



Washington State University

Agricultural Research Center

PO Box 646240
Pullman, WA 99164-6240
509-335-4563
FAX 509-335-6751

July 9, 1999

Larry Biles
USDA/CSREES
Partnership/POW
1400 Independence Avenue SW
Stop 2214
Washington DC 20250-2214

Dear Dr. Biles:

Herewith is the Plan of Work from the Agricultural Research Center, Washington State University. We have chosen to submit a plan which is separate from Cooperative Extension at WSU.

I will be available to respond to questions or to clarify anything in the POW during the period of July 26-29 and after August 15. My e-mail address is arlen@wsu.edu(.)

Sincerely,

A handwritten signature in cursive script that reads "Arlen D. Davison".

Arlen D. Davison
Associate Director

gh Giles.ADD

PLAN OF WORK

Agricultural Research Center

College of Agriculture
And
Home Economics

Washington State University

Submitted to CSREES

July 15, 1999

Federal Fiscal Years

2000 to 2004

TABLE OF CONTENTS

Page

Section I

Introduction	1
Point of Contact	2
POW Development	2
Plans for Annual Reports/POW Updates	2
Research Funding	3
Washington Agricultural Economy	5
Stakeholder Input & Identification of Critical Agricultural Issues	5
Agricultural Research Center - Cooperative Extension Coordination	8
Regional Cooperation	8
Resource Allocation	9
Peer Review of Research Projects	9
USDA Signature Authority	10
Equal Employment Opportunity	11
Unit Plans of Work	11
Certification	11

Section II

CSREES Goal 1	12
Department of Agricultural Economics	12
Department of Animal Sciences	19
Department of Crop and Soil Sciences	25
Department of Entomology	31
Department of Food Science & Human Nutrition	36
Department of Horticulture & Landscape Architecture	41
Department of Natural Resource Sciences	51
IMPACT Center	55
Institute of Biological Chemistry	65
WSU Puyallup Research & Extension Center	73
WSU Vancouver Research & Extension Unit	76
WSU Wenatchee Research & Extension Center	82

CSREES Goal 2	86
Department of Animal Sciences	86
Department of Biological Systems Engineering	89
Department of Horticulture & Landscape Architecture.....	94
Department of Plant Pathology	98
College of Veterinary Medicine - Field Disease Investigation Unit	102
WSU Puyallup Research & Extension Center	105
WSU Vancouver Research & Extension Unit.....	107
WSU Wenatchee Research & Extension Center	112
 CSREES Goal 3	 118
Department of Food Science & Human Nutrition	118
 CSREES Goal 4	 121
Department of Agricultural Economics	121
Department of Biological Systems Engineering	125
Department of Crop & Soil Sciences.....	131
Department of Natural Resource Sciences.....	136
WSU Puyallup Research & Extension Center	146
 CSREES Goal 5	 149
Department of Horticulture & Landscape Architecture.....	149
Department of Natural Resource Sciences.....	153
Department of Rural Sociology.....	157

Section III

Appendix A - College of Agriculture & Home Economics	
Advisory Groups.....	161
Appendix B - Implementation of Safe Food Initiative.....	173
Appendix C - Regional (Multistate) Research Projects	179
Appendix D - Regional (Multistate) Coordinating Committees.....	186
Appendix E - Equal Employment Opportunity Report.....	191
Appendix F - Agricultural Research Center, Strategic Plan 1997-2002	193

SECTION I

INTRODUCTION

The Agricultural Research Center (ARC) (state agricultural experiment station) College of Agriculture and Home Economics (CAHE), Washington State University (WSU) has chosen to submit an individual Plan of Work (POW) rather than a joint plan with Cooperative Extension (CE) at WSU.

CAHE is mid-way through implementation of a 1997-2002 Strategic Plan. The ARC has chosen to develop the POW within the framework of the institutional strategic plan. The POW's of the individual units, which constitute Section II of this plan, are built around their component of the WSU Strategic Plan. The individual unit "research programs" will encompass the continuing nature of research and are appropriate for the CSREES 2000-2004 POW. The Strategic Plan of the ARC is referenced in Appendix F.

Each of the following units of College of Agriculture and Home Economics (CAHE) are hereby designated as a "program unit", each of which has one or more planned research programs addressing issues important to one or more components of the agricultural industry of the State of Washington.

Program Planning Units

Agricultural Economics
Animal Sciences
Biological Systems Engineering
Crop and Soil Sciences
Entomology
Food Science and Human Nutrition
Horticulture and Landscape Architecture
Natural Resource Sciences
Plant Pathology
Rural Sociology

Special Program Units and Institutes

IMPACT Center
Institute of Biological Chemistry
Veterinary Medicine - Field Disease Investigation Unit

In addition, ARC shares responsibility for fiscal and programmatic management at the following off-campus research and extension centers/units, which are designated program-planning units. Several off-campus research extension units have chosen to include the research activities of faculty located there in the disciplinary planning units.

WSU-Puyallup Research and Extension Center (WWREC)
WSU-Vancouver Research and Extension Unit (SWREU)
WSU-Wenatchee Tree Fruit Research and Extension Center (TFREC)

POINT OF CONTACT

All correspondence/contacts regarding this plan should be directed to:

James R. Carlson, Associate Dean
Agricultural Research Center
Washington State University
Pullman, WA 99163-6240
Voice: 509-335-4563
FAX: 509-335-6751
e-mail: carlsonj@wsu.edu

or

Arlen D. Davison, Associate Director
Agricultural Research Center
Washington State University
Pullman, WA 99163-6240
Voice: 509-335-4563
FAX: 509-335-6751
e-mail: arlen@wsu.edu

POW DEVELOPMENT

The WSU ARC Plan of Work has been developed around the individual-planning units' **Strategic Institutional Plans** in relation to the five national goals. Each program-planning unit (PPU) identified selected projects within the units planned research programs, which separately or in combination address one or more of the national goals. To make tracking of information/results more possible all included projects have been aligned with newly revised CRIS RPA codes. Each PPU developed the brief program description(s) applicable to their planned research program. Not all research programs of a PPU are included in the POW -- only those most clearly related to the national goals. While most basic research can be indirectly related to the national goals identifying specific output and outcome indicators is somewhat difficult. The 2000-2004 POW tends to include more applied research projects but does not exclude selected basic research projects. The ongoing nature of most unit research programs and the number of individual research projects undertaken make it impractical to designate portions thereof as short, intermediate and long term in nature. Virtually all research programs have components of each. Individual research projects have objectives which in part reflect the anticipated time required to accomplish the objectives. Many research projects continue over many years as objectives are accomplished and new objectives are developed.

PLANS FOR ANNUAL REPORTS/POW UPDATES

Collection of some data for "output indicators" and "outcome indicators" will be expected on all units "Research Programs." In addition, the Associate Dean, Director of ARC, will select certain programs for more in depth collection of data and reporting.

WSU ARC will provide impact statements, which are associated with funding sources. For example, CAHE is committed to the Washington State Legislature to document economic

benefits of \$200 million to the state economy from funding of the Safe Food Initiative at \$7.5 million biennially. Such a return on investment is expected in a 5 to 10 year period.

RESEARCH FUNDING

In federal FY 1998 the ARC received \$1,904,430 in Hatch formula funds and \$1,383,567 in regional (multi-state) funding for a total of \$3,287,997. The State of Washington provided \$14,163,580 with grant funding totaling \$17,165,933. Total Hatch, state and grant funding was \$34,617,510. Total Hatch Act formula funding including multi-state funds constituted 9.5 percent of the 1998 ARC budget expenditures. Hatch funds alone constitute 5.5% of the ARC budget expenditures.

Hatch formula funds are allocated to ARC/CRIS approved research projects in partial support of faculty and staff salaries, good and services and travel. The budget allocation process used by WSU does not provide for separation of fund sources at the departmental, center or unit level. The "resources allocation" data provided for each unit research program is based on actual expenditure data for federal FY 1998.

Hatch multi-state, multi-disciplinary funds are allocated to specific Regional Research projects and to Regional Coordinating Committee projects. See Appendix C for a list of Regional Research Projects and participating faculty. Consult Appendix D for a list of Regional Coordinating Committees and participating faculty.

Data extracted from the CRIS report AD 419 documents the following total expenditures from various fund resources.

<u>Source</u>	Fed. FY 1998 <u>Expenditures</u>	<u>%</u>
Hatch Formula	\$3,287,997	9.5
State	\$14,163,580	40.9
Grants	<u>\$17,165,933</u>	<u>49.6</u>
	\$34,617,510	100.0

WSU more than adequately meets all matching requirements.

FY 1998 Hatch Allocation	<u>\$1,904,430</u>	
FY 1998 Hatch Multi-State Research Fund Allocation	<u>\$1,383,567</u>	
Total Expended on Multistate Research and Coordinating Committees included in the POW	<u>\$960,055</u>	<u>% 69.4</u>

\$1,311,921 of \$1,904,430 Hatch funds are assigned to research projects included in the ARC POW. The remaining \$592,509 of Hatch funds are used in support of projects not included in the POW.

\$960,555 of \$1,383,567 Multistate funds are assigned to projects included under the CSREES Goals in the POW. The remaining \$423,012 is assigned in support of other Regional Research & Coordinating Committee projects not included in the POW. See Appendices C & D for additional information.

In federal FY 1998 ARC expended \$14,163,580 of state appropriated funds. Of that amount \$9,283,382 was spent on the projects included in this POW. The remaining portion of state funds in expended in support of other research efforts.

8-26-99
 Requested
 Revised
 Table 1
 to account
 for \$592,509
 of Hatch
 money
 identified on
 page 3 &
 \$423,012
 of Hatch
 multistate
 identified
 on page 4.
 1. b -
 The WSH
 contact was
 Arlene
 Dawson

Table 1: Fed FY 98 Expenditures & Estimated Future Allocations Supporting CSREES Goals 1

Funding Source	CSREES Goals					
	1	2	3	4	5	Total
Hatch Funds	\$817,412	\$205,461	\$58,153	\$197,834	\$33,061	\$1,311,921
Hatch Multistate Funds	\$265,847	\$252,413	\$37,612	\$401,150	\$3,533	\$960,555
Fed. Research Grants	\$1,053,001	\$207,707	-	\$284,668	\$67,846	\$1,613,222
State Appropriation	\$6,910,906	\$818,997	\$223,843	\$1,066,288	\$322,201	\$9,342,235
Industry & Other Grants	\$1,730,948	\$480,574	-	\$108,392	-	\$2,319,914
Totals	\$10,778,114	\$1,965,152	\$319,608	\$2,058,332	\$426,641	\$15,547,847
FTE's	256.39	43.07	7.62	42.62	3.29	352.99

1 No significant changes are planned in future allocations/expenditures of federal or state funds except for the additional state appropriated \$7.5 million per biennium for the Safe Food Initiative beginning July 1, 2000.

Over the past 10 years, substantial decreases in base programs have occurred from budget reductions. In order to reach stated goals, it was necessary to down size, while developing more focus, and to maintain and build on areas of strength. The ARC can have its greatest impact by emphasizing research related to food and fiber systems. This includes (a) basic research and (b) research directed toward food and fiber production; disease and pest control; natural resource management and protection; the quality, safety, and processing of products; economics and marketing; nutrition and health of consumers; and community issues related to food and fiber systems. We have downsized dramatically while focusing our efforts on food and fiber systems and attempting to preserve strength by selective reductions. This has resulted in serious gaps in expertise in some core areas.

As a result of gaps in expertise and program delivery, stakeholders for the Washington agricultural industry have worked closely with CAHE over the last 2 years to identify the most

urgent concerns and to develop a plan to remedy some of these staffing issues. The result was the Safe Food Initiative, which was supported by over 40 agricultural stakeholder groups and organizations. A consensus for increased support for agricultural research and extension united these groups; and the Initiative was fully funded by the Washington Legislature, beginning on July 1, 2000.

WASHINGTON AGRICULTURAL ECONOMY

The State of Washington has a very diverse climate and geography, which supports an extremely diverse agricultural industry. The 1997 value of agricultural production totaled \$5.60 billion. The farmgate value of 40 different commodities exceeds \$2.7 million each with the value of production of apples (No.1) being \$822,800 million in 1997. Over 230 commodities contribute to the Washington agricultural economy.

STAKEHOLDER INPUT & IDENTIFICATION OF CRITICAL AGRICULTURAL ISSUES

Through cooperative planning efforts with stakeholders CAHE identified the following critical agricultural issues.

- **Ensure safe food products for domestic and global markets by elimination of risks from food-borne pathogens.**
- **Protect food crops from devastating pests through new crop protection techniques and materials.**
- **Help farmers and ranchers produce food safely and economically while conserving natural resources.**

These formed the basis for the "Safe Food Initiative" (SFI) for consideration by the Washington State Legislature. The initiative requested \$7.5 million in new permanent funding beginning in the 1999-2001 biennium.

The following advisory groups or organizations have regular opportunities to provide advice to college administrators and faculty concerning needed research and extension education programs.

CAHE Advisory Council
Ag 101 - Presidential "Kitchen Cabinet"
Association of Agricultural Presidents
Commodity Commissions
Commodity & Agricultural Organizations

See Appendix A for additional information

In addition, college leadership and faculty regularly attend and participate in the annual meetings of commodity and farm organizations such as the Washington Association of Wheat Growers,

Farm Bureau, Washington Horticulture Society, Western Washington Horticultural Association, Washington Friends of Farms & Forests, etc.

Two constituent groups with which CAHE-ARC did not have a long working tradition are Washington Tilth Producers and the Washington Sustainable Food and Farming Network. Through the leadership of College Administration both groups endorsed the SFI. The new cooperative working agreements should result in better research & extension service to these previously underserved groups.

As evidence of broad constituent input into research and extension programs the following organizations and groups endorsed the Safe Food Initiative.

Statewide and Local Organizations

Washington Ag Presidents Association
Washington State Farm Bureau
Washington State Council of Farmer Cooperatives
Washington Tilth Producers
Washington Association of Conservation Districts
Washington Sustainable Food & Farming Network
Washington Rangeland Committee
Washington Women for Agriculture
Columbia - Snake River Irrigators Association
Far West Fertilizer and Agri-Chemical Association
Washington Friends of Farms and Forests
King County Agriculture Commission
Washington State Farmers Market Association
Washington State Grange
Washington State Association of Counties
Washington State Nursery & Landscape Association
Northwest Agricultural Research Foundation

Commodity Groups

Washington State Tree Fruit Research Commission
Washington Wheat Commission
Washington State Potato Commission
Washington Association of Wheat Growers
Washington Barley Commission
Washington State Horticultural Association
Washington Growers Clearinghouse
Hop Growers of Washington
Washington Asparagus Association
Washington - Oregon Asparagus Growers Association
Washington Dry Pea and Lentil Council
U.S. Dry Pea and Lentil Commission
Idaho Dry Pea and Lentil Commission
Washington Association of Wine Grape Growers

Washington Egg Commission
Washington Red Raspberry Commission
Washington State Bee Keepers Association
Washington Strawberry Commission
Washington Cattlemen's Association
Washington State Dairy Federation
Washington State Sheep Producers
Washington Cranberry Alliance
Washington Dairy Products Commission
Washington State Hay Growers Association
Darigold Farms

Regional Newspapers

Capital Press
Skagit Valley Herald
Tri-City Herald
Wenatchee World
Spokane Spokesman-Review

*Safe Tool
sent.*

With the broad support from stakeholders the 1999 Washington Legislature fully funded the SFI request which will enable WSU to add 20 faculty and 20 technical support staff distributed among the Colleges of Agriculture and Home Economics, Veterinary Medicine and Sciences. Funding will become available the second year of the biennium. It is the goal of CAHE to have all new faculty on the job no later than October 1, 2000.

As further evidence of continuing interaction with stakeholders, see Appendix B, which describes the process being used to recruit and fill the 20 faculty positions. These new faculty will become important and pivotal additions to teams of extension and research faculty which will address emerging needs of clientele statewide as well as long term needs. This process of stakeholder involvement in search committees has been a fairly common practice in CAHE in recent years.

In addition to the above-mentioned methods of obtaining constituent input, several planning units and research and extension centers have internal and external advisory committees. WSU Cooperative Extension has an extensive system of local advisory committees. State extension specialists have appointments in academic departments and in most cases are housed with their research colleagues which helps facilitate cooperation and gives both partners more opportunities to communicate research and educational needs. Some units have individual stakeholder advisory committees.

The College of Agriculture and Home Economics (CAHE) at Washington State University (WSU) has a long tradition of addressing research and extension educational needs of the citizens of the state. As early as 1894 the first off-campus agricultural experiment station was established near Puyallup, WA to address the needs of people in western Washington. Since those early days two additional major Research and Extension Centers have been built in

addition to smaller off-campus units established to address very specific needs of local agricultural producers.

Nomination and selection processes of individual citizens to serve on the wide array of advisory committees and commodity commissions differ according to the charter or authority under which they were organized. The process for selecting commodity commissioners is imbedded in Washington State statutes and the administrative codes governing their formation and operation.

AGRICULTURAL RESEARCH CENTER - COOPERATIVE EXTENSION COORDINATION

Faculty of the ARC and CE cooperate in program planning and delivery primarily on an individual basis. Fifty-eight faculty, including 12 college administrators, have split appointments between ARC and CE. Such assignments assure a significantly high level of cooperation and coordination. Scientists stationed at the off-campus Research and Extension Centers/Units routinely conduct research and extension education responsibilities jointly.

The newly assigned funding for the Safe Food Initiative will enable and ensure even more jointly planned and implemented research/extension programming. Refer to Appendix B for information on the SFI "teams" and the research/extension splits of newly authorized faculty positions.

REGIONAL COOPERATION

On a Pacific Northwest Regional basis there has been cooperation/collaboration among research, extension, and teaching faculty of WSU, the University of Idaho, and Oregon State University for many years. As fiscal and human resources have declined the institutions have agreed to focus selected research, extension, and academic programs at a single institution to the degree that is possible. For example, the lead institution in serving the regional swine industry is WSU. The University of Idaho provides leadership for the sheep industry. Examples of other regional cooperation are:

- Tri-state potato variety breeding programs conducted cooperatively by scientists at University of Idaho (UI), Oregon State University (OSU), USDA-Agricultural Research Services (ARS), and WSU.
- Cool Season Food Legume Research Program with scientists at UI.
- Jointed Goatgrass: A Threat to U.S. Wheat Production involves coordinated research in the states of Colorado, Idaho, Kansas, Montana, Nebraska, Oklahoma, Oregon, Utah, Washington, and Wyoming.
- STEEP III - Solutions to Environmental and Economic Problems. Research and Extension programs to protect soil and water resources in the Pacific Northwest - UI, OSU, WSU, USDA-ARS.
- Grass Seed Cropping Systems in cooperation with UI and OSU.

- PM-10 Study - Particulate Emission Prediction and control from Agricultural Land with scientists from WSU, ARS, and UI.
- Barley Genome Study involving personnel at WSU and OSU.
- WSU, OSU, and UI have entered into joint agreements on release of all new varieties on all crops, the majority of which are cereal grains.
- The Northwest Center for Small Fruit Research and Northwest Center for Nursery Crop Research continue to be effective vehicles for obtaining stakeholder input on research needs and coordination of research for the Pacific Northwest land-grant universities.

Institutions in the Western Region cooperate in sponsorship of regional research projects and regional coordinating committees. Refer to Appendices C & D for detailed information about each effort.

The director of agricultural research at the three PNW land-grant institutions meet at least semi-annually to discuss and plan cooperative and/or coordinated research programs. Regional ARS administrators also participate.

RESOURCE ALLOCATION

For each unit (department, center, institute, R & E center/unit) research program the resources (FTE's, salaries, and operations) are allocated to specific research projects. These include all sources of funds expended in addressing the objectives of the Research Programs. In many cases faculty expend effort and funds on research projects, portions of which fall under 1 or more of the CSREES goals. Resource allocations are usually only reported under one CSREES goal to avoid duplication of data.

Sources of the resources expended at off-campus units are partially reported in the departmental allocations because faculty off-campus are members of academic departments. Where efforts have not been included in the department, resource allocations are provided.

PEER REVIEW OF RESEARCH PROJECTS

All CRIS projects administered by ARC undergo a formal peer review at the time of initiation and revision. Academic department chairs appoint three to five scientists with the required expertise to review proposed research projects. Reviewers may be internal or external or a combination of both. Reviewers are asked to consider the following questions:

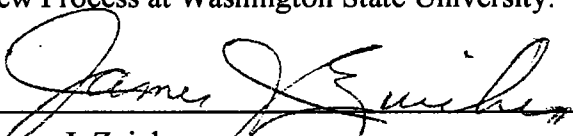
1. Does the outline clearly state the problem to be solved or specify the nature of the knowledge to be sought?
2. Are the objectives clearly stated and sufficiently specific that accomplishment within reasonable project duration can be expected?
3. Do the procedures suggest reasonable approaches to the accomplishment of each objective?
4. Does the outline give evidence of the leader's familiarity with essential literature, concepts, and methods relevant to the research?


5. Are the experimental materials, methods, samples, and criteria of measurements likely to provide interpretable results?
6. Are adequate provisions made for the scientific competencies essential to the conduct of the research?
7. Are definable benefits being sought; and, if so, are they attainable from the successful pursuit of this research? Have appropriate means been identified for disseminating the research findings?
8. Is the project likely to contribute significantly to the cumulative knowledge of the discipline and the targeted clientele?
9. Does the proposed study complement on-going research in the department or in other departments at WSU? Have relevant individuals or units been contacted for possible cooperation.


Upon receipt of the peer review comments by the academic chair the reviewers comments are provided to the author of the research proposal for consideration and incorporation. The academic chair prepared a summary of the reviewers' comments for submission to ARC administration along with the other required documentation for all CRIS projects. ARC administrators review the project proposal/CRIS forms and if satisfied that the proposed research is important submits it to CSREES/CRIS for approval and processing.

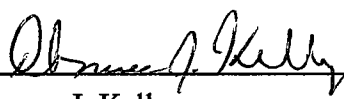
USDA SIGNATURE AUTHORITY FOR ARC

Incumbents in the following administrative positions have USDA signature authority for certification of Merit/Peer Review Process at Washington State University.


James J. Zuiches
Dean & Director, Agricultural Research Center


James R. Carlson
Associate Dean for Research
Associate Director, Agricultural Research Center


Arlen D. Davison
Associate Director, Agricultural Research Center


Thomas J. Kelly
Administrative Manager, Agricultural Research Center

EQUAL EMPLOYMENT OPPORTUNITY POLICY OF WASHINGTON STATE UNIVERSITY

WSU is an Equal Opportunity/Affirmative Action Educator and Employer. See Appendix E for the WSU policy statement. Requests for the institutional EED report required by the Department of Education should be directed to Ernestine Madison, Associate Vice President for Administration and Assistant to the President for Human Relations & Diversity, Washington State University, Pullman, WA 99164-1013.

UNIT PLANS OF WORK

The POW for each Departmental, Center or Institute and off-campus Research & Extension Centers/Units are provided in alpha order in Section II.

CERTIFICATION

I, James R. Carlson, James R. Carlson, Associate Dean for Research and Associate Director, Agricultural Research Center, College of Agriculture and Home Economics, Washington State University, do hereby certify that this Plan of Work constitutes official submission of all reporting requirements.

SECTION II

CSREES GOAL 1

AN AGRICULTURAL SYSTEM THAT IS HIGHLY COMPETITIVE IN THE GLOBAL ECONOMY

WSU PROGRAM PLANNING UNITS

Department of Agricultural Economics

A. Department Research Program -- Production Economics

Department Goals

To assist targeted agricultural and resource industries to become more effective in providing their products and services to consumers.

To maintain the capacity to work with scientists from other disciplines to address important agricultural, natural resource, and community development problems that require expertise from several disciplines.

Department Objective -- Farm management and production economics

RPA 601 - Economics of Agricultural Production and Farm Management

Generate and disseminate management- and decision-related economic intelligence relevant to current and future agricultural production and firm decision making.

Proj. 0269 Dryland Grain Growers' Income Risk Management and Its
Environmental Impacts

Proj. 0275 Agricultural Production, Processing, Trade, and Environmental Quality

RPA 610 Domestic Policy Analysis

Generate and disseminate management- and decision-related economic intelligence relevant to current and future public policy regarding agricultural production, output supply and input demand decisions.

Proj. 0269 Dryland Grain Growers' Income Risk Management and Its
Environmental Impacts

Proj. 0275 Agricultural Production, Processing, Trade, and Environmental Quality

Statement of Issue

Because of rapidly changing technologies, demographics, and world policies, the market for agricultural products and the demand for resources to support agricultural production will continue to be highly volatile. Crop and livestock producers also face exceptional production risk due to weather, pests, and resource depletion. Commodity commissions, departmental advisory committee, and a comprehensive assessment of stakeholders by C-FARE, AAFA, and USDA have expressed the need to improve firm income and risk management tools, to increase understanding of economic and social impacts of biological and other technologies, to protect the environment while maintaining profitability, and to provide economic intelligence relevant to current and future agricultural production, firm, and public policy decision making.

Performance Goals

1. Develop strategies for increasing expected firm profits and/or reducing risks in response to five new technologies, major market and/or policy changes in a five-year period.
2. Generate relevant information to improve foundations for public policy debate on five agricultural production and resource issues by farmers, commodity groups, government agencies, agricultural service firms, and conservation groups in a five-year period.
3. Provide useful economic and risk management decision-making tools, data, and procedures to agricultural managers.
4. Improve ability to give relevant economic guidance to decision-makers in the future.

Key Program Components

1. Measure the impacts of changing technologies, weather and pests, markets, public policies, and other risks on production decisions.
2. Assess the dynamics of firm response to changing technologies, markets, and public policies.
3. Measure aggregate effects of firm decisions.
4. Develop economic intelligence to guide future firm and public policy decisions to increase firm income, reduce risks, and assure a stable food supply.
5. Develop improved conceptual and quantitative tools for managing risk, augmenting firm income, and/or developing public policies to facilitate these objectives.

Internal and External Linkages

Much of the work in production economics is multidisciplinary in nature. Agricultural economists will collaborate with scientists from other disciplines as needed. First class agricultural science expertise is abundant in the Pacific Northwest; production and farm management economists have a long and successful track record of working with these scientists. Agricultural economics extension faculty will be involved in coordinated research and educational delivery programs to agricultural producers.

Target Audiences

Target audiences include conventional farmers; producers involved in sustainable production practices, agribusinesses that serve growers, and public policy makers.

Evaluation Framework

The evaluation framework includes quantitative and qualitative research output data as well as acceptance by clientele as evidenced by changes in production decisions and decision-making procedures.

Output Indicators

1. Number of strategies developed for increasing firm profits and/or reducing risks in response to new technologies, major market and/or policy changes.
2. Number of commodities, commodity groups, and/or types of firm for which historical producer output and input decision making behavior is examined in response to changing technologies, markets, and/or public policies.

3. Number of refereed journal articles, bulletins, policy and trade magazine articles published and electronic media releases that communicate the findings of production economic research.

Outcome Indicators

1. Acceptance by clientele (recommendations adopted by decision-makers, publication citations, web site hits).
2. Documented improvements possible from alternative decisions through increased profits and/or decreased risks.

Program Duration

The program has both short and long term features.

Allocated Resources

Faculty and staff FTEs	.38
Funding	
Hatch	\$ 6,114
Hatch Multistate	-
Fed. Res. Grants	-
State Approp.	\$50,928
Other Grants	

B. Department Research Program -- Agricultural Marketing

Department Goals

To assist targeted agricultural and resource industries become more effective in marketing their products and services to consumers.

To initiate studies on the farm and non-farm effects of concentration in agricultural production and food processing and on the economics of food safety.

Department Objective -- Marketing

RPA 603 Market Economics

Generate and disseminate economic intelligence concerning impacts of changes in private and public strategies, technologies, consumer behavior, and public policies on the economic performance of the food system.

Proj. 0301 Private Strategies, Public Policies, and Food System Performance
Proj. 0794 Food Demand and Consumption Behavior

RPA 604 Marketing and Distribution Practices

Generate and disseminate management- and decision-related economic intelligence relevant to current and future agricultural marketing and distribution practices.

Proj. 0200A Transportation Needs of Washington Intermodal Corridors

Proj. 0278 The Prospects and Pitfalls of Financing Cooperatives Through Patron Demand Deposit Accounts

Proj. 0806 Fruit and Vegetable Supply-Chain Management, Innovations, and Competitiveness

RPA 606 International Trade and Development Economics

Generate and disseminate management- and decision-related economic intelligence relevant to current and future international trade policies and firm decisions.

Proj. 0764 Enhancing the Global Competitiveness of U.S. Red Meat

Statement of Issue

Advances in biotechnology and information technology, changes in demographics, a movement toward freer trade and agricultural policy reform have resulted in rapidly changing food markets and changing relationships in the food supply chain in recent years. Agricultural producers, processors, food manufacturers, distributors, and consumers operate in an environment of unprecedented uncertainty about economic, health, and environmental impacts of choices. Commodity commissions and a comprehensive assessment of stakeholders by C-FARE, AAFA, and USDA have expressed the need to (a) examine the impacts of the changing farm and agribusiness structure, (b) evaluate trade policies and barriers, (c) assess how changes in consumer demand for nutritional, food safety, and environmental attributes affect consumer welfare and producer opportunities, and (d) provide economic intelligence relevant to current and future agricultural marketing, firm, and public policy decision making.

Performance Goals

1. Develop strategies for increasing firm profits and competitiveness, improving food quality, reducing food costs, and/or reducing risks in response to five new marketing or trade opportunities in a five-year period.

2. Measure demand for agricultural products, international trade decisions, and consumer decision making behavior in response to changing market conditions, demand for product attributes, consumer perceptions about food safety or environmental impacts, income, demographics, and/or public policies for five commodities, commodity groups, and/or types of firm in a five-year period.

3. Improve ability to give relevant economic guidance to market and consumer decision-makers in the future.

Key Program Components

1. Measure the impacts of changing technologies, markets, public policies, and associated risk and uncertainty on marketing and trade decisions.

2. Assess the dynamics of firm marketing and trade response to changing technologies, markets, and public policies.

3. Measure aggregate effects of firm decisions.

4. Develop economic intelligence to guide future firm and public policy decisions to reduce food marketing costs, food prices, and economic and environmental risks; increase firm income, food quality and safety; and assure a stable food supply.

5. Develop improved theoretical and quantitative tools for evaluating and managing market risk, augmenting firm income, reducing consumer food costs, increasing food quality, and/or developing public policies to facilitate these objectives.

Internal and External Linkages

Much of the work in marketing economics is multidisciplinary in nature. Scientists from other disciplines will be involved as needed. Talent available in the Pacific Northwest is abundant. Frequent cooperation among scientists, departments, institutions, and states is the norm. Extension faculty will be involved in coordinated research and educational delivery programs to food marketers and consumers.

Target Audiences

Target audiences include agricultural producers, food agribusinesses, consumers, and public policy makers.

Evaluation Framework

The evaluation framework includes quantitative and qualitative research output data as well as acceptance by clientele as evidenced by changes in marketing decisions and decision-making procedures.

Output Indicators

1. Number of strategies developed for increasing firm profits and/or reducing risks in response to new marketing opportunities.
2. Number of commodities, commodity groups, and/or types of firm for which historical demand for agricultural products or consumer decision making behavior is examined in response to changing markets, product attributes, consumer perceptions about food safety or environmental impacts, income, demographics, and/or public policies.
3. Number of refereed journal articles, bulletins, policy and trade magazine articles published and electronic media releases that communicate the findings of market and trade research.

Outcome Indicators

1. Acceptance by clientele (adoption of recommendations by decision-makers, publication citations, web site hits).
2. Documented improvements possible from alternative decisions through increased profits, decreased risks, improved food quality, and/or lower food costs.

Program Duration

The program has both short and long term features.

Allocated Resources

Faculty and staff FTE	2.08
Funding	
Hatch	\$ 16,621
Hatch Multistate	\$ 9,729
Fed. Res. Grants	\$ 15,687
State Approp.	\$126,780
Other Grants	-

Department of Animal Sciences

A. Departmental Research Program -- Nutrition, Physiology, and Breeding of Livestock

Department Goal -- Improvement in the Efficiency of Livestock Production

Departmental Objectives

RPA 301 - Reproductive Performance of Ruminants

Increase conception rates, reduce embryonic mortality and develop methods to increase overall reproductive efficiency in livestock.

Develop vaccines to block the estrous cycle in feedlot heifers.

- Proj. 0189 Improved Efficiency of Artificial Insemination in Large Dairy Herds
- Proj. 0194 Synthesis of Growth Promoting Cytokines by Bovine Binucleate Cells
- Proj. 0313 Sperm/Oviductal Cell Interactions as an In Vitro Model for Fertility Evaluation
- Proj. 0706 Germ Cell and Embryo Development and Manipulation for the Improvement of Livestock
- Proj. 0928 Regulation of Uterine Prostaglandin F2Alpha Secretion in Swine
- Proj. 0957 Reproductive Performance in Domestic Ruminants

Allocated Resources

Faculty & Staff FTE	9.80
Funding	
Hatch	\$ 23,642
Hatch Multistate	\$ 5,469
Fed. Res. Grants	\$110,435
State Approp.	\$432,839
Other Grants	\$ 30,607

RPA 302, Nutrient Utilization in Animals

Optimize rations to maximize maintenance, lactation, growth, and efficiency in livestock.

Evaluate various grains for their potential as animal feedstuffs.

Study with the objective to optimize the level of carotenoids in feedstuffs to maximize health and immunity in livestock.

- Proj. 0167 Enhancement of Dietary Energy Use for Maintenance, Growth, and Lactation by Beef Cattle
- Proj. 0186 Role of Carotenoids on Immunity and Health
- Proj. 0213 Dietary and Genetic Manipulation of the Lipid Composition and Palatability of Red Meat
- Proj. 0408 Maternal Transfer of Copper, Selenium, and Zinc
- Proj. 0702 Evaluation and Improvement of Barley for Food and Feed
- Proj. 0862 Metabolic Relationships in Supply of Nutrients for Lactating Cows

Allocated Resources

Faculty & Staff FTE	9.81
Funding	
Hatch	\$ 11,357
Hatch Multistate	\$ 49,394
Fed. Res. Grants	\$ 55,657
State Approp.	\$424,853
Other Grants	\$207,322

RPA 303, Genetic Improvement of Livestock

Identify and predict the genetic potential to transmit desirable traits i.e., marbling, growth, conformation, and milk production in livestock.

- Proj. 0181 Estimation of Breeding Values of Wagyu Sires for Marbling Ability and Other Traits by Progeny Tests

Allocated Resources

Faculty & Staff FTE	.33
Funding	
Hatch	\$ 7,511
Hatch Multistate	-
Fed. Res. Grants	-
State Approp.	\$46,592
Other Grants	-

RPA 305, Animal Physiologic Profiles

Develop model systems to study the metabolism of dairy cows in relationship to feed formulation and milk production.

To characterize and isolate rumen fungi for their ability to digest cellulose increasing feed efficiency.

