities exist to improve biological efficiency in livestock. Simply increasing the reproductive rate - marketable units per breeding animal -results in great improvements in efficiency.. Examples include lowering morbidity and mortality, raising larger litters or arranging for twins in monotocous species. Another opportunity is producing the right product for the market in a timely fashion. Problems include too much fat on carcasses, a glut of cull cows for hamburger in late fall vs. a shortage in midwinter, and obtaining male offspring when a maternal line of female replacements is desired. Improving feed efficiency and growth rates, for example with steroid implants, represents a third category of opportunities.

Improved management decisions based on sound information can reduce inefficiencies such as excessive-finishing of fed livestock and retaining non-pregnant breeding animals. Biotechnology derived transgenic livestock involves powerful techniques that will help us to understand how genes are expressed to produce the most desired livestock and livestock products. A significant amount of genetic variability is available to improve efficiency, and more can be created through new molecular biological techniques. With increased biological efficiency, fewer livestock are needed; this providing major opportunities, for example, in decreasing use of grain and reducing environmental pollution.

Animal Health and Welfare: The cost of mortality and morbidity associated with biotic and abiotic stress and disease continues to be one of the largest contributors to efficiency loss in animal production. In addition, growing concerns about animal welfare identify an urgent need to develop and adopt production practices that contribute both to efficiency and welfare. Modern animal agriculture places increasing emphasis on disease prevention rather than treatment, and development of herd management techniques rather than treatment of individual animals.

Researchers have made progress in the basic molecular biology and genetics of the animal immune system, as well as in the ability to manipulate the microorganisms responsible for producing disease and their metabolic products. Recombinant immunological techniques are commercially available, and highly specific inexpensive diagnostic tools have also entered the marketplace. Thus, researchers can develop an inherent resistance to disease, an enhanced acquired immunity, or a combination of both. A better understanding is needed through the utilization of a multidisciplinary approach to animal systems about the relationships between biotic and abiotic stress as they are influenced by management systems.

Performance Goals:

1. Develop improved systems for plant and animal production, processing, and marketing.
2. Enhance ability of plant and animal production systems to tolerate environmental stresses.
3. Develop approaches for preventing and curing animal and fish diseases.

Output Indicators:

1. Systems developed for integrated management of resources (land, plant, livestock, aquatic life, humans).
2. Increased efficiency in plant and livestock production systems.
3. Models developed for enhanced management of production systems.
4. Improved methods for treating and preventing animal disease.
5. Peer reviewed publications, patents and licensing agreements as indicators of new technologies developed

Outcome Indicators:

1. Models predict response of plant and animal production systems.
2. Reduction of animal disease will increase livestock performance, reduce mortality, and profitability
3. Disease control will enhance exports of cattle and sheep
4. Increased profitability from plant, fishery and livestock enterprises.
5. More environmentally sound management of private, state and federal lands and water bodies.

Key Program Components:

Cropping systems: Develop cropping systems for irrigated and dryland production regions of Oregon. Determine the effect of existing and alternative cropping systems and urban landscape schemes on the water use and energy balance within systems. Develop cultural management systems for major turf, woody and herbaceous species and quantify the effects of irrigation water, pesticides and plant nutrients on growth and development.

Modeling of production systems: Develop economic mathematical models at the animal and plant levels to integrate biological, ecological and economic systems. Develop production decision models that integrate natural resource management, animal and plant production and marketing technologies, and financial management including risk assessment.

Plant adaptation to stress: Determine the physiological control mechanisms in plants that facilitate adaptation to stress. Develop technology that can be applied by growers to overcome losses from environmental stresses. Determine the relationship between plant water use efficiency and physiological responses by plants to soil water deficits and atmospheric stresses. Evaluate new turf, woody, xerophytic, and herbaceous plants for urban and rural environments.

Animal nutrition and growth: Develop information and methods to improve efficiency of animal growth. Increase understanding of factors influencing nutritional requirements of animals and the effects of environment and genetics on production.

Animal welfare: Evaluate the effects of stress from management and the environment on clinical disease, sub-clinical disease and animal well-being. Develop techniques for rapid diagnosis of infectious disease. Determine the pathogenesis and control of disease in the neonate.

Internal and External Linkages:
Oregon Commodity Commissions
Oregon Growers Associations and Leagues
National Cattlemen Association
Oregon Cattlemen Association
Oregon Woolgrowers Association
Oregon Wine Advisory Board
Oregon Department of Agriculture
Oregon Department of Fisheries and Wildlife
Oregon Department of Environmental Quality
USDA-Agricultural Research Service
USDA-Natural Resource Conservation Service
USDA-Forest Service
Oregon Farm Bureau
Oregon Agri-Business Council
National Science Foundation
National Institutes of Health
US Environmental Protection Agency
Oregon State University departments involved include animal sciences, botany and plant pathology, entomology, fisheries and wildlife, chemistry, Center for Gene Research, environmental and molecular toxicology, bioresource engineering, forest sciences, food science and technology, Food Innovation Center, human nutrition, horticulture and landscape architecture, microbiology, physiology, rangeland science, statistics, and crop and soil sciences, and OAES branch research stations.

Multi-state Components:

Oregon State University contributes to 5 multi-state projects in this program (W-128, NC-136, NC-140, NE-132 and NE-183).

Integrated Research and Extension Activities:

This program contains integrated research and extension projects in the following areas:
1. Integrated resource management for animal production.
2. Crop production systems involving forages, fruits, vegetables, and horticultural crops.

Target Audiences:

Crop and livestock producers, ranchers, fishers, farmers, foresters, agribusiness firms; local, state, and federal agencies; environmental organizations; and non-governmental organizations involved in agriculture and forestry.

Program Duration:

Greater than 5 years.

USDA Goal 1: An agricultural system that is highly competitive in the global economy. Through research and education, empower the agricultural system with knowledge that will improve competitiveness in domestic production, processing, and marketing.

OSU Program 3: Safe and Effective Management of Pests

(RPAs 201, 202, 203, 204, 205, 206, 207, 208, 209, 210, 211, 212, 213, 214)

Statement of Issue

Management of insect, disease, nematode and weed pests is crucial in sustainable production of food, fiber, and timber. Pests and pest management activities impact production cost, product quality and safety. Concerns about environmental quality and food safety are targeted to pesticides, frequently without sufficient consideration of their positive impacts. Researchers need to explore non-chemical alternative means of pest control, while continuing to decrease risks associated with pesticide use.

Safe and effective management of pests is dependent upon knowledge of pest biology and ecology. Integrated pest management should combine many appropriate control measures into cost-effective and environmentally sound programs. These include: (a) genetic resistance, (b) bio-control measures, (c) cultural practices, and (d) safe and judicious use of chemical and biological pesticides.

Performance Goals:

1. Develop pest control strategies based on sound practices of pest biology and ecology.
2. Improve biological control approaches to pest management.
3. Enhance use of integrated pest management in plant and animal production systems.

Output Indicators:

1. Improved understanding of pest populations and their ecology.
2. Develop more precise methods of chemical application.
3. Identify new and improved agents for use in biological control
4. Peer reviewed publications, patents and licensing agreements as indicators of new technologies developed

Outcome Indicators:

1. Increased adoption rate of integrated pest management and biological control approaches will reduce environmental impact of pesticide use.
2. Reduced crop loss due to weeds and pests will reduce cost of production.
3. Enhanced biodiversity in crop production systems.
4. Improved strategies for pest control.

Key Program Components:

Pest biology and ecology: Define the biology and ecology of key pest species to better understand and develop control strategies.

Integrated pest management: Develop and enhance integrated pest management programs that decrease and rationalize pesticide use. Improve identification and selection of biological control agents.

Risk assessment/communication: Improve methods for assessing and communicating the risks and benefits of pesticides and their alternatives to both producers and the general public.

Internal and External Linkages:

Oregon Commodity Commissions
Oregon Growers Associations and Leagues
National Cattlemen Association
Oregon Cattlemen Association
Oregon Woolgrowers Association
Oregon Wine Advisory Board
Oregon Department of Agriculture
Oregon Department of Fisheries and Wildlife
Oregon Department of Environmental Quality
USDA-Agricultural Research Service
USDA-Natural Resource Conservation Service
USDA-Forest Service
Oregon Farm Bureau
Oregon Agri-Business Council
National Science Foundation
National Institutes of Health
US Environmental Protection Agency
Oregon State University departments involved include animal sciences, botany and plant pathology, entomology, fisheries and wildlife, chemistry, Center for Gene Research, environmental and molecular toxicology, bioresource engineering, forest sciences, food science and technology, Food Innovation Center, human nutrition, horticulture and landscape architecture, microbiology, physiology, rangeland science, statistics, and crop and soil sciences, and OAES branch research stations.

Multi-state Components:

Oregon State University contributes to one multi-state project in this program (W-186).

Integrated Research and Extension Activities:

This program contains integrated research and extension projects in the following areas:
1. Biological and ecological basis for weed management.
2. Biology and control of insect pests in crops and livestock.

Target Audiences:

Crop and livestock producers, ranchers, farmers, foresters, agribusiness firms; local, state, and federal agencies involved in agriculture and forestry and pest management activities; commercial pest managers.

Program Duration:

Greater than 5 years.

USDA Goal 2: A safe and secure food and fiber system. To ensure an adequate food and fiber supply and food safety through improved science based detection, surveillance, prevention, and education.

OSU Program 4: Food Safety and Quality

(RPAs 404, 408, 412, 701, 702, 704)

Statement of Issue:

Food Safety: Few issues have greater impact on the entire agricultural community than that of the safety and quality of the food supply. Areas of concern include microbiological safety, pesticide residues and natural toxins that can occur from production to consumption of the food. Innovative biotechnology or new processing, sensory and packaging methods may contribute to safety and quality concerns. Facilities, equipment, and rapid, sensitive methods for the detection and monitoring of all components of food must be available. Public concerns about these issues must be addressed scientifically.

Food safety and consumer protection are vital issues for government, industry, and consumer groups. Today a sophisticated food processing and delivery system supplies consumers with a greater variety of food and a higher level of safety than ever before. While the food supply in this country is recognized as high quality, we must continually monitor and guard against contamination by chemical, microbiological, and natural toxins. The mere complexity of our present-day food system has led consumers to question various practices and assumptions, and these questions must be rationally answered. New products, processes, and biotechnological advances require a continual upgrade of our knowledge base regarding the toxicology and analysis of possible contaminants in our food supply.

Performance Goals:

1. Improved safety and quality of foods for consumers through improved techniques of production, processing, sensory, packaging and marketing

Output Indicators:

1. Improved methods to detect pathogens and toxins in foods.
2. Enhanced databases useful to food safety research and outreach.
3. Improved processing, sensory analyses, packaging and marketing of foods.
4. Peer reviewed publications, patents and licensing agreements as indicators of new technologies developed

Outcome Indicators:

1. Reduced incidence of food-borne illness and healthier communities.
2. Reduced probability of contamination of food raw materials and products.
3. Results incorporated into HACCP systems.
4. Improved economic return and enhanced marketability of products.
5. Peer reviewed publications, patents and licensing agreements as indicators of new technologies developed

Key Program Components:
Improved processes for food processing: Develop new or improved processes to prevent contamination and minimize deterioration. Define processing parameters that can remove harmful biological and/or chemical components. Determine effects of extrusion and other cooking processes on the nutritional and flavor properties of food products. Develop improvements in sensory analysis and packaging of foods for new and developing markets.

Safety aspects of product development: Employ hazard analysis critical control point strategies to identify and monitor critical control points in production, processing, and distribution of food. Develop methodologies to assess relative risks of various components of food products considered to be harmful. Monitor and evaluate new developments in production, processing, sensory, packaging, and preparation practices to determine their impact on food safety and quality.

Internal and External Linkages:
Oregon Commodity Commissions
Oregon Growers Associations and Leagues
National Cattlemen Association
Oregon Cattlemen Association
Oregon Woolgrowers Association
Oregon Wine Advisory Board
Oregon Department of Agriculture
Oregon Department of Fisheries and Wildlife
Oregon Department of Environmental Quality
USDA-Agricultural Research Service
USDA-Natural Resource Conservation Service
USDA-Forest Service
Oregon Farm Bureau
Oregon Agri-Business Council
National Science Foundation
National Institutes of Health
US Environmental Protection Agency
Oregon State University departments involved include animal sciences, botany and plant pathology, entomology, fisheries and wildlife, chemistry, Center for Gene Research, environmental and molecular toxicology, bioresource engineering, forest sciences, food science and technology, Food Innovation Center, human nutrition, horticulture and landscape architecture, microbiology, physiology, rangeland science, statistics, and crop and soil sciences, and OAES branch research stations.

Multistate Components:

Oregon State University contributes to two multi-state projects in this program (W-122 and NE-103).

Integrated Research and Extension Activities:

This program contains integrated research and extension projects in the following areas:
1. Improving food safety for consumers
2. Enhancing quality and safety of food products

Target Audiences:

Consumers and producers of Oregon agricultural commodities, local, state, and federal agencies involved in food safety, human nutrition and related issues; food manufacturing, processing, and distribution firms; dieticians and other human nutrition professionals; educators involved in human nutrition and wellness programs; food processing and food packing firms.

Program Duration:

Greater than 5 years.

USDA Goal 3: A healthy and well-nourished population. Through research and education on nutrition and development of more nutritious foods, enable people to make health-promoting choices.

OSU Program 5: **Human Health and Nutrition**

(RPAs 703, 705, 706, 707, 708, 709)

Statement of Issue:

Nutrition and health: The physical and chemical properties of the components of food and fiber commodities and the nature of their interactions determine quality, organoleptic characteristics, and applications. Knowledge of these properties and the manner in which they are affected by conventional or new production technologies is extremely inadequate. Furthermore, the relationships between molecular structure and function are critical to ensure innovative formulation/ fabrication, chemical and processing control, rational application of biotechnology, and effective development of new food and non-food products that meet the specific needs of particular markets. Research methods and databases are required for the physical, chemical, and colloidal polymer properties of foods and bio-materials and their components, such as polysaccharides, proteins and lipids.

Nutrition is crucial to both health maintenance and disease prevention. The role of nutrients, both at deficient and excessive intakes, in health promotion and disease prevention has been recognized for many years. The requirements for nutrients at the cellular level are strikingly different, both quantitatively and qualitatively, from those for the body as a whole. Cellular nutrition and the interaction between the genome and nutrients are providing new insights to disease and new approaches and treatments in health maintenance and disease prevention.

Nutrition is involved in both health promotion and disease prevention. About 40 required nutrients contribute to health maintenance. These are important in reproductive success, growth, resistance to disease, brain development and function, physical performance, tissue integrity and hence optimal health. In addition, nutrition is recognized increasingly as playing a role in reducing the dietary risk of such chronic diseases as obesity, heart disease, diabetes, hypertension, cancer and osteoporosis. For most people, adequate intake of essential nutrients and reducing nutrient excesses are most important in health promotion and reducing the dietary risk of chronic disease, respectively.

Chronic diseases, all of which have dietary components, limit life span and quality of life today. Heart disease and cancer are major causes of all deaths. Obesity contributes to both heart disease and cancer. Diabetes and hypertension contribute to heart disease and stroke. Osteoporosis result in many fractures in the elderly that are life threatening and in many cases life-limiting. The public's interest in these matters is extremely high, as evidenced by many feature articles in the major national news sources, both print and TV. Thus, health concerns increasingly influence food choices and hence the market for agricultural commodities and processed food items.

Performance Goals:

1. Increase understanding of motivators, barriers, attitudes and knowledge about food consumption across age, gender, geographic location, and minority groups
2. Enhanced research and educational approaches to improve human health through nutrition

Output Indicators:

1. Improved assessments of adequate nutrition.
2. Higher quality food products.
3. Enhanced databases useful human health and nutrition.
4. Peer reviewed publications, patents and licensing agreements as indicators of new technologies developed

Outcome Indicators:

1. Translation of nutrition research to exercise and daily living, health and disease prevention, and community and food production.
2. Improved economic return and enhanced marketability of products.

Key Program Components:

Improved techniques for food processing: Develop new or improved techniques to prevent contamination and minimize deterioration. Define processing parameters that can remove harmful biological and/or chemical components. Determine effects of extrusion and other cooking processes on the nutritional and flavor properties of food products.

Diet and health and nutrient bioavailability: Determine important relationships between diet and health. Increase our understanding about human obesity and develop improved methods for its prevention and treatment. Determine the effects of plant breeding and food processing on the bioavailability of vitamins and minerals, and on the digestibility of protein, complex carbohydrate and dietary fiber. Investigate the development of unique food products or ingredients to address specific nutritional or health problems. Develop methodologies to assess relative risks of various components of food products considered to be harmful. Monitor and evaluate new developments in production, processing, sensory analysis, packaging, and preparation practices to determine their impact on human health and nutrition.

Internal and External Linkages:
Oregon Commodity Commissions
Oregon Growers Associations and Leagues
National Cattlemen Association
Oregon Cattlemen Association
Oregon Woolgrowers Association
Oregon Wine Advisory Board
Oregon Department of Agriculture
Oregon Department of Fisheries and Wildlife
Oregon Department of Environmental Quality
USDA-Agricultural Research Service
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USDA-Forest Service
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National Science Foundation
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Oregon State University departments involved include animal sciences, botany and plant pathology, entomology, fisheries and wildlife, chemistry, Center for Gene Research, environmental and molecular toxicology, bioresource engineering, forest sciences, food science and technology, Food Innovation Center, human nutrition, horticulture and landscape architecture, microbiology, physiology, rangeland science, statistics, and crop and soil sciences, and OAES branch research stations.

Multistate Components:
Oregon State University contributes to five multi-state projects in this program (W-143, W-175, NC-167, NC-219 and S-278).

Integrated Research and Extension Activities: This program contains integrated research and extension projects in the following areas:
1. Improving human health and nutrition research and education for consumers
2. Enhancing quality and nutrition of food products

Target Audiences:
Consumers and producers of Oregon agricultural commodities, local, state, and federal agencies involved in food safety, human nutrition and related issues; food manufacturing, processing, and distribution firms; dieticians and other human nutrition professionals; educators involved in human nutrition and wellness programs; food and processing and food packing firms.

Program Duration:
Greater than 5 years.

USDA Goal 4: Greater harmony between agriculture and the environment. Enhance the quality of the environment through better understanding of and building on agriculture and forestry's complex links with soil, water, air, and biotic resources.

OSU Program 6: **Agriculture and environmental quality**

(RPAs 107, 108, 901, 902, 903, 904, 905)

Statement of Issue:

Natural Resources and Ecosystem Management:

An increasing world population is placing greater demands on our natural resources. Public concern for a quality environment has increased as agriculture has become more complex and population pressures have increased. Natural resources must be conserved and their capacity maintained or improved in order to meet the needs of future generations. The long-term viability of agriculture and forestry production is tightly linked to proper use and protection of our soil, air and water resources. Production agriculture and forestry are often named as major contributors to the deterioration of natural ecosystems and environmental quality.

Development of management practices that are compatible with a high quality environment requires new methods of study that involve entire agricultural and forest ecosystems. Quantitative relationships between agriculture, natural resource-use, and environmental quality must be defined. This will require a more thorough understanding of basic biological/ecological processes, as well as computer-aided systems management research. Continuing to use natural resources to produce agricultural, range, and forest products requires new multiple use strategies which are realistic in terms of biological, economic, social and environmental constraints. Transport and fate of pesticides, fertilizers, and other agricultural chemicals, as well as threatened and endangered species, bio-diversity, habitat, wetlands, and water are all issues of concern. Knowledge must be developed to understand and evaluate competitive land use impacts and interactions on agricultural, range, aquatic and forest systems. This research provides the basis for developing agricultural, forestry and aquatic management systems that are more compatible with conservation and environmental goals.

The program intends to provide workable compromises instead of burdensome regulatory programs. Concern for the quality of surface and subsurface water supplies has reached national prominence. Protecting the quality of ground and surface water supplies is an issue of local and national concern. Agriculture has been identified as the largest contributor to non-point pollution in the U.S. Clearly, protecting water quality will require reducing the use and mitigating the impacts of agri-chemicals while maintaining an economically viable production system. Renewed effort is needed to identify and implement best management practices as well as develop databases and models to determine the fate and transport of contaminants at the field or even larger scales.

Global climate models indicate that significant changes in climate are likely in the next few decades due to the increase in "greenhouse" gases. Changes in the variability of climate could occur as well as changes in the mean condition. This change in climate could have significant impact on the diversity, productivity and distribution of plant, animal, aquatic and microbial systems.

The global environmental change is likely to modify temperature, precipitation, evaporation, wind, radiation and sea level. Present understanding of the effects of climate and climate variation on plant, animal, aquatic and microbial ecosystems are not adequate to allow an assessment of the impacts of global change. Knowledge must be developed to determine the sensitivity of these systems to global change and to evaluate the effects at macro and micro environmental levels. The recent emphasis on the potential for soils to serve as a sink for atmospheric carbon dioxide warrants an expansion of tillage and cropping systems research. The increase in basic knowledge will allow scientists to predict future conditions for agriculture, forestry and other natural resources.

Water: Quality. Quantity, and Management: Assessing the extent of groundwater contamination and means of mitigating contamination has generated a call for research and monitoring programs. In Oregon, surveys of wells in some parts of the state have shown that significant numbers exceed the drinking water standard for nitrate. Problems of ground water contamination from pesticide have been less well documented within the state, but monitoring studies are ongoing. Aquifers and water run-off from fields in areas of high chemical usage could be expose water supplies to pesticide contamination. In some parts of Oregon, conditions that include low precipitation, high altitudes and both high and low temperatures, are different from those under which many studies of chemical transport, transformation, and fate have been conducted.

The agricultural sector in Oregon is dependent on the efficient use of water. Maximizing precipitation capture in dryland agriculture is critical to sustainability in much of the state. Availability of high quality surface and groundwater for irrigation use and proper management of both is essential. Increased competition between the urban and agriculture sectors for limited high quality water supplies will be encountered, and conversion of irrigated land to dryland farming will continue. It is therefore critical that irrigation efficiency be improved as urban and aquatic water needs grow. The principles of water capture and storage in soils are common to both dryland and irrigated agriculture and form the basis for research in efficient use of water for all relevant systems.

Performance Goals:

1. Develop approaches for natural resource and ecosystem management.
2. Propose technical, institutional, or social solutions to water quality and quantity problems in Oregon.
3. Develop technologies for managing agricultural and municipal wastes.

Output Indicators:

1. Input to state and national policy processes.
2. Production and distribution of decision-support software packages
3. Improved practices to improve water quality by reducing erosion, nutrient or pesticide movement.
4. New sensors for environmental monitoring
5. Peer reviewed publications, patents and licensing agreements as indicators of new technologies developed

Outcome Indicators:

1. More scientific basis for policy decisions
2. Greater options for evaluating management choices and environmental impact.
3. Improved prediction of environmental processes such climate, solute transport, water management, and water allocation policy.
4. Provide accessible climate and related data to clientele for application to technical and policy issues.
5. Enhanced capability for environmental monitoring.
6. Improved environmental quality and ecosystem sustainability.

Key Program Components:

Soil/water conservation: Identify crop and soil management systems that maximize precipitation use efficiency, minimize erosion by wind and water, increase soil organic matter and fertility status, improve soil physical characteristics such as aggregation and infiltration, ensure long-term food supplies, make use of animal and human waste products, and result in maximum economic benefits to agriculturists and the general public.

Ecosystems: Improve knowledge of the basic processes underlying the structure and function of crop-land, forest-land, range-land and aquatic ecosystems. Quantify the response of important crop species to a variety of stresses including herbivory, drought, and climate change. Develop and refine the tools of systems technology (agro-ecological simulation models, resource allocation models, and management models) to manage cropland, forests, range-lands and aquatic systems.

Irrigation/drainage systems: Design and implement irrigation and drainage systems to optimize water use efficiency.. Evaluate the contamination of groundwater and surface water supplies (agricultural and urban). Develop conjunctive use models to manage both the surface irrigation, groundwater and aquatic systems. Develop best management practices with regard to water quality protection under Oregon conditions in the areas of nitrogen fertilizer, pest, irrigation water, grazing and feedlot manure management.

Water quality monitoring: Develop approaches for designing and implementing water quality monitoring programs to assess the impacts of agriculture on water quality and to detect changes over time. Study Oregon watersheds and major Oregon aquifers to define potential areas that can be managed for increased water yields and evaluate strategies that would aid in protection of aquifer recharge areas to protect against urban encroachment.

Movement of constituents in soil and water: Improve sampling techniques and experimental methodology for accurate and rapid assessment of spatially variable solute transport properties at large scales. Develop screening tools, including indices and models, for assessing the local vulnerability of Oregon ground water to agricultural chemical contamination. Conduct experiments to validate or improve contaminant fate and transport models in natural and agricultural systems.

Internal and External Linkages:
Oregon Commodity Commissions
Oregon Growers Associations and Leagues
National Cattlemen Association
Oregon Cattlemen Association
Oregon Woolgrowers Association
Oregon Wine Advisory Board
Oregon Department of Agriculture
Oregon Department of Fisheries and Wildlife
Oregon Department of Environmental Quality
USDA-Agricultural Research Service
USDA-Natural Resource Conservation Service
USDA-Forest Service
Oregon Farm Bureau
Oregon Agri-Business Council
National Science Foundation
National Institutes of Health
US Environmental Protection Agency
Oregon State University departments involved include animal sciences, botany and plant pathology, entomology, fisheries and wildlife, chemistry, Center for Gene Research, environmental and molecular toxicology, bioresource engineering, forest sciences, food science and technology, Food Innovation Center, human nutrition, horticulture and landscape architecture, microbiology, physiology, rangeland science, statistics, and crop and soil sciences, and OAES branch research stations.

Multi-state Components:

Oregon State University contributes to four multi-state projects in this program (W-045, W-133, NC-214 and S-275).

Integrated Research and Extension Activities:

This program contains integrated research and extension projects in the following areas:
1. Water quality and quantity management
2. Animal, crop and processing waste management

Target Audiences:

Crop and livestock producers, ranchers, farmers, foresters, agribusiness firms; local, state, and federal agencies involved in agriculture and forestry; local, state and federal agencies involved in managing public lands; local, state, and federal agencies involved in environmental protection wildlife, fisheries, endangered species, water, and other natural resources; environmental organizations; private sector businesses managing or consulting on environmental issues and natural resources; firms manufacturing products used in natural resource management.

Program Duration:
Greater than 5 years.

USDA Goal 5: Enhanced economic opportunities and quality of life for Americans. Empower people and communities, through research-based information and education, to address economic and social challenges facing our youth, families, and communities.

OSU Program 7: **Rural and community development**

(RPAs 602, 603, 801, 802, 803, 804, 805, 806, 807, 808, 907, 908)

Statement of Issue Fundamental economic and social shifts in society are affecting the viability and competent functioning of both rural and urban American families, and negatively affecting the development of quality human capital for the future. Such shifts are reflected in the trends toward increases in: necessity for off-farm income, unemployment and underemployment; two-earner families, many of whom have simultaneous responsibilities for elder care and child care; diversity in family structures; and family violence.

A growing number of children are growing up in at-risk environments with increasing rates of divorce, substance abuse and addiction, suicide, illegitimacy, teenage pregnancy, school drop-out, and poverty-level incomes. At the opposite end of the age spectrum, increased family and societal resources are needed for health, financial, housing, and emotional support of the aging population. Consumer health issues include nutrition as well as consumer contact with clothing and household textiles (products produced from agricultural and forestry commodities) and related medical problems.

Since the early part of the 20th century, we have attempted to cope with important problems of agriculture via agricultural policy and programs. Policies have ranged from land grants to price and income supports for export enhancement. Whatever the involvement of the government it has been significant affecting resource uses, farm organization and structure, productivity of enterprises, marketing of commodities, etc. Furthermore, changing trade patterns, balances and agreements such as NAFTA as well as dynamic economic conditions throughout the world (e.g., financial crises) continue to have an impact on U.S. and Oregon agriculture. Oregon producers, processors, and others involved in agribusiness need to anticipate and to understand the coming adjustments and to be prepared to accommodate and to capitalize upon them.

The policies and programs of government(s) have had significant effects on the organization and management of farms and ranches, the costs of production, the quantity and quality of output, the disposition of the products of agricultural enterprises and finally the economic welfare of farm and ranch families. Furthermore all this is affected by foreign trade patterns. Effects of domestic agriculture policy and international trade policies have been so important that they have been/should be the subjects of careful analyses and the objects of educational programs. At the national level, credible research is ongoing. In both public and private institutions, issues of domestic and international policy, alternative policies and programs, and consequences of policies are being studied and reported to the public. But at the state level, specifically in Oregon, virtually no research has been undertaken.

Performance Goals:

1. Evaluate impact of agricultural and natural resource policy on crop, livestock, range, aquatic and forest production systems.
2. Identify the impact of economic and social factors on rural and community development, including individual and family issues.

Output Indicators:

1. Modified management systems for small businesses and workforce preparation.
2. Better understanding of interactions within the family and with social processes in rural areas.
3. Development of policy alternatives for environmental issues.
4. Peer reviewed publications, patents and licensing agreements as indicators of new technologies developed

Outcome Indicators:

1. Prescriptive policies that reduce government waste will improve equity, preserve the environment, create and preserve jobs, and reduce institutional conflicts.
2. Community development and job creation
3. Training programs designed to meet needs of constituents and local industry.
4. Improved local decision-making.
5. Better targeted more efficiently delivered social services.

Key Program Components:

Marketing: Evaluate alternative approaches to export market assessment and to assess statistical and institutional approaches of relevance to Oregon products. Identify markets and conduct feasibility studies for selected new corps or products.

Agricultural and natural resource policy: Evaluate impact of public policy on agricultural production systems and interrelationships with natural resources. Assess the consequences of the changing structure of agricultural enterprises on rural communities and producers. Determine the social and economic impact of environmental regulations and policies. Determine the relationships between cost and benefit for assessing public and private use of federal land. Evaluate the impact of regulations resulting from policy decisions.

Rural families: Identify the impacts of economic, social, demographic, technological, and environmental changes on rural families and to develop strategies to alleviate adverse impacts of and stress resulting from the changes. The goal is to empower individuals and families to achieve optimum well-being.

Consumers: Develop understanding of relationships between textiles and the user. Investigate opportunities for developing local textile-based business. Evaluate impact of plant materials on human environment.

Internal and External Linkages:
Oregon Commodity Commissions
Oregon Growers Associations and Leagues
National Cattlemen Association
Oregon Cattlemen Association
Oregon Woolgrowers Association
Oregon Wine Advisory Board
Oregon Department of Agriculture
Oregon Department of Fisheries and Wildlife
Oregon Department of Environmental Quality
USDA-Agricultural Research Service
USDA-Natural Resource Conservation Service
USDA-Forest Service
Oregon Farm Bureau
Oregon Agri-Business Council
National Science Foundation
National Institutes of Health
US Environmental Protection Agency
Oregon State University departments involved include animal sciences, botany and plant pathology, entomology, fisheries and wildlife, chemistry, Center for Gene Research, environmental and molecular toxicology, bioresource engineering, forest sciences, food science and technology, Food Innovation Center, human nutrition, horticulture and landscape architecture, microbiology, physiology, rangeland science, statistics, and crop and soil sciences, and OAES branch research stations.

Multi-state Components:
Oregon State University contributes to three multi-state projects in this program (W-167, W-193 and W-183)

Integrated Research and Extension Activities:
This program contains integrated research and extension projects in the following areas:
1. Benefits and costs of resource policies.
2. Market analyses of Oregon products.

Target Audiences:
Consumers and producers of Oregon agricultural commodities, local, state, and federal agencies involved in rural or community development and related issues; firms involved in fabricating, manufacturing or distributing agriculturally related products; firms supporting the development of agriculture product processing and distribution; financial institutions involved in community development; social service agencies and youth organizations.

Program Duration:
Greater than 5 years.

II. Stakeholder Input

The Oregon Agricultural Experiment Station (OAES) annually utilizes multiple means of obtaining stakeholder input on programs conducted and solicits input on changes in program direction. The OAES supports research in 12 departments on the Oregon State University campus as well as at 11 off-campus branch research stations. Programs at the research stations are administratively responsible to the Director of the OAES and coordinate with one or more academic departments. Each year, most college departments and all off-campus research stations hold a meeting with their Advisory Boards where research results and policy issues are presented proposed programs are discussed and input sought from the members. It should be noted that many of the programs discussed involve scientists located on the Corvallis campus as well as at the off-campus research stations.

The OAES is also an active participant in biannual meetings of an Advisory Committee convened by the Dean/Director of the College of Agricultural Sciences/Oregon Agricultural Experiment Station. OAES programs are discussed and input is solicited on future priorities for research activities. There are 32 State of Oregon Commodity Commissions and 20 other commodity related organizations, most of which provide funding for research projects. Through the process of reviewing proposals from involved OSU scientists and the College Dean's representative to these groups, there is a distinct set of annual priorities established for research in each of the programs.

In addition, the OAES regularly participates in meetings held by OSU Extension Service where current and future program needs are discussed. Actually, at OSU, the Extension Service manages the budgets for extensions programs, but the individual colleges are responsible for all extension programs outlined for their faculty. A variety of joint research programs are conducted with USDA-ARS programs in Corvallis, Pendleton, and Burns, and other locations as well as collaborative programs with other USDA units. Experimental studies are also conducted in cooperation with individual farmers, ranchers, processors, fisheries and marketing individuals and groups.

III. Peer Review

All projects conducted by the OAES are subjected to a peer review process. Each department is responsible for completing a process for conducting a peer review (see below) on all OAES projects submitted for support by state and federal funds. The Director or his designate must approve all proposals that are submitted by faculty through the OAES.

OREGON AGRICULTURAL EXPERIMENT STATION

Policies & Procedures

for

Research Project Establishment & Evaluation

October, 1995

New POW Page Numbers

The Agricultural Experiment Stations (AES) were established within the Land Grant institutions in each State through the Hatch Act legislation in 1888. The mission of Land Grant agricultural research differs from that in the general sciences at the university level in that there are State clientele who depend on outputs from the AES research system to provide a stable agricultural production/processing environment, which enhance the well-being of the citizens.

The Agricultural Experiment Station research project system was established through a cooperative effort by the individual states and the USDA as a means for departments to plan and to monitor research activities, to provide information for effective local, regional and national planning and to serve as a means to account for Hatch Act funding utilized by the states to support research. AES projects (programs) are utilized locally to plan and to monitor research activities in a wide variety of research program areas, commodities, and disciplines in order that there are clear research goals and measurements of achievements toward the objectives established for high priority agricultural research in the State. Reports on research progress and accomplishments are reported annually to USDA annually, and become a part of the national agricultural research database, the Current Research Information System (CRIS), which is accessible by scientists throughout the world.

Mission of the AES

The Agricultural Experiment Station has been the principal agricultural research agency in Oregon since its establishment in 1888. The AES mission in research is to foster the development of the agricultural, biological, environmental and social sciences to:

insure a stable and productive agriculture through management of the state's natural resources,
protect crops and animals from insects, diseases and other hazards and to improve the efficiency of agricultural production,
protect and to improve the environment and quality of living,
protect the consumer and to improve the nutrition and well-being of Oregon's people,
develop new agricultural products and processes and to enhance product quality,
improve the marketing of Oregon's agricultural products, and
promote community development and economic and public services for Oregon's people.

United States Department of Agriculture
Cooperative State Research, Education and Extension Service
USDA-CSREES Policy on Administration of Hatch Formula Funded AES Projects

"The State Agricultural Experiment Stations are expected to propose and to conduct research projects, supported with Hatch formula and matching funds, which comply with the purposes of the Hatch Act and the National Agricultural Research, Extension, and Teaching Policy Act of 1977, as amended, which have relevance to the special conditions and needs of the respective States. Consideration of the priorities and objectives of the Joint Council on Food and Agricultural Sciences and the National Experiment Station Committee on Organization and Policy ESCOP/CSREES Strategic Plan is to be included in the project selection process. In order to maximize the research effort, States and parent institutions are encouraged to supplement Federal Allotments and the required State matching funds whenever possible."

The rationale for the national policy for updating each AES project (program) at least every five years reflects the need to re-evaluate individual faculty research priorities. This process enables the PI to set a new course for the project based on progress made during the previous five years as a result of advances made in the field by the faculty member and by other scientists working in the research area.

Maintaining an up to date AES program for each PI is also required by USDA-CSREES for awarding of Federal Hatch Act funding for all State Agricultural Experiment Stations (SAES). All SAES are required to report all expenditures for research activities through approved and appropriate Hatch or State funded programs. Therefore, it is necessary for all scientists within the AES to have an approved program (also a requirement of the OSU-FIS) through which expenditures can be reported for representative program activity areas within the research system.

This AES policy and procedure statement on research program development provides a step-by-step methodology to assist unit administrators and faculty in developing AES project proposals and in activating an effective peer review system to ensure high quality research projects in the Oregon Agricultural Experiment Station.

All faculty who hold an FTE assignment in the AES are responsible for being a Principal Investigator (PI) or a Co-Principal Investigator (Co-PI) on at least one approved AES project (program) that depicts their area of research responsibility.

Unit administrators (department heads, chairpersons, and branch station superintendents) are responsible for guiding faculty in the preparation of their AES projects (programs), for selecting project proposal reviewers, and for ensuring that only high quality proposals are submitted to the AES and USDA-CSREES for their approval. All written program evaluations must accompany the proposal when submitted to the AES Director's Office including an indication by the unit administrators that review comments have been considered and appropriate changes have been incorporated into the final project proposal as a result of the evaluation comments.

I. All AES Research Projects (Programs)

Regular AES projects are those which are supported by State appropriations, Federal Hatch Act funds, Regional Research Funds, service fees, sales and other income which are funded through unrestricted indexes, (formerly the AES 35-0X0-XXXX accounts), and supplementary gifts, grants, contracts which are funded through restricted indexes (formerly the 30-26X-XXXX accounts).

The following policies are applicable to **all** research conducted by **personnel who hold AES professorial rank faculty appointments**.

A. All research activities, projects, grants, contracts and cooperative agreements involving AES appointed faculty, staff, facilities or property must be administered through an approved AES research (not administrative) program. If the proposed research does not fit logically within the faculty member's, or another existing AES program, a new project (program) must be prepared. Arrangements for such matters must be made with the unit administrator (superintendent, head or chairperson) at the time of submitting the new project. AES administration will facilitate program development.

B. All AES faculty who have ongoing AES projects (programs) which are nearing their termination date must prepare a new or revised AES project for the next five year period prior to the termination date.

Faculty members will be advised by their unit administrator one year in advance of their need to either develop a new or revised AES project (program). The decision to prepare a new or revised project will be determined through consultation with the unit. The unit administrator will send notices as reminders for the need to update the AES project to the concerned faculty member six months, three months, one month and on the date of termination of the current AES project.

If no new AES project (program) has been fully approved by the AES Director's Office by the date of termination of the old project, all funds supporting project operations will cease to be approved for expenditure and no travel will be allowed until such time that the AES project is fully approved by the AES Director's Office.

C. Once an established project (program) reaches its revision date, the decision to prepare a replacement **new** or to **revise** the AES project will be based on the following criteria:

Faculty who have made a significant change in direction of their research should prepare a replacement **new** AES project (program). For example, if a faculty member had been working with one type of commodity or process and expected to change to another, if a move is made to alter the emphasis on more basic or applied research, if the new research direction entails a new enzyme system, focus on a different species, organ or tissue, etc., then it would be necessary to prepare a replacement new AES project. However, if as in many genetics/breeding projects, the general direction of the research will be a continuation of the previous project, a project **revision** would be appropriate, with recognition that scientific progress has been made during the previous five years.

D.If a faculty member conducts research through the objectives of a Regional Project (but not a Regional Coordinating Committee) or USDA-CSREES National Research Initiative Competitive Grant Research Project, development of an AES project (program) which relates to their specific area(s) of responsibility within the project is required.

E. The following process shall be used to prepare and to gain approval of an Oregon AES project (program):

1. The PI(s) are expected to prepare a detailed proposal of the research they intend to pursue during the next 5 years. The proposal must follow the prescribed format (see Appendix I: Project Outline), including title, duration, introduction and justification, previous work and present outlook, objectives, procedures and methods, personnel resources, institutional units involved, cooperators and literature cited.

2. It is recommended that, prior to preparation of a new AES project (program), a thorough literature search (AD-427) be made by the PI in order to ensure that the proposed research objectives represent the most current technological approach to the problem and are not duplicative of other reported research. Information on any research project covered by the CRIS system throughout the United States can be retrieved by completing CRIS form AD-427. For example, the CRIS system can be searched by Activity, Commodity and /or Research Problem Area. Information can be requested by submitting two copies of Form AD-427 to the AES Director's Office. This information is also available by doing a literature search with the Kerr Library's Library Information Retrieval Service, or by searching the Agriculture area of the Kerr Library CD-ROMs either in person at the Kerr workstations or through a faculty member's networked personal computer. The Information Retrieval is a valuable part of AES project development prior to its preparation and peer review.

3. Unit administrators have the responsibility of guiding their faculty in the preparation of their AES projects (programs) on a timely basis. They have responsibility to guarantee a high quality and appropriate peer review. The purpose of program proposal reviews is to assist faculty in developing high quality research programs, to enable prudent allocation of resources to those projects of high priority that have a good chance of success and to encourage interdisciplinary and cooperative research when possible.

4. New AES faculty are to submit a fully reviewed program proposal within a period of eight (8) months after they take up official duties at OSU. It is the responsibility of the unit administrators to ensure that the preparation of the new AES project is deemed a high priority by each new faculty member.

5. Research program proposals prepared according to the outline in Appendix I must be submitted by the investigator to the unit administrator along with names of prospective reviewers, both from within and outside the unit. The unit administrator shall select from the list supplied or other lists of appropriate reviewers (at least three) and request an evaluation of the proposal. The proposal reviewers selected will represent the same or related areas of science, and will provide a critical review of the project proposal. Each project is to be reviewed by at least one qualified OSU faculty member from within the unit in which the PI is located (not a cooperator on the project). In the case of joint unit submissions, select at least one from each unit. Also, to ensure high quality research, one qualified peer reviewer from outside Oregon State University is required in order to get a broader perspective about the merits of the proposed research and the methods used to accomplish the objectives. The unit administrator is responsible for maintaining quality standards here. Final proposals must be submitted to the AES with peer reviews attached.

6. The Oregon AES must provide a certification regarding the use of Human Subjects (includes interviews and surveys), Recombinant DNA, and live vertebrate Animal Subjects. If the PI plans to involve activities concerning any of these three topics in his research, the forms should be completed and submitted to the appropriate OSU Review Board. Once approval is received, include the authorization letter(s) with the project package when it is forwarded to the AES.

7. The unit administrator will return the comments from the peer reviewers to the investigator for discussion and project revision as necessary to improve the presentation of the proposal.

8. The CRIS forms AD-416 and AD-417 are necessary parts of any new, or revised research project proposal. NOTE: CRIS forms should be prepared **after** the project proposal is approved and in final form. The *Manual for Preparing CRIS Forms for State and Non-Federal Institutions* and the *Manual of Classification of Agricultural and Forestry Research - Revision V* are both helpful in preparing these forms. In addition, staff in the Oregon AES Director's Office is available to assist faculty in the preparation of these forms.

9. Two copies of the final proposal text will then be resubmitted, along with the forms AD-416, AD-417, a copy of the peer review comments, and the Animal Subjects, Human Subjects, and Recombinant DNA clearances where necessary, to the unit administrator, who will decide on approval of the program. The unit administrator has the responsibility to review the revised proposal (program) and to determine if it is in satisfactory condition to forward to the Director of the AES. The unit administrator shall send the package to the Oregon AES Director's Office with a transmittal letter.

10. The Director of the AES will forward the proposal along with evidence of it having been peered reviewed, to USDA-CSREES for federal approval.

11. The USDA/CSREES will then conduct its own evaluation of the project proposal for completeness and compliance with USDA-CSREES provisions of appropriate federal legislation which regulate Hatch Act funding for the State Agricultural Experiment Stations.

12. Approved AES projects will be assigned a program (formerly, project) number by the AES Director's Office. Unit administrators will be notified of this number by copy of the transmittal letter to CSREES. Approved copies of the CRIS forms will be supplied to administrative units and to the PI(s) involved in the project.

II. Other Procedures

A. Dual Department Research Projects (Programs) -- State or Hatch

Research with co-investigators from two or more departments and/or research and extension centers.
1. The AES research proposal shall designate one administrative unit as having primary responsibility or leadership in the program. Funds allocated to the program by each cooperative unit can be distributed in their respective indexes (formerly, account numbers). The unit designated as having primary responsibility shall:

a. submit an approved research proposal and CRIS forms as outlined in Part I of the AES Project Policies and Procedures.

b. summarize the results of the cooperative research in only one cooperating faculty annual progress report (CRIS form AD 421).

2. Cooperating administrative units are listed on CRIS form AD-416, Fields 10 and 11. The unit having primary responsibility shall submit the CRIS forms and the research proposal and prepare the annual progress report.

B Revised Projects (Programs)

If an investigator plans to continue to pursue objectives which are similar those in the previous AES project, it is still necessary to submit a new (revised) research proposal. Even if one intends to work toward the objectives and use the same general approach, a new research proposal is required. The revised project must reflect that progress has been made in the research area and that new challenges which are presented to the investigator(s). It is also necessary to complete new CRIS forms AD-416 and AD-417 for the revised project. The same general procedure as required for a new project is to be followed.

C. Extended Projects (Programs)

Projects may be continued beyond the estimated termination date shown on the CRIS forms only on the basis of submission of written justification by the unit administrator to the AES Director's Office. The request will be forwarded to CSREES indicating the new termination date. A one time project extension shall be for a maximum of one additional year during the life of a five year AES project.

D. Annual Progress Reports

Preprinted progress report forms (AD-421) are sent annually to each department/branch station for their projects (programs) by the AES Director's Office. These are usually received from CSREES during October or November and are due back in the Director's Office during the first week of February. Beginning with the reporting of calendar year 1995 research results, the units will complete the reports using a new computer software package.

It must be emphasized that these annual reports serve an important purpose not only for local monitoring and planning, but also as an important part of the USDA-CRIS reporting system. Their contents are also important in keeping OSU administrators and researchers informed about program affairs. Decisions concerning priority-setting and fund allocations are aided by review of these documents. It is therefore imperative that a good annual report be submitted by each project leader.

E. Terminating Projects (Programs)

When a project is terminated, completed or discontinued, a CRIS for AD-421 (progress report) must be completed at the termination of the project at the termination of the program. The AD-421 should summarize the accomplishments **for the entire life** of the project. The AD-421 should then be submitted to the AES Director's Office. Termination forms are available in the unit administrator's office (extra copies of the AD-416, AD-417, AD-421, and AD 427 may be obtained from the AES Director's Office).

F. Special and/or Outside Grant Supported Projects (Programs)

The primary responsibility for grant review rests with the unit administrator for grant proposals intended for support by extramural grants, contracts, or gifts administered through restricted fund indexes (formerly the 3X-26X-XXXX. accounts).

1. A proposal is for extramural funding prepared by a faculty member following the format specified by the granting agency. The final grant proposal is reviewed and approved by the unit administrator and by the AES Director's Office. After the Director's approval, the proposal and blue check off sheet will be forwarded to the Dean of Research. The department is responsible for forwarding the appropriate number of copies of the proposal to the granting agency.

1. When the extramural proposal is funded, the research should be within the domain of the Principal Investigator's existing umbrella AES project (program). If the new grant award is outside the scope of an existing AES project, a new project (program) may be required. If the objectives of the existing project are changed, revised CRIS forms AD-416 and AD-417 must be submitted along with a revised AES research proposal, in the format in Appendix I, for the existing project. If the new grant does not change the objectives of the existing project, new CRIS forms are not required. This is the responsibility of the unit administrator.

APPENDIX I: PROJECT OUTLINE

A research proposal shall accompany all CRIS forms (AD-416 and AD-417) for a new or revised project (program). Copies of the final proposal shall be provided to all investigators, each administrative unit involved, and two copies to the AES. In the case of USDA NRI Competitive or Special Grants, the individual's grant proposal serves as the necessary AES project text. The recommended components of a research proposal are as follows:

1. **Title**:
A brief, clear specific designation of the subject of the research topics. The title should reflect the objectives and scope of the program. Accurately describe the research contemplated in 80 spaces or less. The title of contributions to regional projects shall be identical to that of the regional project. In cases where the project is funded principally from a grant, contract or agreement, the title of the research project (abbreviated if necessary) shall be used.

2. **Duration**:
A maximum of five years is allowed between initiation and revision or termination of a project. (A one year extension may be approved if adequately justified.)

3. **Introduction and Justification**:
This section shall include the subject, purpose, scope and justification of the research program. The justification should present the importance of the problem to agriculture, other natural resources, human resources, or environmental quality in the state and region. Identification of needs the project will fulfill, timeliness, and ways in which public welfare or scientific knowledge will be advanced are useful.

4. **Previous Work and Present Outlook**:
A review of the literature pertinent to the field of inquiry shall be presented. Consider the project within the context of the most important and recent publications. Summarize the status of current research and describe the additional knowledge, which the project is expected to provide. Literature citations must be listed at the end of the project proposal.

5. **Objectives**:
A clear, complete and logically arranged (outline form) statement of the specific results to be achieved by the program.

6. **Procedures and Methods**:
A statement of the essential working plans and methods to be used in attaining each of the stated objectives. The procedures must correspond to the objectives and follow the same order. Phases of the work to be undertaken should be indicated, as well as the location of the work and the facilities and equipment needed and available. Wherever appropriate, the procedure should provide data suitable for statistical analysis. The statement of procedure should illustrate that the research has been carefully planned and should provide for changes when they are necessary to improve the work.

7. **Personnel Resources**

New projects (programs) are not funding requests within the CSREES; however, identification of available resources provides insight into project scope. A detailed budget is not necessary. The names of the program leader (tenure or tenure track at the rank of Instructor or above) or leaders and other technical workers assigned, including the assigned FTE for SY, PY, and TY. (Scientist Year, Professional Year, Technical Year - See the *Manual for Cooperative Regional Research,* Appendix C, page 51 for definitions of SY's, PY's, and TY's.)

8. **Institutional Units Involved**:

Each subject matter unit in the AES and any other units of the institution contributing essential services or facilities shall be indicated. The responsibilities of each shall be stated. If there is an advisory, coordinating or directing committee for the program, this should be shown as well.

9. **Cooperation**:

A statement as to cooperation with the outside agencies, such as USDA, ODA, BLM, EPA, etc. or any other stations, institutions, or agencies cooperating formally or informally on the program. Indicate if the project is a formal contributing part to a regional project.

10. **Literature Cited**:

List the references cited in the research outline according to the method presented in the American Institute of Biological Science (AIBS) style manual.

Example: DETROY, R.W. and STILL, P.E. 1974. Penicillin virus; large scale concentrate and purification by polyethylene glycol. Appl. Microbiol. 28:733-735.

RANDELL, A.W. 1973. Studies on the soluble protein fraction of the milk-fat-globule membrane. Ph.D. Thesis, Univ. Illinois, Urbana. 127p.

NOTE:Investigators should follow this format for all new programs or proposals to outside agencies if no other format is recommended by the agency.

APPENDIX IIa: SAMPLE PEER REVIEW MEMO

(Date)

MEMORANDUM

TO: _____

FROM: (Department Head or Branch Station Superintendent)

SUBJECT: Review of AES Project Proposal

I would appreciate your serving as a member of a committee to review the attached Oregon State University Agricultural Experiment Station project proposal, "_____(Title)_____."

The purpose of the review is to evaluate the justification, objectives, and methodology of the research. Relevance, interrelationships, chance for success, and overall quality are important factors. Please do not take time to emphasize grammar and word usage unless clarity is demanded.

All comments should be returned by me by ____ (Deadline Date)_____. I will coordinate the responses and will advise the principal investigator of all comments and recommendations.

Thank you very much for assisting our research program in this project review process.

Enclosures

The following questions shall be used to constructively evaluate the merits of research project (program) proposals. Please provide a brief, clear statement of response to each question after careful study of the project proposal. (Use an additional page for responses.) Please provide a more complete response than simply writing in a "yes" or "no."

1. Does the program proposal clearly state the problem to be solved or specify the nature of the knowledge to be sought? If needed, please suggest improvements.

2. Are clear and definable benefits being sought; if so, can they be attained from the successful pursuit of the proposed objectives and methods in this research proposal? If not, how might they be improved?

3. Are the objectives clearly stated and sufficiently specific so that they could be accomplished within the five year duration of the proposed program? If not, how might they be improved?

4. Do you judge that the proposed procedures/methods suggest reasonable and sound scientific approaches to accomplish each objective? If not, how might they be improved?

5. Are the experimental methods (materials, samples, measurement, criteria, etc.) likely to provide reliable and interpretable results? If not, how might they be improved?

6. Does the proposal give evidence of the investigator's familiarity with the essential literature concepts and methods relevant to the research? If not, how might this area be improved?

7. Does the investigator appear to have the scientific competency essential to complete the research?

8. Is the program likely to contribute significantly to new knowledge in the discipline? Please explain why, or why not.

Along with responses to questions #1-8 above, reviewer comments should be solicited on the following:

a. Suggest possible cooperative research that might be established within and/or outside OSU via this proposed research:

b. Add relevant comments and suggestions for the improvement of any deficiencies deemed to be important to help ensure this will be a successful program:

IV. Equal Employment Opportunity Reporting

The OAES adopts by reference the Oregon State University's procedures for reporting civil rights compliance with Equal Employment Opportunity requirements. A biennial report is filed by the Oregon State University to the Oregon University System, which forwards the report to the U.S. Equal Opportunity Commission. The OAES is committed to enhancing the diversity of the faculty, staff, and students at Oregon State University.