



**PARTNERSHIP  
BETWEEN  
THE WASHINGTON WINE INDUSTRY FOUNDATION  
AND THE  
UNITED STATES DEPARTMENT OF AGRICULTURE  
FEDERAL CROP INSURANCE CORPORATION**

**PROJECT TITLE:**  
**Grower Decision-Making Tool for Grapes and Tree Fruit**

**PARTIES:**  
The Partner: The Washington Wine Industry Foundation (WWIF)  
The Agency: The United States Department of Agriculture (USDA) Federal  
Crop Insurance Corporation (FCIC), through the Risk Management  
Agency (RMA)

**AUTHORITIES:**  
This partnership is authorized under section 522(d) of the Federal Crop Insurance Act.

**FINAL REPORT**  
**Grower Decision-Making Tools for Grapes and Tree Fruit**

**Table of Contents**

**PREFACE**

**EXECUTIVE SUMMARY**

**I. INTRODUCTION OF PARTNERSHIP**

- a. Purpose
- b. Risk Management Tools – Proposed
- c. Risk Management Tools - Additional
- d. Timeline
- e. Template for Partnership Collaboration
- f. Primary Producer Partners

**II. OVERALL OBJECTIVES**

- a. Research Objectives
- b. Implementation Objectives

**III. DELIVERABLES**

- a. Industry Database for Apples, Cherries, and Pears
- b. State Industry Data Collection Systems and Reporting Mechanisms
- c. Cost of Production Calculators
- d. Automated Crop Load and Yield Estimation Techniques
- e. Acreage Inventories by Crop, Variety, Age, Production System
- f. Surveys

**IV. PARTICIPANTS**

- a. Partnering Entities
- b. Collaborators
- c. Advisory Teams
- d. Substantial Risk Management Agency Involvement

**V. PARTNERSHIP MANAGEMENT AND ADMINISTRATION**

- a. Work Plan (aka Scope Of Work)
- b. Microsoft Project

**VI. NON-FINANCIAL BENEFITS**

- a. Comprehensive Industry Database Templates
- b. Cost-Of-Production Calculators
- c. Automated Crop Load and Yield Estimation Techniques
- d. People
- e. Overall

## **VII. CONCLUSION**

## **VIII. APPENDICES**

- A. Work Plan/ Statement Of Work
- B. Listening Sessions & Industry Sources
  - a. Tree Fruit Report
  - b. Tree Fruit Responses: Additions and Changes
  - c. Grape Compilation of Needs, Current Situation, and Potential Next Steps
- C. Grape Industry Summits
- D. OVID
  - a. Expanding OVID to Other States
  - b. The Oregon Vineyard Database: Research and Implementation Phase II
  - c. The Oregon Vineyard Database: Research and Implementation Phase III
- E. Cost of Production Calculators
  - a. Tree Fruit
  - b. Grape
- F. Crop Load Estimation
- G. Technology Report by CPAS: Classification of Orchards and Vineyards Using Commercial Satellite Imagery
- H. Mapping Proposal
- I. Technology Report and Accuracy Assessment of Mapping Study
- J. Washington Tree Fruit Acreage Survey Report
- K. Washington Vineyard Acreage Survey Report
- L. Idaho Tree Fruit and Grape Census
- M. Washington Winery Survey Report
- N. Industry Information Sources Grid
- O. AgWeatherNet
- P. Tree Fruit Communications
- Q. Grape Communications
  - a. Communications Plan Summary
  - b. Communication Talking Points
  - c. Grape and Partnership Communications

## PREFACE

This USDA Risk Management Agency research partnership was the culmination of a four-part, progressive series of risk management grants for the grape and tree fruit industries in the Pacific Northwest.

Idaho, Oregon, and Washington initiated a regional, cooperative efforts for grapes with a RMA Education partnership grant and strengthened it with a Western Center RME Competitive Grant. With successful fulfillment of deliverables and fiduciary responsibilities, trust was established, additional needs identified, and momentum developed to seek means for achieving the additional regional goals. A third RMA Education partnership grant extended collaborative efforts to producers in four more specialty crops as well.

A brief description of each partnership and the deliverables is provided below.

<b>PARTNERSHIP</b>	<b>DESCRIPTION AND TIMING</b>
Risk Management Education Program for Grape Growers in Idaho, Oregon, and Washington	<p>This 2002-awarded USDA-RMA education partnership grant focused on identifying and prioritizing "risks" facing wine and juice grape producers throughout Oregon, Idaho and Washington and included fact-finding through focus groups, surveys and roundtable discussions. Highest risk topics were identified by growers and "Riskbusters" developed for each issue area.</p> <p>Through additional industry efforts (and no additional risk management funding), the "riskbusters" morphed into "Vinewise, the Washington Guide to Sustainable Viticulture:" an online, interactive guide of business and viticulture topics created by and for Washington state wine grape growers and vintners to determine and assess their current viticulture management practices against industry standards of sustainability.</p> <p>Accurate, timely, and user-friendly industry data was identified as a high and critical need but the tools, necessary resources, and capacity were beyond the scope of the partnership and the industry's stage of development at that time.</p>
Agricultural Producer Training	<p>In mid-year 2003, an "add-on" grant from the Washington State University Cooperative Extension Western Center for Risk Management Education Competitive Grants Program helped to take the risk management education program to the Pacific Northwest industry in the form of hands-on risk seminars on marketing and contracts to support the training of agricultural producers and their families to use improved risk management practices. The agenda of each seminar included an introduction to "riskbusters" for lending, contracts, marketing plans, and insurance. In addition, to further cooperative efforts amongst the three states, the importance of having good data was emphasized.</p>
Producer Education for Wine Grapes, Potatoes, and Tree Fruit	<p>In 2004, education partnership funds were utilized within the grape industry to extend the efforts for both insurance and lending "riskbusters" via the development and implementation of hands-on seminars. "Riskbuster" templates for water, soil, nutrients, cover crops, human resources and business plans were developed. For the business plan "riskbuster," the Foundation hosted a day-long introductory seminar and keynote presentation at the annual meeting of the Washington Association of Wine Grape Growers followed by an all-day, hands-</p>

on business planning seminar for producers.

Within the tree fruit industry, the partnership hosted hands-on educational workshops. Workshop leaders assisted growers in using the Cost-Of-Production Calculator for the eight major varieties of apples produced. The COP Calculator became available to all growers via a website, however, small group sessions increased awareness, generated interest, and promoted trial/adoption of the Calculator as a valuable decision-making tool.

Publication of a Spanish-language Integrated Pest Management technical manual for cherry, pear and apple production also served as an important deliverable and risk management tool for tree fruit producers and their employees.

Additional deliverables were attributed to the potato portion of the partnership and encouraged further partnering opportunities for risk management education as well as working together on the AgWeatherNet.

## EXECUTIVE SUMMARY

This USDA Risk Management Agency Research Partnership served an estimated 3,700 apple, cherry, and pear producers in Washington and approximately 1,200 grape producers in Idaho, Oregon, and Washington.

The partnership provided user-friendly, timely, basic industry information (e.g. acreage, yield, and cost data) to grape and tree fruit producers to assist their decision-making processes relative to production, renewal, expansion, consolidation, and entry/exit. Specifically, the partnership identified/developed the following risk management tools for use by producers and industry members:

1. Comprehensive Industry Database Templates (i.e. acres planted and producing, varieties, age of vines, crush, storage capacity, bottle and bulk inventories, and wine sales) and the associated reporting mechanisms for use by vineyards and wineries in Idaho, Oregon, and Washington;
2. Cost-Of-Production Calculators for organic and conventionally grown apples, cherries, grapes, and pears;
3. Automated Crop Load & Yield Estimation techniques for wine and juice grapes; and
4. Acreage Inventories in Washington by crop, variety, age and production to assist grape and tree fruit growers in their decision-making processes and reduce the impacts of year-to-year variability.

Development and/or expansion of the following additional five tools (only four listed though) was made possible through a synergistic combination of industry awareness, fiscal management and RMA support to redirect partnership funds as the research process unfolded during the life of the partnership. They are:

1. Breakeven Budgets – The tree fruit Cost Of Production (COP) Calculator task was expanded to include development of breakeven budgets for orcharding operations for the three primary crops of apples, cherries, and pears.
2. Oregon Vineyard Database (OVID)  
Once OVID was identified as a potential regional industry database template, the grant partnership funded completion of software for a full range of planned OVID services online. This effort took place in two phases.
3. Idaho Tree Fruit and Grapes Acreage Census - In July 2006, USDA National Agricultural Statistics Service (NASS) surveyed more than 300 tree fruit and grape producers in Idaho to document new benchmarks for acreage. The last acreage census was conducted seven years ago in 1999.
4. AgWeatherNet – During the first half of 2007, Washington State University's AgWeatherNet Program conducted research into new telemetry technology to streamline collection and distribution of weather data to the Washington agricultural industry.

Work for this Risk Management Research Partnership commenced in October 2004 and was scheduled for completion in March 2007 for a total period of 30 months. With two additional enhancements, a no-cost time extension was approved by the Risk Management Agency staff through the Spokane regional office and by the Kansas City national office. The remaining deliverables for these enhancements were completed in July 2007. A subsequent time

extension until October 2007 was initiated by RMA to allow for coordination and travel to Kansas City by project management personnel for a final report and presentation to RMA leadership.

Project staff, Advisory Teams, and industry members hold every expectation that the risk management tools researched and developed as a result of this partnership will become integral tools for industry producers. Adoption and usage will expand as education and tool availability marketing continues. The risk management tools now exist and industry organizations are eager to promote their availability and use with current producers considering expansion/consolidation, new producers beginning their agribusiness endeavors, and individuals and firms considering entry into production agriculture and specialty crop industries.

# INTRODUCTION OF PARTNERSHIP

## PURPOSE

The 2004 USDA RMA Request For Applications specified the development of “risk management tools to assist producers in reducing the impact of multiple-year losses.” Specific items to address included mitigating price and production risks; enhancing measurement and prediction of risks; and improving production management, harvest, record keeping, and marketing.

In response, this partnership provided user-friendly, timely, basic industry information (e.g. acreage, yield, and cost data) to grape and tree fruit producers to assist their decision-making processes relative to production, renewal, expansion, consolidation, and entry/exit.

## RISK MANAGEMENT TOOLS

Pacific Northwest plantings for grapes, apples, cherries, and pears are rapidly changing and/or expanding in association with changes in the marketplace. In part, this is attributable to grape growers gaining recognition for producing world-class premium products, admirable cherry and pear prices, and continuing emergence and adoption of new apple and cherry varieties. The dollar investments and the subsequent concerns of growers about how to protect those investments continue to escalate with the changes.

Accurate, timely, user-friendly data are critical to every aspect in the production, harvesting, transportation, storage, functional transformation, marketing, and sales of these specialty agricultural crops. To help manage the risks associated with the investments, the respective industries prioritized their data needs. Specifically, this partnership was proposed and awarded to identify/develop the following risk management tools for use by producers and industry members:

1. Comprehensive Industry Database Templates (i.e. acres planted and producing, varieties, age, crush, storage capacity, bottle and bulk inventories, and wine sales) and the associated reporting mechanisms for use by vineyards and wineries in Idaho, Oregon, and Washington;
2. Cost-Of-Production Calculators for organic and conventionally grown apples, cherries, grapes, and pears;
3. Automated Crop Load and Yield Estimation techniques for wine and juice grapes; and
4. Acreage Inventories in Washington by crop, variety, age and production to assist grape and tree fruit growers in their decision-making processes and reduce the impacts of year-to-year variability.

All of these risk management tools were identified/developed within the time frame of the partnership and within budget.

## RISK MANAGEMENT TOOLS – ADD ON’S

As stipulated in both the request for application and the official partnership agreement, significant involvement by Risk Management Agency staff was a key requirement. This partnership benefited hugely from that involvement – both with respect to the above identified tools as well as to several critical enhancements that emerged during the life of the partnership and were enabled through re-direction of partnership funds. Development and/or expansion of the following four tools was made possible through a synergistic combination of industry awareness, fiscal management, and RMA support to redirect partnership funds as the research process unfolded during the life of the partnership.

1. Breakeven Budgets –

The tree fruit Cost Of Production (COP) calculator task was expanded to include development of breakeven budgets for orcharding operations for the three primary crops of apples, cherries, and pears. Data was collected based on size of orchard operation (small <50 acres; medium 50-150 acres; and large >150 acres) and then consolidated into one budget template on a weighted basis.

2. Oregon Vineyard Database (OVID)

Phase I - Once OVID was identified as a potential regional industry database template, the grant partnership funded completion of software for a full range of planned OVID services online. This then allowed industry members to assess the database for potential regional applications as a Northwest industry template. Specific outputs and tools included:

- Developing the core database functionality, including inventorying vineyard sites, soils, and plantings; recording of vine growth and fruit development; and providing online discussion groups.
- Creating and implementing the “Manage Your Vineyard” component of the website which allows growers to create a digital record of their vineyard management practices.
- Assessing the viability of the database for adoption/expansion by the Washington and Idaho grape industries.

Phase II - In February 2007, the grant partnership awarded OVID additional funding to further develop the database for potential use by Northwest grape and wine producers. Specific outputs and tools included:

- Designing circuits to a) provide growers a means to give other OVID users access to specific block data and activity data within their vineyards; b) allow growers to download data tables from OVID (soil data, block, site history, spray history, etc) and export them into Excel files for easier use; and compile pesticide usage data, which can be easily uploaded to the Oregon Department of Agriculture’s Pesticide Usage Reporting Systems (PURS). With some alterations, this latter function could also work for Washington and Idaho producers.
- Structuring data entry limits to help growers more efficiently and concisely enter data into OVID’s 35 major forms as well as other minor forms.
- Building a security patch to enhance database security and prevent hacking attempts.
- Creating templates to demonstrate ways in which OVID may be utilized (e.g. reporting, data sharing, research) by producers.

3. Idaho Tree Fruit and Grapes Acreage Census

In July 2006, USDA National Agricultural Statistics Service (NASS) surveyed more than 300 tree fruit and grape producers in Idaho to document new benchmarks for acreage. The last acreage census was conducted seven years ago in 1999.

4. AgWeatherNet –

During the first half of 2007, Washington State University’s AgWeatherNet Program conducted research into new telemetry technology to streamline collection and distribution of weather data to the Washington agricultural industry. AgWeatherNet consists of a series of 81 weather monitoring stations, or data loggers, each equipped with

temperature, relative humidity, leaf wetness, wind direction, wind speed, soil temperature and soil moisture sensors. Growers can access raw weather data and value-added products (such as models, etc.) on their computers to make decisions for pest and disease control, irrigation needs, and frost protection. The AgWeatherNet is used by growers of all agricultural products from tree fruit and grapes to wheat and potatoes.

## **TIMELINE**

Per the partnership agreement, work for this partnership commenced in October 2004 and was scheduled for completion in March 2007 for a total period of 30 months. With the latter two additional enhancements identified previously (i.e., AgWeatherNet and OVID – Phase II), a no-cost extension of time was approved by the Risk Management Agency staff through the Spokane regional office and by the Kansas City national office. The remaining deliverables for these enhancements were completed in July 2007. A subsequent time extension until October 2007 was initiated by RMA to allow for coordination and travel to Kansas City by project management personnel for a final report and presentation to RMA leadership on October 10.

## **TEMPLATE FOR PARTNERSHIP COLLABORATION**

Project managers attribute much of the success of this current partnership to the relationships and work initiated in the three previous risk management education efforts. Essentially, a template for partnership collaboration and deliverables has been established. Key elements include:

- Identify core industry needs – preferably through an integrated, industry process that not only results in documented, prioritized needs but also lays the essential foundation for industry-wide support to implement grant-funded efforts.
- Define deliverables, timeline, budget, and participants for all objectives. Compile this information in a work plan document (aka Statement Of Work) to record, communicate, track, and report objectives and major tasks.
- Establish and maintain industry-based Advisory Teams to guide not only the overall partnership but also specific topics and objectives.
- Provide Advisory Teams with progress reports on a regular basis so that team members may assist in serving as eyes, ears, and spokespeople for the partnership and partnership activities. This is particularly helpful in identifying emerging needs during the life of the partnership.
- Conduct on-going communications program(s) to build awareness, encourage participation, and, as applicable, prompt adoption and usage of risk management tools. Nearly all decision-making is a process of awareness, interest, evaluation of applicability, trial, and adoption. The more on-going communication, the further down the continuum producers can be and, thus, enable them to be ready for potential adoption and implementation within a specified partnership/grant period. In essence, the goal is to talk to everybody all the time!

## **PRIMARY PRODUCER PARTNERS**

This partnership addresses all apple, cherry, and pear growing regions within Washington State and all grape-growing regions in Idaho, Oregon, and Washington. It is estimated that there are 3,700 tree fruit growers in Washington on 236,000 acres. Within Idaho, Oregon, and Washington, there are approximately 1,200 wine grape producers with over 48,000 acres and nearly 800 wineries.

## OVERALL OBJECTIVES

The partnership was initiated to provide user friendly, timely, basic industry information (e.g. acreage, yield, cost data) to grape and tree fruit producers to assist their decision making processes relative to production, renewal, expansion, consolidation, and entry/exit.

The objectives of this research partnership were applied as “research” and “implementation.” Research has a literal meaning of “to investigate thoroughly” and research facilitated the methodological exploration of potential data collection, organization, and dissemination tools. Implementation refers to the application or execution of an idea, plan, or model that, in this case, is already known to be a useful risk management tool for producers and agricultural industries.

### THE RESEARCH OBJECTIVES WERE IDENTIFIED AS FOLLOWS:

- Document what is – data currently available and currently being accessed (grapes, tree fruit).
- Determine wants and needs – data, timing, format, and frequency (grapes, tree fruit).
- Identify best way (i.e. template) to fulfill industry data requirements on a long-term basis (grapes).
- Pilot acreage inventory estimation by remote sensing survey and reporting (grapes, tree fruit).
- Refine crop size and load estimation techniques for commercial applications (grapes).

### THE IMPLEMENTATION OBJECTIVES WERE IDENTIFIED AS FOLLOWS:

- Develop Cost-Of-Production Calculators by crop, variety, state/region, intended market (grapes), and cropping system (grapes, tree fruit).
- Implement comprehensive industry templates and databases in each state utilizing web-based format accessible to industry members (grapes, tree fruit).
- Promote availability, delivery, and use of industry databases and Cost-Of-Production Calculators throughout producer populations in all three states for grapes and in Washington for tree fruits.
- Maintain web pages, databases, security and equipment; increase speed for data searches; provide more current graphics of data selections; and simpler, more user-friendly access to the website database (grapes, tree fruit).

## THE DELIVERABLES

Based upon the identified objectives, clear deliverables were defined for the work of the partnership. These are identified and explained according to rationale, process, output, and next steps (maintenance, expansion, vision for education and/or implementation in the future).

### INDUSTRY DATABASE FOR APPLES, CHERRIES AND PEARS

#### Rationale

- Provide accurate, accessible, and timely data to answer tree fruit producers’ business planning questions for planting and tree removal as well as horticultural management during the growing season.
- Fill existing industry information voids and provide “real time” data from which producers can make timely decisions within a dynamic marketplace.

## **Process**

This research was conducted to determine what is working and what is needed in order to increase industry use of data decision-making tools provided by the Washington Growers Clearing House Association (WGCH). Specifically, WGCH wanted to determine which tools are utilized by Washington growers and marketers, which ones are under-utilized, and why (or why aren't) producers using the tools.

- Four listening sessions were conducted in December 2005 in Yakima, Wenatchee, and Omak, Washington. A total of 25 growers and marketers participated. Each session lasted approximately three hours and included written feedback, discussion, and educational elements. Information from the listening sessions was intended to improve existing tools, identify additional tools that would be of benefit, and design educational programs for growers and marketers. At the beginning of each session, participants provided information about their familiarity with WGCH reports and completed a one-page feedback sheet. During the meeting, the moderators asked the producer participants questions concerning each of the major WGCH publications as well as industry issues. Grower participants also provided the WGCH with input on common varieties and rootstocks to be considered for the Washington State Ag Statistics Acreage Survey implemented the first half of 2006.
- AgWeatherNet conducted an analysis of available telemetry technology that would facilitate collection and distribution of weather data. Previous hardware had been developed internally and, with expansion of the system, resources were stretched too far to accommodate new sites, maintenance, and upgrades.

## **Output**

- A written report of the listening sessions was prepared and disseminated to WGCH Board members and staff. This report as well as a summary of subsequent changes, enhancements, and additions made as a result of producer input is contained in Appendix B.
- New hardware for AgWeatherNet has been selected and is being purchased and implemented in phases according to geographic location and producer needs.

## **Next Steps**

- As indicated in Appendix B, a number of changes, enhancements, and additions to data decision-making tools have been provided by the Washington Growers Clearing House Association. WGCH staff and board members are committed to an on-going process of evaluation and responses that will address the data needs of Washington tree fruit producers. WGCH staff has also started serving on a national industry data committee through a sister organization.
- The Washington State University Decision Aide System (WSU-DAS) is a web-based program for apples and pears that integrates phenology models for insects and diseases with management recommendations. It is based on weather data collected by the WSU AgWeatherNet System which allows near real-time running of phenology models for the insects and temperature and temperature/wetness-driven models for diseases. In time, and with additional funding, it will be possible to expand WSU-DAS to address juice and wine grapes as well as cherries.

## **STATE INDUSTRY DATA COLLECTION SYSTEMS AND ASSOCIATED REPORTING MECHANISMS**

### **Rationale**

- Generates accurate, accessible, and timely data to answer growers' planning questions for planting/vine removal, vine management during the growing season, and current year contracts.
- Generates accurate, accessible, and timely data to answer winery planning questions for current year contracts and bottling decisions.
- Fosters the ability to integrate data from Idaho, Oregon, and Washington to produce regional data (e.g., generic pesticide data, regional pest and disease management, production data and harvest timing by companies that cross state borders).
- Provides producers with the tools to address critical business risk management components: contracts, insurance, planning, and marketing.
- Fills existing industry information voids by providing "real time" data from which producers can make timely decisions within a dynamic marketplace.
- Builds OVID's software infrastructure:
  - A communications hub – where growers can find other growers with similar vines, sites, and concerns; share experiences and management information; create and maintain management records; and gain perspective on critical management variables.
  - A management hub – where vineyard owners, managers, and wineries can share records of vineyard conditions, activities, and outcomes during each growing season.
  - A research hub – where researchers and industry members can survey the status of vineyard soils, vines, practices, and crops to identify research opportunities and the variables of site, vine, and management that may be critical to fruit and wine quality and value.

### **Process**

At the partnership's kick-off meeting in 2004, several of the Oregon participants presented the concept of OVID: Oregon Vineyard Database which had been initiated in 2002. Grape Advisory Team members from all three states recognized the strong potential of OVID to not only serve the grape industry in Oregon but also, at a minimum, to provide an industry data template for Idaho and/or Washington and, ideally, for the Pacific Northwest.

Additionally, most of OVID's activities during its first two years of inception mirrored what had originally been proposed through the listening sessions. As mentioned previously, RMA staff approved the redirection of funds toward OVID projects.

### **Output**

In 2006, after consideration of data collection, management and dissemination options identified through partnership activities and industry work (Appendix C), members of both the Washington and Idaho grape industries reached consensus to move forward with OVID as the regional data management template. OVID could provide the individual yet compatible state industry data collection systems and associated reporting mechanisms for wine and juice grapes in the three states. With this consensus, the partnership again applied for, and received, a redirection of funds to continue with Phase II development of OVID which would subsequently position the risk management tool as a workable option. Screen shots of OVID website pages (e.g. circuits) are provided in Appendix D.

## **Next Steps**

The current status of OVID is that all technical components are complete. What remains to be developed is the OVID content management system. To date, a systematic approach to put information into an organized format that allows for overall management of data and modules has not been available. Fortunately, in this particular case, technological developments within the software industry are advancing correspondingly. Off-the-shelf content management software is available and appropriate for OVID. This eliminates the need for and cost of creating software from scratch. The estimated cost for this off-the-shelf software and its specific adaptation to OVID is approximately \$100,000.

At present, OVID is owned, operated, and maintained by the Oregon Wine Board. Idaho and Washington producers are expecting that with a) the completion of OVID (i.e. implementation of the content management system) and b) state industry specific tweaking, OVID could be adopted in both states. How grower groups from each state would maintain their portion of the three-state industry database is yet to be determined. Industry members are very excited about this opportunity. Additionally, the Oregon industry is exploring additional circuitry for OVID that would be useful for non-production options.

Assuming that necessary funding levels are attained for completion of OVID, industry leaders estimate a potential timeline of twenty-four months for completion and pilot testing of OVID. The target market for usage of OVID is small and medium size producers who account for the majority of the industry. While the producers with more acres tend to have their own internal version of a database, they are supportive of a tri-state OVID risk management tool and have committed to assist as appropriate.

## **Future Options**

Both Washington and Oregon have systems in place to help growers mitigate risk and build sustainability (e.g. Washington's Vinewise and Oregon's LIVE). Concurrent industry discussions focus on incorporating germane aspects of these programs into OVID so that growers have a single point of entry to address risk management. Further potential also exists to match appropriate parts of Vinewise with Oregon's LIVE (Low Input Viticulture and Enology) program so producers could obtain certification from the International Organization of Biological Control (IOBC).

## **COST-OF-PRODUCTION CALCULATORS**

### **Rationale**

- Creates template for growers to assemble and analyze their own costs of production by variety (all crops) and by intended market tier (grapes only).
- Creates tool whereby growers can contrast their costs by category with industry averages by crop, by variety, and by conventional or organic systems.
- Provides ability to compute breakeven cost-of-production figures.
- Fosters the ability to compute future costs-of-production and compare costs of different management practices.
- Using this tool directly contributes to growers' understanding of financial records, enhances their ability to effectively analyze production and business practices, and facilitates business planning.

## **Process**

Although the specifics varied slightly by crop, the overarching methodology for creating the COP calculators involved conducting interviews and surveys with producers and industry affiliates to determine needs and formats; researching what materials were available, could be adapted, and/or needed to be created; reporting findings to industry leaders/members; developing templates in response to industry direction; implementing templates; preparing supporting informational and promotional materials; introducing the tools in a large-group format; and following up as appropriate with small group, hands-on workshops and posting on industry websites (Appendix D). Evaluation and documentation were built into each step to not only provide immediate feedback but also enhance subsequent efforts.

## **Output – Tree Fruit**

The tree fruit industry now has in place Cost Of Production Calculators for apples, cherries, and pears and for both conventional and organic growing systems. All of the supporting database figures have been updated to reflect current costs and prices. The original model of the COP Calculator served as the basis for not only the improvements within tree fruit but also the sixteen calculators developed for the grape industry.

## **Next Steps – Tree Fruit**

Outside of the scope of this partnership, the COP Calculator served as the entry point for producers to prepare orchard systems and horticultural practices for use in additional financial risk management tools developed through Oregon State University. The COP Calculator allows growers to organize their cost and price information in a manner that then allows them to apply the data to scenarios within TEAM (a grower's Technologies Economic Assessment Model) and TEAM-Lite.

Industry intent is to update the baseline data for the calculators on an every 3-5 year basis.

## **Output - Grapes**

The Northwest grapes Cost-Of-Production calculators were completed and now serve as the online resource for Washington, Oregon and Idaho wine and juice grape growers to automatically calculate the costs of producing grapes. There are sixteen COP calculators: four calculator types addressing the first four production years:

- Wine grapes conventional, years 1 - 4+
- Wine grapes organic, years 1 - 4+
- Juice grapes conventional, years 1 - 4+
- Juice grapes organic, years 1 - 4+

These calculators went online in early 2007 and are expected to receive considerable use by existing producers as well as those interested in entering the grape production business. Usage statistics for the grape calculators are contained in Appendix E.

## **Next Steps - Grapes**

It is anticipated that the Washington Association of Wine Grape Growers will assume responsibility for updating the baseline data utilized in the calculators. Based on supply and demand and industry economics, these updates will likely need to take place at a minimum of every five years.

As funding becomes available, Cost Of Production Calculators will be created for wineries. The format will follow the templates of the tree fruit and grape COP Calculators but will be based on bottle or case units rather than acreage.

This calculator intends to address both red and white wine varieties and production of both organic and conventional product.

## **AUTOMATED CROP LOAD AND YIELD ESTIMATION TECHNIQUES**

### **Rationale**

- Given finite and costly processing infrastructure, it is imperative that grape juice processors and wineries accurately anticipate volume of fruit to schedule picking, processing, fermentation, and storage functions.
- Growers of premium grapes will utilize accurate yield estimates to thin excessive crops.
- Cost and labor savings will accrue with automated and more reliable estimation techniques.

### **Process**

Drs. Julie Tarara and Paul Blom with USDA-ARS in Prosser, Washington developed a system for continuously monitoring crop development and predicting yield in vineyards as an alternative to the current industry method that relies on repeated, costly, hand sampling during the season. Their method involves direct, continuous measurement of tension in the trellis wire by load cells. The record of increasing tension during the season can be used to follow crop growth and development and to make estimates of final yield or to time other sampling efforts.

Two Trellis Tension Monitor (TTM) systems were tested: one in which the load cell senses tension along the entire row ("open" system), and another in which the load cell is installed in a restricted length of trellis wire between two posts that are fixed by a steel brace, dubbed the "bridge" system.

As canopy and fruit develop, the increasing mass is borne by the trellis through the main trellis/cordon wire. By inserting a load cell into the cordon wire to measure the change in wire tension, one can quantify this increasing mass over time. With current technology, this process can be automated and scaled to a fine temporal interval so that the tension pattern can be used to monitor crop development and to predict yield.

While the physical concept is straightforward, there are many environmental and biological factors that must be considered for successful application (e.g., diurnal temperature cycles, wind, forces associated with the plant and trellis components, effects of management practices, and between-row and between-year variability). Investigation began in 2001 under USDA-ARS funding in a research vineyard with a single-curtain trellis. Many of the basic issues listed above (Tarara et al. 2004) were addressed. This partnership focused on problems and solutions more directly tied to commercial implementation of the method (Appendix F).

### **Outputs**

Four objectives were accomplished with a combination of funding from USDA-ARS and the USDA-RMA research partnership:

- In a well-watered, juice grape vineyard trained on a single-curtain trellis, scientists compared the finite-length TTM system ("bridge") with open-ended TTM measurements; collected continuous data to monitor the crop and estimate yield; and collected intensive supplemental data on vegetative and reproductive growth.
- In a deficit-irrigated wine grape vineyard on a modified sprawl trellis, scientists compared the finite-length TTM system with open-ended TTM measurements; collected continuous data to monitor the crop and estimate yield; and collected intensive supplemental data on vegetative and reproductive growth.
- In ten commercial juice grape vineyards, researchers coupled a) a local processor's sentinel vine system for yield estimation via hand sampling with measurements of trellis

wire tension using the finite-length TTM system and b) compared processor's 10-site yield estimate with that derived from the tension measurements.

- Data from the research vineyards was posted on a regular basis to the Washington State University viticulture website.

### **Next Steps**

- Initially conceived as a tool for yield prediction, the Trellis Tension Monitor system has the potential to play a more expansive role in vineyard management. All parties concerned (grower to winery) will be able to 'watch' crop growth and development throughout the season and, coupled with knowledge of variables impinging on the crop (e.g. irrigation, pruning, etc.), be able to interpret the increasing tension as an aide to management decisions and yield estimation.
- Researchers and industry leaders are hopeful that the Trellis Tension Monitor technology will be acquired by the private sector for full-scale commercial development. Grape producers throughout the world who utilize trellis in their production systems would be seen as the target market for purchase of commercial versions. Down the road, there may be adaptations appropriate for other trellised crops including kiwi, berries, cherries, and apples.

## **ACREAGE INVENTORIES BY CROP, VARIETY, AGE, AND PRODUCTION SYSTEM**

### **Rationale**

- Establishes industry baseline data upon which future and timely data collection efforts can be compared and contrasted.
- Improves accessibility to data by species and by variety for producers and industry affiliates (e.g. lenders, insurance, processors, warehouses, etc.).
- Fosters ability to assess potential risks associated with variety concentrations in a given area.
- Improves ability to measure geographic dispersion of crop damage after weather events.
- Improves ability to evaluate the rate of entry/exit/expansion into the respective industries.

### **Process**

This deliverable fully exemplified the opportunity for research and implementation. The former involved researching new technologies that might provide more accurate, faster, and less expensive methods for achieving acreage inventories by crop, variety, age, and production system. The latter involved conducting, analyzing, and reporting a number of surveys.

#### **a) Research - Washington State University Center for Precision Agriculture Systems**

Washington State University's Center for Precision Agricultural Systems (WSU CPAS) conducted research on new crop mapping technologies (e.g. remote sensing and satellite imagery) to generate crop maps for both tree fruit and grapes. In addition, the research analyzed the feasibility of using existing USDA National Agriculture Imagery Program (NAIP) images to improve crop mapping of orchards and vineyards and evaluated the quality and cost of the USDA's new Common Land Unit (CLU) database and commercial images from satellite and aircraft.

A pilot study near Prosser, Washington included apples, cherries, wine grapes, and juice grapes growing in a diverse agricultural area with other crops such as hops. The classification was developed and tested on a set of multi-date images from 2003 and 2004 which took

advantage of both crop phenology and canopy architecture. Significant effort was put into compiling a ground truth data set representing the crops grown during the 2004 season.

Grape industry members in Oregon conducted a ground truthing exercise at their annual meeting. This was achieved through the posting of aerial maps whereby producers can take a permanent marker and outline their vineyards. With the help of Perry Beale, crop mapping specialist at the Washington State Department of Agriculture (WSDA), this mapping exercise was conducted for grapes in 2006 and for tree fruit in 2006 and 2007. The maps helped to truth the pilot studies conducted by researchers at both Washington State University and the University of Washington as well as the acreage survey conducted by NASS-Washington State.

One of the greatest challenges to the implementation of the methods described is the cost of the satellite imagery and processing. In addition to the imagery, ground truth is needed to develop and test the classification (i.e. system for differentiating one crop from another within the imagery) for each area. These classifications are developed and applied on an area basis (i.e. the classification model for Prosser, Washington is probably not directly applicable to Okanogan, Washington). However, classification models would improve with time, as subsequent classifications would build off of existing ones. The WSU-CPAS Technology Report and Recommendations are contained in Appendix G.

At the initial partnership planning meetings, the Advisory Teams' input suggested that information tabulated at the county level would be sufficient for most needs. However, subsequent collateral benefits were identified with developing a state-wide Geographical Information System (GIS) that provided information in both spatial and tabular forms to individual growers and companies as well as the industry associations. Some example analyses that could be addressed with the data in a spatial (as opposed to just tabular) format include:

- If a given irrigation district is 40% short of water during the irrigation season, how many acres of apples are affected?
- How many acres of cherry have been taken in and out of production this year, and where are those acres located?
- Which appellations are most threatened by residential growth and other land use changes?

State-wide crop maps and field boundaries would provide the backbone for this type of GIS.

At industry request, Perry Beale provided a proposal (Appendix H) for ongoing crop mapping in Washington State to collaborate and support the efforts by WSDA to improve the crop lands mapping as well as provide industry-based ownership of the mapping data. Additional human and financial resources need to be identified before this proposal can be considered further.

## **b) Research – UW Geographic Information Systems Certificate Program**

From December 2005 to June 2006, a team of University of Washington continuing education students (Joan Johnson, Steve Cudd, and Carlito Tolentino) in the Geographic Information Systems Certificate Program researched the viability of using satellite remote sensing technology combined with processing software to map Pacific Northwest grape and tree fruit crops yearly. While seeking a project to fulfill a core class assignment, these professionals encountered a newspaper report about this partnership. They subsequently contacted grant staff and proposed to become a part of the project.

Their program project was designed to evaluate commercial satellite imagery combined with processing software to develop detailed digital maps for acreage surveys and a geodatabase with information on acreage by crop and variety that could be easily updated by the industry.

Due to the amount of crop data already available to verify results, particularly from ground truthing, the team focused their research on a 28 square kilometer area between the cities of Chelan and Manson, Washington. They researched the types of data already available to map crops to assess detail level and cost and concluded that “commercial satellite remote sensing technology provides the level of detail needed (i.e., 60cm resolution) to easily differentiate crops but it requires more analysis to determine the cost effectiveness.”

The team evaluated the viability of the technology using one 60cm, multi-spectral QuickBird satellite image purchased from DigitalGlobe, a satellite imagery vendor. Then, using processing software (i.e., Feature Analyst and ArcGIS), they layered known crop data from WSDA onto the image to train the software to recognize different crops and varieties. Once the software recognized the different crops and varieties, it was used on image areas without known data to categorize the crops.

The students completed the research in June 2006 (Appendix H) and presented their findings to their class, the WWIF, and the Tree Fruit Advisory Team. Results indicated positive potential for the imagery and software combination to map crops, though the results are not yet conclusive. They recommended that additional study be conducted to fully verify the future of the technology. In October 2006, the Team (i.e., no longer certificate program students) was hired to conduct an accuracy assessment on their results (see Appendix I).

## **Outputs**

### **Surveys**

Utilizing state-of-the-art techniques, four surveys were conducted by the state offices in Washington and Idaho of the National Agriculture Statistics Service (NASS) for tree fruit and grape acreage and Washington wineries:

- Implementation - Washington Tree Fruit Acreage Survey (conducted with grapes and reported separately). The last tree fruit acreage survey was conducted in 2001. The final report is presented in Appendix J.
- Implementation - Washington Grape Acreage Survey (conducted with tree fruit and reported separately). The last grape acreage survey was conducted in 2001. The final report is presented in Appendix K.
- Implementation - Idaho Tree Fruit and Grape Acreage Census. In July 2006, NASS surveyed more than 300 growers in both industries to set new benchmarks for acreage. The last tree fruit acreage census, which included grapes, was conducted in 1999. The final report is presented in Appendix L.
- Implementation - Washington Winery Survey. In October 2006, USDA-NASS conducted Washington's first winery survey, funded by the grant and industry partners. The paper survey, modeled after Oregon's yearly winery survey, was sent to Washington's 400+ wineries to seek information by variety on grape crush, storage capacity, bottle and bulk inventories and wine sales. By modeling the Oregon survey, not only were survey development costs saved but also the resulting data was prepared in a manner to allow comparison, contrast, and compilations as the Pacific Northwest industry works towards an integrated, regional database in the form of OVID. The final report is presented in Appendix M.

## **Next Steps**

At the time of the original partnership application, it was hoped that by simultaneously testing remote sensing abilities for crop inventories and conducting the NASS surveys, this partnership would establish the industry baseline data upon which future and timely data collection efforts could be compared and contrasted. For example, traditional surveys might be conducted on a 5-year rotation and remote sensing could be utilized for the middle years to keep data current and accessible for grower and industry decision making. Significant advantages could then be garnered in improving accessibility to acreage data by species and varieties, assessing potential risks associated with variety concentrations in a given area, measuring geographic dispersion of crop damage after weather events, and evaluating the rate of entry/exit into the respective industries.

Two outcomes emerged from this combination of research (remote sensing) and implementation (acreage and winery surveys). First, while the remote sensing technology works for acreage inventories, it is probably better suited at this time for smaller geographic areas (i.e. less than an entire western state) and for highlighting risk management issues associated with identification of pest outbreaks, water management, timing of harvests, etc. Second, the current cost and inconsistent availability of high resolution imagery prohibits significant usage of remote sensing for acreage inventory purposes by the industry through industry organizations. A few of the larger producer entities have been able to finance the imagery for internal use but, overall, it is cost prohibitive on an individual or three-state regional basis.

In the future, it may be possible to acquire imagery through other partners (e.g. inside or outside of USDA, inside or outside of the agriculture industry), federal mandate, or some other vehicle. Also, as with much of today's technology, the imagery costs may decrease to a point allowing feasibility for tree fruit and grape industry organizations to join with other crops to acquire the necessary imagery. The results from this deliverable will still be useful at that time.

For now, the tree fruit partners have significant interest in establishing a process to conduct a survey regularly at every five years and, preferably, every three years. The Washington Association of Wine Grape Growers has committed to replicating the grape survey every five years for both acreage and winery information. They have also committed to having an economic impact statement conducted every five years for the Washington grape and wine industry. This latter is an unintended, but extremely welcome, benefit.

## **PARTICIPANTS**

### **PARTNERING ENTITIES**

The Washington Wine Industry Foundation (WWIF) served as the fiduciary partner and recipient in this partnership with the USDA Risk Management Agency (RMA).

The Washington Wine Industry Foundation was organized in 2001 as a 501(c)(3) to provide resources to meet the needs of the Washington wine industry. WWIF seeks opportunities to provide for or coordinate education, outreach and research programs and to administer scholarship and charitable donations. In many cases, WWIF partners with other industry organizations to fulfill these objectives.

The Washington Growers Clearing House Association (WGCH) served with the WWIF as the co-lead organizations for crop specific research and implementation deliverables. Washington Growers Clearing House Association is a voluntary, 501(c)(5) tree fruit grower association representing over 2,200 fruit growers. It publishes a weekly bulletin tabulating

prices obtained by the participating regional marketing organizations and shippers for apples, pears and cherries. In addition, WGCH discusses fruit marketing, prices, and supplies as well as represents growers' interests in legislative and regulatory issues at the state and federal levels.

## **COLLABORATORS**

A number of other industry organizations committed their support during the application process and throughout the life of the partnership. Because of a unique collaborative approach, the partners were not only able to build awareness but also effectively reach and inform the region's grape and tree fruit growing industries via meetings, publications, web sites, conventions, and educational workshops throughout the year. The five collaborating partners identified at the time of the partnership being awarded included:

1. Washington Association of Wine Grape Growers (WAWGG) - Established in 1986, this membership organization advocates for the Washington wine growing industry by educating, promoting, representing, and unifying. Communication to members is through email updates and specific industry publications and an active web site. The organization's annual meeting is the single largest gathering of the industry in the Northwest; over 1,100 attended in 2007.
2. Washington Tree Fruit Research Commission (WTFRC) - The WTFRC was established by the Washington State legislature in 1969 to "promote and carry on research and administer specific industry service programs which will or may benefit the planting, production, harvesting, handling, processing, or shipment of tree fruit of this state."
3. Idaho Grape Growers and Wine Producers Commission – This commission manages the marketing, research, and education efforts to serve the grape and wine producers in the state of Idaho. Approximately 54 vineyards and 22 wineries are included in this organization.
4. Oregon Wine Board (OWB) - The Oregon Wine Board is a semi-independent Oregon state agency managing marketing, research, and education initiatives that support and advance the Oregon wine and wine grape industry which includes 350 wineries and 770 vineyards with 15,600+ acres of wine grapes planted.
5. Washington State Grape Society - Organized in 1971, the purpose of the Washington State Grape Society is for the overall advancement of the grape industry in the state of Washington. Members are growers and industry personnel who have an interest in and lend their assistance to promoting the organization's purpose. Today, the Grape Society's memberships top over 400, with wine grape grower, juice growers and grape industry members participating.

Additional collaborative relationships emerged as the work of the partnership unfolded. Members of these seven partners included growers and affiliated industry leaders throughout the agri-business and educational communities who provide goods or services to Northwest producers.

1. Center for Precision Agricultural Systems (CPAS) - The Washington State Legislature authorized the CPAS in 1999 as part of Washington State University's Advanced Technology Initiative. The Center's mission is to advance the science and practice of precision agriculture in Washington State and beyond.

2. National Agricultural Statistics Service (NASS) – This partnership with the state field offices in Washington, Oregon, and Idaho assisted in the data collection from and dissemination to grapes and tree fruit producers in the Pacific Northwest.
3. Natural Resources Assessment Section of the Washington State Department of Agriculture - Along with providing technical assistance, the Natural Resources Assessment Section oversees the surface water pesticide monitoring program, gathers data necessary for EPA to develop Washington state-specific Endangered Species bulletins, and provides EPA with pesticide impact assessments for ground and surface waters in Washington State. This partnership worked directly with Perry Beale, crop mapping coordinator.
4. The University of Washington GIS Certificate Program offers application-oriented training via a nine-month certificate program for professionals seeking the skills and knowledge to use GIS. A Geographic Information System (GIS) is a comprehensive spatial database used to input, store, retrieve, manipulate, analyze and output geographically-referenced information, to support decision making for planning and management of land use, natural resources and the environment, transportation, facilities and services, and public administration. The U.S. Department of Labor identified geospatial technologies as one of the three most important emerging and evolving fields, along with nanotechnology and biotechnology.
5. The Oregon Vineyard Database (OVID) is an online service used by Oregon's wine grape growers and winemakers to share information on vineyard sites, soils, plantings, and management practices. OVID was a non-profit, educational and scientific 501(c)(3) organization and management currently comes from the Oregon Wine Board.
6. The Washington State University AgWeatherNet (AWN) - The AWN includes 81 weather stations located mostly in the irrigated regions of eastern Washington State providing 15 minute weather data updates approximately once an hour. The AWN network is administered and managed by the AgWeatherNet Program located in Prosser, Washington and facilitates access to raw data from the Washington State University Public Agricultural Weather System and AWN weather network.
7. Wenatchee Valley College's Hispanic Orchard Employee Education Program – The tree fruit Cost Of Production (COP) Calculator was integrated into class projects in which students developed their own “virtual” orchards. While many of the students actively work for other orchardists or have purchased existing orchards, this project proved to be an eye opener for students in terms of not only putting financial numbers to orchard establishment and overall production costs but also to increasing understanding of the financial risks involved with producing high quality, marketable tree fruit.

## **ADVISORY TEAMS**

Through previous partnership efforts, both industries have benefited significantly from the use of Advisory Teams. Members provide breadth and depth of feedback in a timely manner for the overall direction of the partnership, communication with other industry players, and linkages to official and unofficial partners. This partnership continued the practice with establishment of two crop specific advisory teams:

TEAM	TEAM MEMBER AND AFFILIATION(S)
Grape Advisory Team	<p><i>Washington</i></p> <ul style="list-style-type: none"> <li>• Craig Bardwell, National Grape (Welch’s) and Washington State Grape Society</li> <li>• Todd Cameron, Sagemoor Farms</li> <li>• Mary Lou Casey, USDA Risk Management Agency</li> <li>• Paul Champoux, Champoux Vineyards, WWIF Board Member</li> <li>• Kevin Corliss, Ste. Michelle Wine Estates</li> <li>• Jordan Ferrier, Hogue Cellars</li> <li>• Roger Gamache, Gamache Vineyards, Gamache Vintners, WWIF Chairman of the Board</li> <li>• Rick Hamman, Hogue Ranches</li> <li>• Debbi Heintz, Washington State Grape Society</li> <li>• Steve Hoel, National Ag Stats Service</li> <li>• Marcus Keller, Ph.D., Washington State University</li> <li>• Reed McKinley, Wyckoff Farms, Coventry Vale Winery</li> <li>• Christina Messer, National Ag Stats Service</li> <li>• Colin Morrell, ICON Estates NW Division</li> <li>• Mercy Olmstead, Washington State University, Prosser</li> <li>• Joe Parsons, National Ag Stats Service</li> <li>• Dave Paul, USDA Risk Management Agency, Spokane</li> <li>• Eileen Perry, WSU Center for Precision Agriculture Systems</li> <li>• Fran Pierce, WSU Center for Precision Agriculture Systems</li> <li>• Russ Smithyman, Ste. Michelle Wine Estates</li> <li>• Julie Tarara, USDA Agriculture Research Service Washington</li> <li>• Kent Waliser, Sagemoor Farms</li> <li>• Tom Waliser, Waliser Vineyards, Beresan Winery, WWIF Board Director</li> <li>• Jack Watson, WSU Cooperative Extension - Benton County</li> <li>• Tedd Wildman, Saddle Mountain Vineyards and StoneTree Vineyards</li> </ul> <p><i>Oregon</i></p> <ul style="list-style-type: none"> <li>• Laura Burgess, National Ag Stats Service,</li> <li>• Alan Campbell, NW Vineyards Consulting</li> <li>• Kevin Chambers, Resonance Vineyard</li> <li>• Ted Farthing, Oregon Wine Board</li> <li>• Chris Mertz, National Ag Stats Service</li> </ul> <p><i>Idaho</i></p> <ul style="list-style-type: none"> <li>• Ron Bitner, Idaho Grape Growers and Wine Producers Commission</li> <li>• Scott DeSeelhorst, Snake River Winery and Arena Valley Vineyards</li> <li>• Tom Kurtz, National Ag Stats Service</li> <li>• Bill Meyer, National Ag Stats Service</li> <li>• Krista Shellie, USDA Agriculture Research Service</li> </ul>
Tree Fruit Advisory Team	<ul style="list-style-type: none"> <li>• Lindsey Buckner, Tree Top, Inc.</li> <li>• Tom Butler, Washington Tree Fruit Research Commission</li> <li>• Mary Lou Casey, USDA Risk Management Agency</li> </ul>

	<ul style="list-style-type: none"> <li>• Dana Faubion, WSU Cooperative Extension</li> <li>• Bruce Grim, The Marketing Associations</li> <li>• Denny Jones, Allan Brothers</li> <li>• Karen Lewis, WSU Extension – Grant and Adams Counties</li> <li>• Dave Losh, Agricultural Statistician WSDA-USDA</li> <li>• Dave Marshall, AgriManagement, Washington State Fruit Commission</li> <li>• Jim McFerson, Washington Tree Fruit Research Commission</li> <li>• Christina Messer, National Ag Stats Service</li> <li>• Dave Paul, USDA Risk Management Agency, Spokane</li> <li>• Eileen Perry, WSU Center for Precision Agriculture Systems</li> <li>• Jack Pheasant, Pheasant Ridge Orchards</li> <li>• Fran Pierce, WSU Center for Precision Ag Systems</li> <li>• Tom Schotzko, WSU Extension Economist</li> <li>• Clark Seavert, OSU Agricultural Economist</li> <li>• Paul Tvergyak, Cameron Nursery</li> </ul>
Partnership Staff	<ul style="list-style-type: none"> <li>• Project Supervisor, Vicky Scharlau, Washington Wine Industry Foundation</li> <li>• Project Manager, Susan Pheasant, Pheasant Projects, Inc.</li> <li>• Tree Fruit Lead, Dan Kelly, Washington Growers Clearing House Association</li> <li>• Grape Lead, Tricia Belcastro, Belcastro Consulting</li> </ul>

An introductory partnership planning meeting was held in The Dalles, Oregon on November 19, 2004. Twenty-four industry members met to kick-off the partnership, initiate planning activities, and identify Advisory Team members from the grape and tree fruit industries. Particular emphasis was spent on 1) meeting, understanding, and knowing partners and 2) the sustainability of “data” jumpstarted through the partnership to create an industry template of lasting value and use by producers.

Both Advisory Teams met individually the following month (December 3 for tree fruit with 14 participants and December 16 for grapes with 25 participants) to address issues unique to their respective crops and also explore how best to leverage resources and work together to achieve the goals of the partnership. One of the initial tasks for each Advisory Team was to gather input from key industry leaders to identify at what level of detail (e.g. block, orchard/vineyard, region, state) data should be collected both now and in the future. This input was deemed critical for determining the appropriate technology/ies to employ for the majority of work of the partnership (Appendix N).

In addition to annual face-to-face meetings (and sometimes more as deemed necessary), Advisory Teams’ communication channels included monthly electronic updates, email communications from the grape and tree fruit leads, industry summits, and presentations at key industry meetings as necessary.

### **SUBSTANTIAL RMA INVOLVEMENT**

Per partnership requirements and industries’ needs, RMA personnel served on both the Tree Fruit and Grape Advisory Teams. Given the project deliverable of improved data availability by variety, all stakeholders benefited from RMA personnel’s expertise in how information should be reported to RMA for consideration in calculating new and revised insurance offerings. RMA personnel also provided on-going feedback and evaluation regarding

both the partnership process and deliverables, assisted in communications efforts, and provided overall agency support to the project management team.

Equally important, RMA staff contributed directly throughout the formulation and execution of the work plan (Appendix A). Along with state Agricultural Statistics staff, RMA's active participation provided integral in providing technical and analytical assistance regarding data procurement and reporting. RMA regional staff also served as a conduit to national USDA-RMA staff in order to review industry recommendations with respect to unique or frequent risk management concerns as well as challenges and opportunities uncovered during research and implementation.

## **PARTNERSHIP MANAGEMENT AND ADMINISTRATION WORK PLAN**

In 2004, RMA adopted the use of work plans (aka Scope Of Work) within the funded partnerships. For this particular research partnership, RMA and project staff organized the work plan into twelve primary tasks. Products and processes of these deliverables are included in the appendices (as indicated below).

1. Develop The Project Plan
  - a. See Appendix A
2. Develop And Administer Industry Listening Sessions
  - a. Tree Fruit – please see Appendix B
3. Source Information Currently Available
  - a. Tree Fruit – please see Appendix B
  - b. Grapes – see Appendix B
4. Prepare Written Report Of Listening Session & Existing Sources
  - a. Tree Fruit – see Appendix B
  - b. Grapes – see Appendix B and C and N
5. Develop “Strategic Plan/Template” For Industry Data
  - a. See OVID as available on the web at <http://ovd.modwest.com> and page printout as displayed in Appendix D
6. Develop and/or Expand Cost-Of-Production Calculator
  - a. Tree Fruit – see Appendix E and on the web at [www.waclearinghouse.org](http://www.waclearinghouse.org)
  - b. Grapes – see Appendix E and on the web <http://www.nwgrapecalculators.org/>
7. Develop Acreage Inventory By Remote Sensing
  - a. See CPAS report in Appendix G
  - b. Proposal by Perry Beale – see Appendix H
  - c. See UW Certificate Program student team's report in Appendix I
8. Automating Yield Estimation
  - a. See ARS report in Appendix F
9. Generate Estimate Of Crop Acreage
  - a. See Number 10 below
10. Collect And Report Data
  - a. Washington Tree Fruit Acreage Survey – see Appendix J
  - b. Washington Grape Acreage Survey – see Appendix K
  - c. Idaho Tree Fruit and Grape Census – see Appendix L
  - d. Washington Winery Survey - see Appendix M
  - e. AgWeatherNet – see Appendix O

11. Conduct Communications and Promotional Program
  - a. Tree Fruit – see Appendix P
  - b. Grapes and Overall Partnership – see Appendix Q

12. Project Reporting

These dozen tasks provided the core structure for the work of the grant as well as the basis for all reporting to Advisory Teams, industry members, and the Risk Management Agency. Initially, quarterly reports were submitted; early in the partnership the timeline was switched to monthly as a tool for keeping everyone informed on a more regular basis. The latter helped to keep communication among Advisory Team members more current and maintain overall support for the partnership. Monthly reporting and submission of financials also facilitated the transfer of funds to the partnership for use in a timely manner.

### **MICROSOFT PROJECT**

Several members of the partnership staff received training with Microsoft Project software. The software seemed to be a useful tool for documenting the organization of the project. However, the majority of this particular partnership staff had worked together on other projects and partnerships using the Statement Of Work as their primary project management tool. It was a proven and successful tool for them and offered time-efficient updates and tracking of completed tasks, budget, deliverables, and remaining tasks.

Additionally, given the separation of this particular partnership into distinct units (marked with clear deliverables and timelines along with monthly progress reports) that were subcontracted to other entities, the Microsoft Project required significantly more time to maintain than it provided savings to use.

As a tool for communication within the partnership, and especially with RMA, Microsoft Project was not useful. Instead, with RMA input and approval, project staff chose to provide the Advisory Teams, collaborating organizations, and RMA staff with monthly narrative reports. These reports were organized by objective and outlined not only the most recent progress but also the overall status of tasks within each objective. These reports were well received within the partnership.

Completion of the twelve tasks resulted in a fulfillment of the overall purpose and objectives of the partnership.

## **NON-FINANCIAL BENEFITS**

### **COMPREHENSIVE INDUSTRY DATABASE TEMPLATES – grapes (Idaho, Oregon, Washington), tree fruit (Washington)**

Prior risk management education efforts have focused on business (e.g. contracts, insurance, planning, data availability) and technical (e.g. management of soil, nutrients, pests) topics. While all of these represent critical components in sustaining viable production agriculture, having user-friendly access to basic industry data on a timely basis significantly increases the power and feasibility of doing this work. This research partnership filled existing industry information voids, thus providing growers with “real time” data from which they can make timely decisions focused towards a dynamic marketplace.

For grapes, added benefits will subsequently be derived from creating three individual yet compatible state industry databases (i.e., based on OVID) and the associated reporting mechanisms sufficient to answer grape producers’ business planning questions for planting and

vine removal decisions, vine management during the growing season, current year contracts, and bottling decisions.

### **COST OF PRODUCTION CALCULATORS - organic and conventionally grown grapes and tree fruit**

These calculators serve as a template for growers to assemble and analyze their own costs of production by variety. They also serve as a tool whereby growers can contrast their costs by category with those of the industry average by commodity, by variety, and by conventional or organic systems. Such information allows both growers and the industry as a whole to compute breakeven cost-of-production figures. The “Cost-Of-Production Calculator” will directly contribute to growers’ understanding of their financial records, enhance their ability to effectively analyze production and business practices, and facilitate business planning. The COP Calculator becomes one more tool in the risk management toolbox as growers strive to efficiently manage and minimize the myriad of financial, production, and price risks inherent in operating within today’s dynamic tree fruit and grape industry environments.

Within tree fruit, the research effort updated the figures available for estimated profit and loss calculations and allowed for publication of that information via the WGCH website. WGCH staff also presented the COP Calculator tool and development process at the national Extension Risk Management conference in Phoenix, Arizona in April 2007. In addition, another unintended benefit from the research partnership, is a proposal for developing COP Calculators within the Pacific Northwest potato industries.

Tree fruit also experienced one unintended cost in its collection of organic production data. The original intent for organic tree fruit data involved close cooperation with a 2003 RMA Research Partnership with the lead institution of Washington State University. However, humongous delays in having their survey instrument approved by the federal Office of Management and Budget necessitated going directly to producers for the pertinent information.

### **AUTOMATED CROP LOAD AND YIELD ESTIMATION TECHNIQUES – grapes (Washington)**

Accurate estimates of crop yield are important because processing infrastructure is finite and costly. Juice processors and wineries need to know as far in advance as possible the amount of fruit anticipated at harvest to schedule picking, processing, fermentation, and storage. Beyond this process-driven requirement, growers of premium fruit need accurate yield estimates early enough in the season to thin excessive crops.

The current method of estimating yield in grapevines via hand sampling and hand counting of clusters or berry mass is labor-intensive, producing both limited data and a static prediction. The large variances in cluster or berry weights that have been observed between vineyards or within a single vineyard between seasons contribute to the lack of reliability in this yield prediction method among growers. Automation of yield estimation in grapes could increase labor and production efficiencies by providing real-time data, and by giving growers and processors more detailed and more accurate information for crop management.

### **PEOPLE**

This work of the partnership does not create financial gain for any one individual grower by virtue of the partnership grant but rather that they may all benefit from the collaborative efforts of the work done on their behalf. Project staff members gained both personally and

professionally and become even stronger advocates for risk management programs. While also a benefit to USDA-RMA and its stated goals, individual project staff will continue to increase their value and worth to the production agricultural community.

Additionally, a number of students, post-docs, technicians, and university faculty participated and benefited from this partnership. In particular they were involved in COP Calculators, acreage inventories, automated crop load estimation aspects, AgWeather Net, and Oregon Vineyard Database.

## **OVERALL**

In addition to micro-level individual and firm benefits, a number of crop-specific and region-wide, macro-level agricultural industry benefits accrued:

- Proactively continued and expanded previously initiated risk management tools available to grape and tree fruit producers.
- Maintained grower organizations' demonstrated commitment to risk management tools and education.
- Expanded the number of collaborating partners within the Pacific Northwest.
- Built internal industry infrastructure for each individual crop (i.e. tree fruit, grapes).
- Collaborated with other agricultural producers and organizations to improve overall sustainability of agriculture within the Pacific Northwest and therefore encouraging a greater degree of international competitiveness.

## **CONCLUSION**

Project staff, Advisory Teams, and industry members hold every expectation that the risk management tools researched and developed as a result of this partnership will become integral tools for industry producers. Adoption and usage will expand as education and marketing of tool availability continues through the coming weeks, months, and years. The risk management tools now exist and industry organizations are eager to promote their availability and use with current producers considering expansion/consolidation, new producers beginning their agribusiness endeavors, and individuals and firms considering entry into production agriculture and the specialty crop industries.

On behalf of the grape and tree fruit industries in the Pacific Northwest, we greatly appreciate the opportunity to partner with the USDA Risk Management Agency to undertake these critical research and implementation efforts to increase the risk management tools available to apple, cherry, grape, wine and pear producers.