# 2006
# AGRICULTURAL WORKFORCE IN WASHINGTON STATE


**Washington State Employment Security Department**
**Karen T. Lee, Commissioner**

**Labor Market and Economic Analysis Branch**
**Greg Weeks, Ph.D., Director**

**Economic and Policy Analysis Unit**
**Ernst W. Stromsdorfer, Ph.D., Economist**



**WASHINGTON STATE**
**EMPLOYMENT SECURITY DEPARTMENT**
**LABOR MARKET AND ECONOMIC ANALYSIS**

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Prepared by
Ernst W. Stromsdorfer, Ph.D., Economist
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Ernst W. Stromsdorfer, Ph.D., Economist

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# Foreword

The Employment Security Department collects data on agricultural employment, wage rates, and earnings to assist Washington's agricultural industry in the recruitment of farm workers and in the management of the industry. As the seasons change, and the vagaries of the weather assert themselves as happened between 2005 and 2006, it is important to estimate the number of workers needed in the state and the northwest region. It is also important to gain estimates of the wage rates that will have to be paid to these workers for different jobs. Finally, it is important to understand how the industry is evolving and how it responds to economic and weather challenges yearly and over time.

A major source of agricultural farm labor data is the Employment Security Department's Unemployment Insurance (UI) tax records. Since 1990, most agricultural employment has been covered by the Employment Security Act. Under this act, employers are required to report employment and wages, by worker, each quarter for UI tax purposes. The data compiled from the UI tax records include virtually all hired agricultural employment and wages paid that are essential to measure the impact of agriculture on the state and local agricultural regions.

However, the UI tax records do not include information on employment in specific activities such as apple tree pruning as well as the corresponding wage rates for these activities. To obtain these data, the ESD conducts a monthly survey – the Agricultural Labor Employment and Wage Trends survey – in which approximately 600 growers participate. This survey estimates the number of seasonal employees working in specific jobs each month, such as cherry pruning in south eastern Washington, as well as their corresponding wage rates.

The next primary source for the data contained in this report is the yearly Washington Annual Agriculture Bulletin and supporting data from the national website of the USDA National Agricultural Statistics Service – a very comprehensive information source.

The final primary source of data is from the various growers' associations, such as the Northwest Cherry Growers and the U.S. Apple Association.

It is important to note that final, official, or even preliminary data are not always available for the 2006 calendar or fiscal year. In such a case, typically data for 2004 or 2005 are the latest figures available. This is the case in particular for the Washington Annual Agriculture Bulletin, compiled and published by the Washington Field Office of the USDA National Agricultural Statistics Service.

Taken as a whole, these data can assist agricultural employers in assessing their labor requirements. These data can also assist economists and policy makers in estimating the impact of seasonal farm work and agricultural labor in general, on Washington's economy. Finally, for state and local officials and social service agencies, these data can provide a basis for estimating the impact of the farm worker population on their existing and proposed programs and facilities.

# The State of the Agricultural Economy in Washington

## Introduction

This chapter reviews the economic performance of the agriculture sector in Washington state and sets forth its role in the overall economy of the state. Thus, the chapter establishes the context for analyzing the agricultural labor force during the 2006 agricultural production cycle.[1]

## The Total Value of Production[2]

In 2005, agriculture in the state of Washington became a six billion dollar industry in current dollars. Yet, during the late fall of 2004 and into mid-summer of 2005, lack of rainfall throughout the key fruit and vegetable growing regions in the state led to dire predictions in the media of a drop in agricultural output and revenues for 2005. Estimates of revenue shortfall ranged from a low of about $300 million to up to one billion dollars. As we see in retrospect, these predictions were not only incorrect; fortunately, they were even incorrect in the wrong direction.[3]

In the final result, the total value of production in 2005 equaled $6,412,716,000. The addition of $239,854,000 in government subsidies increased this total to $6,652,570,000. Relative to 2004, the total value of output, excluding government subsidies, rose by an additional $523,636,000, an increase in current dollars of 8.9 percent.

However, the picture is somewhat different in terms of constant (inflation-adjusted) dollars. Using 2005 as the base year, we see that the total value of production increased from $6,151,732,000 in 2004 to $6,412,716,000 in 2005, an increase of 4.2 percent in constant dollar terms. Even so, the increase is substantial and represents a continuing trend of an increase in the total value of production beginning in 2001, when the constant dollar value of total production was only $4,926,131,000 or 30.2 percent less than in 2005.[4] In short, the constant dollar value of agricultural production has been increasing in the state over the past decade. This is consistent with the fact that agricultural productivity has been increasing in Washington state as well.[5]

**Exhibit 1.1**
Total Value of Agricultural Production and Government Payments, Current and Constant Dollars, 2005 = 100
Washington State, 1996 to 2005
*Source:* ESD/LMEA, Appendix Exhibit 1.2

| Year | Total Value of Production in $1,000s | | Total Value of Production Plus Government Payments in $1,000s | |
|---|---|---|---|---|
| | Current Dollars | Constant Dollars | Current Dollars | Constant Dollars |
| 1996 | 5,755,176 | 6,474,573 | 5,910,540 | 6,649,357 |
| 1997 | 5,540,292 | 5,688,771 | 5,687,555 | 5,839,981 |
| 1998 | 5,242,793 | 5,008,964 | 5,503,317 | 5,257,869 |
| 1999 | 5,362,137 | 4,644,146 | 5,632,731 | 4,878,508 |
| 2000 | 5,341,809 | 4,578,464 | 5,694,602 | 4,880,843 |
| 2001 | 5,573,177 | 4,926,131 | 5,872,198 | 5,190,435 |
| 2002 | 5,585,653 | 5,236,549 | 5,801,565 | 5,438,967 |
| 2003 | 5,758,735 | 5,707,482 | 6,024,131 | 5,970,516 |
| 2004 | 5,889,080 | 6,151,732 | 6,086,089 | 6,357,528 |
| 2005 | 6,412,716 | 6,412,716 | 6,652,570 | 6,652,570 |

**NOTE:** See Appendix Exhibit 5.2 for index numbers of prices received by farmers.

## Changes in the Composition of the Total Value of Production

Changes in the composition of the total value of production reflect how the agricultural economy is evolving over time. These compositional changes have implications with respect to the amounts and types of labor that are employed in Washington agriculture. *Exhibit 1.2* displays these compositional changes in the total value of production. To help correct for annual variations in the value of production that may be due to weather, we compare the average composition of production over 1996 to 1998, the beginning of the most recent 10-year period, with the comparable statistic for the 2003 to 2005 period. All data are in current dollars.

Two major changes are apparent in *Exhibit 1.2*. The total value of field crop production has dropped by an estimated 4.5 percent over the last ten years. The total value of fruits and nuts production has increased by an estimated 6.5 percent during the same time. Fruits and nuts, commercial vegetables, and berry crops combined have increased 6.4 percent over the period, so that almost all of the increase in this category of production is due to the proportional increase in fruits and nuts. Specialty products have dropped by about two percent (-1.98 percent) and livestock and products have essentially remained unchanged.

While demand factors affecting the relative price of field crops and fruits and nuts can partially explain these changing shares of the total value of agricultural production – the increase in demand for sweet cherries is an example – another important implication of these data is that there is a shift away from agricultural production that is land-intensive and toward agricultural production that is more labor intensive, capital intensive, or both.

Observations on a single crop or two cannot tell the whole story, but two examples are of interest. First, viticulture and wine production have increased dramatically in the state, as is documented in *Chapter 5*. For wine grapes alone, the value of utilized production in 1996 (current dollars) was $33,180,000. By 2005, this value had risen to $102,300,000 in current dollars.[6] Next, note that in 1996, there were 2.4 million acres planted in winter wheat. By 2005, this had dropped to 1.85 million acres. With 400,000 acres devoted to spring wheat in 1996, planted acres rose to a peak of 625,000 acres in 2000 and dropped again to 430,000 acres in 2005. All wheat, corn for grain, barley and lentils have dropped in their rank among the top 40 agricultural commodities in Washington. In contrast, apples have maintained their first rank. Cherries, all pears, all onions and fall potatoes have increased their rank.

**Exhibit 1.2**
Percent Change in Composition of Total Value of Agricultural Production, Current Dollars
Washington State, 1996 to 1998 Compared to 2003 to 2005
*Source:* ESD/LMEA, Appendix Exhibit 1.2

| Year | Field Crops | Fruits and Nuts | Fruits and Nuts, Commercial Vegetables, and Berry Crops | Total Crops | Speciality Products | Livestock and Products |
|---|---|---|---|---|---|---|
| 1996 to 1998 Average Percent | 33.87 | 21.40 | 28.45 | 62.32 | 10.77 | 26.91 |
| 2003 to 2005 Average Percent | 29.35 | 27.87 | 34.85 | 64.20 | 8.79 | 27.01 |
| Difference | -4.52 | 6.47 | 6.40 | 2.12 | -1.98 | 0.10 |

## Value Added to the Economy by the Agriculture Sector

*Appendix Exhibit 1.7* provides extensive detail on the money value composition of agricultural production over the period 1999 to 2005. These data break down the current value of *Final Agricultural Sector Output* into the values of the separate components that produce that value.[7] *Final Agricultural Sector Output* is the current market value of the commodities and services produced by the farm sector within a given calendar year.

### *Decomposition of Final Agricultural Sector Output – Labor Inputs*

*Final Agricultural Sector Output* is estimated at $6,499,553,000 for 2005. This is a slight decrease in current dollars of 0.07 percent compared to 2004.[8]

As shown in *Exhibit 1.3*, *Contract Labor* hired in 2005 is estimated at $22,745,000, while farm operators are estimated to have hired $32,781,000 worth of contract labor in 2004. Thus, there is an estimated 44.1 percent drop in the hiring of contract labor in 2005 relative to 2004. After rising in terms of total expenditure over the period 1996 to 2001, contract labor hired has dropped steadily through 2005. The reasons for this change are not apparent from the data at our disposal.

*Employee Compensation* (*Total Hired Labor*) increased sharply in 2005 compared to 2004. An estimated $1,217,255,000 was spent on hired labor to produce the final agricultural sector output in 2005. This is 10.9 percent higher in current dollars compared to 2004. This is consistent with the fact that hourly, before-tax wage rates in current dollars rose between 2004 and 2005, especially in the large seasonal labor demand sectors of apple, cherry, and pear production.[9]

**Exhibit 1.3**
Percent Change in the Contribution of Net Value Added, Farm Labor Hired and Net Farm Income Relative to the Total Value of Agricultural Production, in Current Dollars
Washington State, 1996 to 2005
*Source:* Washington Agriculture Statistics 2003, Page 21, 2005 Washington Annual Statistical Bulletin, p. 25, and 2006 Washington Annual Agriculture Bulletin, p. 25, U.S. Department of Agriculture, National Agricultural Statistics Service.

| | YEAR - ALL VALUES IN $1,000s | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | 1996 | 1997 | 1998 | 1999 | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 |
| Total Value of Production (1) | 5,764,502 | 5,360,437 | 5,198,362 | 4,871,416 | 5,085,671 | 5,216,939 | 5,247,710 | 5,506,709 | 5,823,315 | 5,809,500 |
| Net Value Added (2) | 3,280,161 | 2,736,354 | 2,808,939 | 2,470,709 | 2,644,039 | 2,639,616 | 2,549,082 | 3,203,931 | 3,169,359 | 2,743,480 |
| (2) as a percent of (1) | 56.9 | 51 | 54 | 50.7 | 52 | 50.6 | 48.6 | 58.2 | 54.4 | 47.2 |
| Contract Labor Hired (3) | 35,294 | 41,440 | 34,141 | 39,429 | 38,603 | 54,892 | 47,585 | 37,448 | 32,781 | 22,745 |
| (3) as a percent of (1) | 0.6 | 0.8 | 0.7 | 0.8 | 0.8 | 1.1 | 0.9 | 0.7 | 0.6 | 0.4 |
| (3) as a percent of (2) | 1.1 | 1.5 | 1.2 | 1.6 | 1.5 | 2.1 | 1.9 | 1.2 | 1 | 0.8 |
| Total Hired Labor (4) | 863,841 | 930,888 | 963,102 | 1,126,503 | 1,141,855 | 1,134,115 | 1,073,301 | 1,122,522 | 1,097,219 | 1,217,255 |
| (4) as a percent of (1) | 15 | 17.4 | 18.5 | 23.1 | 22.5 | 21.7 | 20.5 | 20.4 | 18.8 | 21 |
| (4) as a percent of (2) | 26.3 | 34 | 34.3 | 45.6 | 43.2 | 43 | 42.1 | 35 | 34.6 | 44.4 |
| Net Farm Income Minus Direct Government Payments (5) | 1,548,545 | 997,705 | 929,433 | 447,123 | 492,122 | 628,428 | 704,301 | 1,349,724 | 1,353,555 | 717,619 |
| (5) as a percent of (1) | 26.9 | 18.6 | 17.9 | 9.2 | 9.7 | 12 | 13.4 | 24.5 | 23.2 | 12.4 |
| (5) as a percent of (2) | 47.2 | 36.5 | 33.1 | 18.1 | 18.6 | 23.8 | 27.6 | 42.1 | 42.7 | 26.2 |

## The Contribution of Agricultural Labor to the Total Value of Production

While the grower and the farm operator see expenditures on hiring labor as a cost of production, from the standpoint of measuring the total value of production, the labor input becomes a source of value added to the product being produced. In a competitive labor market such as agriculture, the wage rate (a cost to the employer) is equal to the physical quantity of product produced by that labor times the price the farmer can get in the market place for that product produced by the worker.[10] This sum is a measure of value produced for society. Thus, there is always a cost and a benefit side to the wage bill paid to the agricultural labor force.

*Exhibit 1.3* shows the proportional relationship between the total value of production, net value added by the agricultural process of production, contract labor hired, employee compensation for total labor hired (excluding contract labor), and net farm income minus direct government payments, all in current dollars.[11]

### *Net Value Added*

*Net Value Added* is the contribution of the agriculture sector to gross domestic product (GDP). Essentially, it is estimated by subtracting all agricultural inputs purchased off the farm, such as gasoline, seed, or pesticides, from the total value of production (*see Appendix Exhibit 1.7* for details on this accounting convention.)

As a percent of the total value of production, net value added in the agriculture sector hovers around 50 percent. It falls as low as 47.2 percent in 2005 to as high as 58.2 percent in 2003. The simple ten-year mean is approximately 52.4 percent. There is no obvious positive or negative trend over time in the share of net value added in the value of total production.

### *Contract Labor Hired*

*Contract labor hired* is not a major contributor to the agricultural production process in Washington state. It typically represents less than one percentage point of the current dollar value of the total value of production. Its simple average value over the ten-year period is 0.74 percent of the total value of production. Contract labor hired represents somewhat more than one percent of net value added. Since 2001, contract labor hired as a percent of each of these values has been declining. Its simple average over the ten-year period is 1.4 percent.

### *Total Hired Labor*

*Total hired labor* is all labor hired other than contract labor. Thus, it includes the wage bill paid to permanent and to seasonal farm workers. After reaching a peak in 1999 in terms of its percent of the total value of production, its proportion of the value of total production declined until 2005. Its simple average value over the ten-year period is 19.9 percent. Consistent with the discussion above, this proportion can also be seen as the proportionate cost of the agricultural labor wage bill in the production process.

Total hired labor contributes a significant proportion to net value added.[12] Its contribution ranges from a low of 26.3 percent in 1996 to a high of 45.6 percent in 1999. The contribution of total hired labor to net value added rises steadily until 1999 and then declines steadily thereafter, until 2005, when it jumped up to 44.4 percent. The simple mean over the ten-year period is 38.3 percent.

It is not possible to interpret the cause of these percentage fluctuations within the context of this simple descriptive analysis. Year-to-year variations in crop sizes by type of crop play some role, but this descriptive analysis cannot reveal the marginal effect of seasonal variations on the dollar value of total hired labor.

## Net Farm Income Minus Direct Government Payments

Net value added is determined by the competitive markets in which agricultural products and services are sold. The agricultural producer has little if any control over these prices and must accept them. Likewise, if the agricultural producer wants labor for agricultural production, this too is a competitive market for labor, and the producer must pay the wage rates set by this market. Given the amount of value added, subtracting employee compensation for total hired labor basically leaves you with net farm income (*see Appendix Exhibit 1.7*). Thus, net farm income (excluding government transfer payments) is a *residual* after all other components of net value added are subtracted out.

One sees the relationship in viewing *Exhibit 1.3*. Given net value added, as employee compensation for hired labor rises, net farm income falls. As employee compensation falls, net farm income rises. This relationship is consistent over the ten-year period of data shown in *Exhibit 1.3*. An average increase in employee compensation of 7.2 percent is associated with a drop in net farm income of 11.4 percent. An average drop in employee compensation of 2.2 percent is associated with an average increase in net farm income of 4.9 percent.

## Agricultural Trade Multipliers

An additional way of viewing the impact of agriculture on employment and total revenues is to measure the direct and indirect effects by crop or agricultural product on total jobs created and on the *Producer Output Multiplier*. The estimates we have are for the United States agriculture sector as a whole, but the order of magnitude of effects for the Washington state agriculture sector should be similar. An additional qualification to these statistics is that the national data on crops and agricultural products are aggregated differently from the detail provided for Washington state. *Exhibit 1.4* displays the results for key crops and agricultural products.

**Exhibit 1.4**
Agricultural Trade Multipliers for the United States Agriculture Sector, Selected Crops and Agricultural Products
United States, 2005
*Source:* United States Department of Agriculture, Economic Research Service, Data Sets, Agricultural Trade Multipliers: ERS Estimates.

| Commodity | Producer Employment Multiplier (Jobs/$Billion Export Value) | Producer Output Multiplier ($ Total Economic Output/ $ Export Value) |
|---|---|---|
| Wheat | 23,116 | 2.31 |
| Corn | 23,379 | 2.31 |
| Vegetables and Melons | 14,471 | 2.10 |
| Fruits | 23,864 | 2.30 |
| Greenhouse and Nursery Products | 19,835 | 1.58 |
| Cattle | 36,420 | 3.71 |
| Poultry and Eggs | 31,579 | 3.19 |
| Animal Production except Cattle, Poultry and Eggs | 35,519 | 3.60 |
| Forest Nursery, Forest and Timber Tract Products | 11,642 | 2.30 |
| Fish | 10,379 | 2.13 |
| Fluid Milk | 6,626 | 3.89 |
| Creamery Butter | 4,244 | 4.03 |
| Cheese | 4,538 | 4.21 |
| Wines | 2,645 | 2.60 |

http://www.ers.usda.gov/Data/TradeMultiplier/ERSestimates.aspx

### *The Producer Employment Multiplier*

The producer employment multiplier shows the estimated total employment (direct and indirect) created by one billion dollars worth of revenue that can be attributed to the sale of that crop or agricultural commodity as defined. We see that this multiplier is highest for cattle. For this agricultural sub-sector, one billion dollars of total revenue attributed to this sub-sector is estimated to generate 36,420 jobs throughout the United States. The second highest multiplier is for animal production except cattle and poultry and eggs, at 35,519 jobs created nationwide. Poultry and egg production is third, at 31,579 jobs created nationwide. Wheat, corn, and fruits each generate somewhat more than 23,000 jobs. Greenhouse and nursery products generate just shy of 20,000 jobs. Vegetables and melons generate somewhat more than 14,000 jobs. Fish production generates somewhat more than 10,000 jobs, while fluid milk, creamery butter, and cheese generate 6,626, 4,244, and 4,538 jobs, respectively. Wines generate just 2,645 jobs per billion dollars of total revenue (direct and indirect) nationwide.

### *Producer Output Multiplier*

The *producer output multiplier* estimates the total revenue (direct and indirect) generated by a given dollar of agricultural exports. Note that most of the agricultural output of Washington state is exported, either to the other 49 states or overseas. Based on 2004 estimates, about 32 percent of Washington's agricultural production is exported overseas.[13]

The largest multipliers are for fluid milk, creamery butter, and cheese. One dollar of exports of fluid milk generates an additional $2.89 in total revenue. (The multiplier includes $1.00 of direct effect due to the fluid milk export and $2.89 of indirect effect.) For creamery butter, the indirect increase is $3.03 for each dollar of exports. For cheese, the multiplier generates an additional $3.21 per dollar of export. The second largest set of multipliers is for cattle, poultry and eggs, and animal production other than cattle and poultry and eggs. One dollar of cattle exports generates an additional $2.71 in total revenue. For poultry and eggs, this value is $2.19; for animal production other than cattle and poultry and eggs, this value is $2.60. All of the remaining multipliers fall in the range of 2.1 to 2.6. For example, $1.00 of wine exports generates an additional $1.60 of indirect total revenue. Wheat and corn each generate an additional $1.31. Vegetables and melons generate an additional $1.10 while one dollar of fruit exports generates an additional $1.30.

## Total Employment – National Patterns

### *Employment*

*Exhibit 1.5* places agricultural employment and hours worked per week in Washington and Oregon (the Pacific Northwest Region) in the context of the U.S. overall and California. Beginning in January 2006, the National Agricultural Statistics Service (NASS) estimated total agricultural employment in the U.S. to be 796,000. By August, this had increased to 1,202,000, a 51.0 percent seasonal increase. NASS breaks employment down into workers directly hired by farm operators and agricultural service employment.

Direct hires are estimated to be 616,000 in January 2006. This number increases to 875,000 in July of 2006, a seasonal increase of 42.0 percent. However, this total is estimated to be 11.0 percent lower than the direct hires employed in July 2005. NASS attributes this shortfall to a delayed growing season due to weather and the tightening of the border with Mexico, though no explicit statistical analysis is provided to support this judgment (*see Appendix Exhibit 1.6* for the discussion by NASS of the reasons for the levels and changes in the statistics of this exhibit). Agricultural service employment is estimated over this same time period to have grown from 180,000 in January to 320,000 in July, a 77.8 percent seasonal increase (see *Appendix Exhibit 1.9* for detailed statistics).

Over the January to July 2006 time period, California's total agricultural employment is estimated to have grown from 127,000 workers in January to 190,000 workers in July, a 49.6 percent seasonal increase. However, over the entire period, relative to the same time points in 2005, total agricultural employment decreased in California due to weather factors and the tightening of the U.S.-Mexico border, according to NASS.

Over the same time period, total agricultural employment in Washington and Oregon combined was estimated at 52,000 workers in January and 92,000 workers in July, for a seasonal surge of 76.9 percent. Again, this July 2006 estimate is below that of July 2005, due to the reasons previously stated.[14]

**Exhibit 1.5**
Comparison of Hourly Average Wage Rates, Average Hours Worked per Week, and Total Employment, Selected Survey Weeks United States, the Pacific Region (Washington and Oregon), and California, 2006
*Source:* U.S. Department of Agriculture, Agricultural Statistics Board, National Agricultural Statistics Service (NASS), Farm Labor, Issues released on the following dates: February 17, May 19, August 18, and November 17, 2006

| | United States | | | Pacific Region: Washington and Oregon | | | California | | |
|---|---|---|---|---|---|---|---|---|---|
| Survey Week in 2006 | Field | Livestock | All Hired Workers | Field | Livestock | All Hired Workers | Field | Livestock | All Hired Workers |
| | | | | Average Wage Rates in Dollars per Hour | | | | | |
| January 8-14 | 9.15 | 9.25 | 10.11 | 9.36 | 10.47 | 10.25 | 9.12 | 10.25 | 10.36 |
| April 9-15 | 8.96 | 9.30 | 9.79 | 9.24 | 10.13 | 10.10 | 8.95 | 10.85 | 10.19 |
| July 9-15 | 8.95 | 9.56 | 9.74 | 9.50 | 11.06 | 10.15 | 8.98 | 10.90 | 9.96 |
| October 8-14 | 9.25 | 9.41 | 9.95 | 10.25 | 11.00 | 10.85 | 9.13 | 10.40 | 10.10 |
| | | | | Average Hours Worked per Week - All Hired Workers | | | | | |
| January 8-14 | | | 38.2 | | | 35.8 | | | 41.5 |
| April 9-15 | | | 40.8 | | | 37.5 | | | 43.1 |
| July 9-15 | | | 40.9 | | | 41.3 | | | 45.7 |
| October 8-14 | | | 41.6 | | | 41.9 | | | 44.6 |
| | | | | *Total Employment – Direct Hires Only | | | | | |
| January 8-14 | | | 616,000 | | | 52,000 | | | 127,000 |
| April 9-15 | | | 718,000 | | | 65,000 | | | 137,000 |
| July 9-15 | | | 875,000 | | | 92,000 | | | 190,000 |
| October 8-14 | | | 797,000 | | | 85,000 | | | 183,000 |
| | | | | *Total Employment – Agricultural Service Employment | | | | | |
| January 8-14 | | | 180,000 | | | N/A | | | N/A |
| April 9-15 | | | 238,000 | | | N/A | | | N/A |
| July 9-15 | | | 320,000 | | | N/A | | | N/A |
| October 8-14 | | | 280,000 | | | N/A | | | N/A |

**NOTE:** See Appendix Exhibit 1.6 for a discussion of the determinants of the estimates in this exhibit.
*For each sample period, total agricultural employment is the sum of direct hires and agricultural service employment.

### *Weekly Average Hours Worked*

Beginning in January 2006, weekly average hours worked by agricultural workers are highest in California at 41.6 hours per week. At an estimated 35.8 hours per week worked, the Pacific Region is the lowest. This seasonal pattern maintains itself through April and July. However, for the United States overall, hours increase seasonally by 7.1 percent to 40.9 hours in July. But they increased by 15.4 percent over this seasonal period for the Pacific Region. The seasonal increase in weekly hours worked was 10.1 percent for California. Nationally, weekly average hours in July increased 1.0 percent over the same month in 2005.

Thus, there is a large difference in the change in hours worked nationally versus both California and Washington and Oregon combined. The small increase in hours nationally is one piece of evidence tending to support the absence of a national labor shortage in seasonal agricultural workers. However, the large increase in weekly hours for California and Washington and Oregon lend partial evidence that a labor shortage was developing in the height of the season. One can speculate that the reduced number of available workers is responsible for this increase in weekly hours worked, but year-to-year seasonality can also be an explanation (see *Chapter 3* for a more extensive discussion of the seasonal labor shortage issue).[15]

## Total Employment – Washington State Patterns

*Exhibit 1.6* displays estimated statewide total employment and statewide and regional agricultural employment. *Exhibit 1.7* displays these data across a map of the state. These data are based on the U.S. Department of Labor, Bureau of Labor Statistics (BLS) and Local Area Unemployment Statistics. There were an estimated 3,174,650 workers employed statewide during 2006. Of these, 2,504,360 were employed in the western area of the state while only 670,290 were employed in the eastern area of the state, or only 21.1 percent of total state employment.

**Exhibit 1.6**
Total Employment and Agricultural Employment
Washington State and Selected Areas,
2006 Compared to 2005
*Source:* ESD/LMEA. The data in this exhibit are computed from data available from the following source: U.S. Department of Labor, Bureau of Labor Statistics, Local Area Unemployment Statistics.

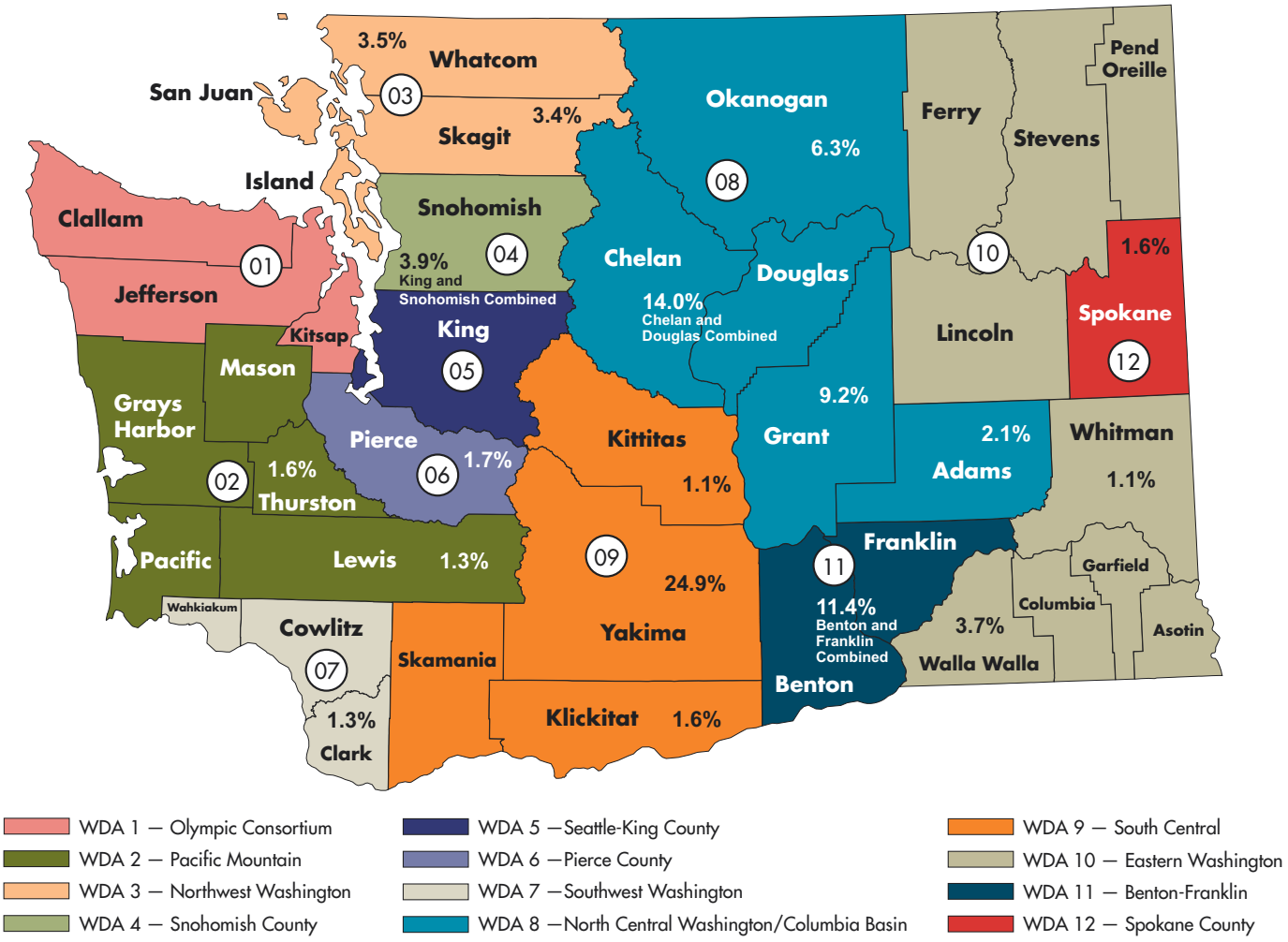
| | 2006 Total Emp. | 2006 Agri. Emp. | 2006 Percent of Total County Emp. | 2006 Percent of Total State Agri. Emp. | 2005 Percent of Total County Emp. | 2005 Percent of Total State Agri. Emp. |
|---|---|---|---|---|---|---|
| **WASHINGTON** | **3,174,650** | **93,582** | | | | |
| Western | 2,504,360 | 19,134 | 80.5 | 20.4 | 78.5 | 21.9 |
| Eastern | 670,290 | 74,389 | 21.6 | 79.5 | 21.5 | 79.1 |
| **AGRICULTURAL AREA** | | | | | | |
| **Columbia Basin** | **43,080** | **10,644** | **1.4** | **11.4** | **1.4** | **11.7** |
| Adams | 7,590 | 2,012 | 0.2 | 2.1 | 0.2 | 2.3 |
| Grant | 35,490 | 8,633 | 1.1 | 9.2 | 1.1 | 9.4 |
| **North Central** | **94,770** | **20,085** | **3.0** | **21.5** | **3.0** | **20.8** |
| Chelan and Douglas | 57,220 | 13,122 | 1.8 | 14.0 | 1.8 | 13.7 |
| Kittitas | 18,430 | 1,070 | 0.6 | 1.1 | 0.6 | 1.1 |
| Okanogan | 19,120 | 5,894 | 0.6 | 6.3 | 0.6 | 6.0 |
| **South Central** | **119,030** | **24,794** | **3.8** | **26.5** | **3.8** | **26.2** |
| Klickitat | 8,730 | 1,536 | 0.3 | 1.6 | 0.3 | 1.6 |
| Yakima | 110,300 | 23,257 | 3.5 | 24.9 | 3.5 | 24.6 |
| **South Eastern** | **134,650** | **14,096** | **4.3** | **15.1** | **4.4** | **15.2** |
| Benton-Franklin | 107,500 | 10,675 | 3.5 | 11.4 | 3.5 | 11.5 |
| Walla Walla | 27,150 | 3,421 | 0.9 | 3.7 | 0.9 | 3.6 |
| **Eastern** | **278,760** | **4,770** | **9.0** | **5.1** | **8.9** | **5.2** |
| Lincoln | 4,440 | 648 | 0.1 | 0.7 | 0.1 | 0.7 |
| Spokane | 218,500 | 1,502 | 7.0 | 1.6 | 6.9 | 1.6 |
| Whitman | 19,560 | 1,016 | 0.6 | 1.1 | 0.6 | 1.1 |
| Asotin | 9,420 | 168 | 0.3 | 0.2 | 0.3 | 0.2 |
| Other Eastern Areas | 26,840 | 1,436 | 0.9 | 1.5 | 0.9 | 1.5 |

In contrast, there were an estimated 93,582 agricultural workers employed in the state in 2006, of which an estimated 74,389, or 79.5 percent, were employed in the eastern area of the state. *These numbers and proportions have been relatively stable over time and are similar to the same proportions reported for 2005.*

Note that, contrary to the NASS estimates, the BLS data report an estimated total of 93,186 agricultural workers in 2005 and 93,582 in 2006. These two estimates are essentially the same in a statistical sense. *There was no decline in Washington's agricultural employment from 2005 to 2006, according to the BLS data.*

**Exhibit 1.7**
Percentage of Total Agricultural Employment by County*
Washington State, 2006
*Source:* ESD/LMEA, Exhibit 1.6

## WASHINGTON STATE WORKFORCE DEVELOPMENT AREAS



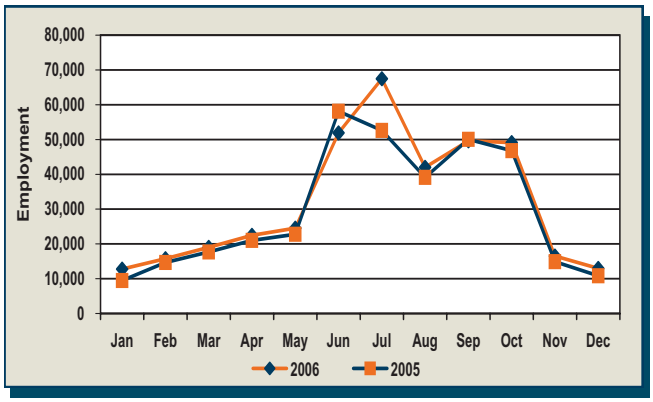

**NOTE:** *Percentage not shown for areas with less than 1.0 percent of the total.

### *Regional Employment*

*Exhibit 1.6* compares the proportionate employment by state agricultural area for 2006 compared to 2005. Since these are annual data, they hide the seasonal patterns in employment that became so important in 2006 in terms of the allocation of seasonal agricultural labor across time and regions. However, as one can surmise from the fact that total employment between the two years changed little, if at all, the annualized regional pattern between the two years is relatively constant as well. For example, in the two largest agricultural areas in terms of employment, South Central and South Eastern, employment as a percent of total state agricultural employment between the two years ranged from 26.2 percent in 2005 for the South Central region to 26.5 percent in 2006. The total employment increase was approximately 400 workers between the two years for this area. Total employment in the South Eastern area was essentially unchanged in a statistical sense between the two years, 14,119 workers in 2005 and 14,096 in 2006.

## Seasonal Employment Patterns

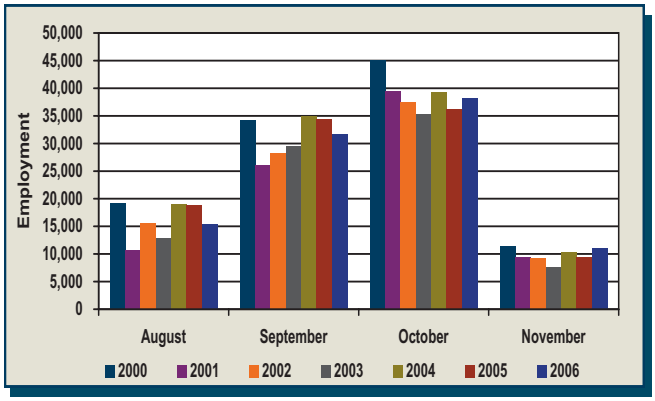
**Exhibit 1.8**
The Twin Peaks of Seasonal Agricultural Work
Washington State, 2005 and 2006
*Source:* ESD/LMEA Agricultural Labor Employment and Wage Trends




### *The Historical Seasonal Pattern*

Over the years, seasonal agricultural employment in Washington shows two peaks. The first peak occurs in either June or July. The second peak occurs in either September or October. Weather patterns across the agricultural areas of the state drive these yearly patterns. As *Exhibit 1.8* shows, seasonal employment surged in June during 2005 and tapered off in its normal pattern until the second peak in September. This situation changed in 2006 due to the delayed cherry harvest season. July became the first peak in 2006 in response to the cherry harvest – later and larger than average. This harvest period extended into August. However, the onset of the apple and pear harvest was consistent with 2005, as *Exhibit 1.8* shows.

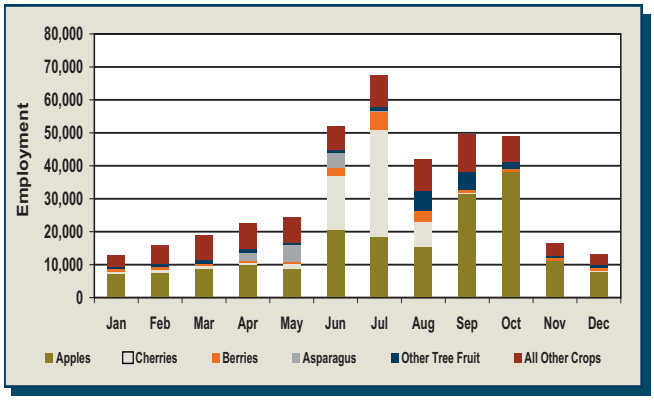
**Exhibit 1.9**
Seasonal Employment in the Apple Harvest
Washington State, 2000 to 2006
*Source:* ESD/LMEA, Appendix Exhibit 1.3, Earlier Editions of the Agricultural Labor Employment and Wage Trends




### *Apples Drive the Seasonality Pattern*

Even so, seasonality in agricultural employment continues to be driven mainly by apple production as is shown in *Exhibit 1.9* which displays a seven-year seasonal pattern. In August, seasonal employment in apples varies from 10 to 15 thousand workers, depending on the size and timing of the crop. Within a month, seasonal employment surges from the high 20 thousands to the low 30 thousands – effectively doubling between August and September. The surge increases in October from the high 30 thousands to as high as the mid 40 thousands. Within a month, by November, seasonal employment in apples drops by a factor of 4 to around 10,000 workers. *Appendix Exhibits 1.3* and *1.4* show the data in detail.

**Exhibit 1.10**
Crop-Specific Seasonal Agricultural Employment
Washington State, 2006
*Source:* ESD/LMEA, Appendix Exhibit 1.3




### *Crop-Specific Seasonality*

*Exhibit 1.10* shows the contribution to employment seasonality as a function of six dominant crop groups: apples, cherries, berries, asparagus, other tree fruit, and all other crops. This exhibit is based on data in *Appendix Exhibit 1.3*.

Over 2006, statewide, annual average worker/months of seasonal employment are estimated at 32,015, an increase from 29,842 in 2005. However, on a monthly basis, January is the lowest month of seasonal employment, with 12,771 worker/months. In 2006, July was the highest month with 67,482 worker/months. Seasonal employment surges by a factor of 5.3 (or 530 percent) between the lowest and the highest employment months. The surge is abrupt. By May, seasonal employment has increased by 192.0 percent. One month later, employment surges again by an additional 212 percent. From

June to July it increases again by an additional 30 percent. Employment in August drops sharply to the low 40,000-worker range. Employment then increases, approaching 50,000 in September and October. It then falls off sharply to well under 20,000 in November. Employment in December is very close to employment in the previous January.

- **January** – As noted, January has the lowest seasonal employment. Apple workers comprise 56.4 percent of seasonal employment in January 2006 compared to 60.9 percent in 2005. The next six crop workers in descending order of importance are: grape workers; nursery workers; cherry workers, total; potato workers, pear workers, total; and other seasonal workers.

- **February** – Apple workers continue to dominate seasonal employment in February, comprising 48.3 percent of all seasonal workers, down from 50.8 percent in 2005. Grape workers surge by 212.8 percent between January and February. They comprise 13.5 percent of all seasonal workers in that month. The next five important crop workers in descending order are: cherry workers, total; bulb workers; nursery workers; raspberry workers; and potato workers.

- **March** – March continues the dominance of seasonal apple workers who now comprise 46.7 percent of the total seasonal employment that month, up from 44.9 percent in 2005. Three other crop workers now exceed 1,000: grape workers, hop workers, and nursery workers. The final three top employers are, in descending order: 994 bulb workers; 805 other tree fruit workers; and 789 onion workers.

- **April** – April finds the share of seasonal apple employment at 44.8 percent, up from 40.0 percent in 2005. There are now an estimated 2,562 asparagus workers, 11.4 percent of the monthly seasonal total. Nursery workers increase to 1,774; other seasonal workers increase from 668 in March to 1,335 in April. Grape workers drop by 574 workers to 1,209 in April. The top six crops are filled out by 958 potato workers and 929 other tree fruit workers.

- **May** – By May, the share of apple employment has dropped to 36.1 percent, up from 34.3 percent in 2005. The 5,087 asparagus workers now become the second largest group of seasonal workers, followed next by 2,041 nursery workers. Grape workers increase to an estimated 1,485, followed by an estimated 1,396 cherry workers. The last two largest groups of workers are other seasonal workers and hop workers.

- **June** – The surge to 51,906 workers in June is due to the 20,619 apple workers and 16,475 cherry workers. Asparagus workers decline to an estimated 4,314. Strawberry workers surge from an estimated 175 workers statewide in May to 2,051 in June, an increase of 1,172 percent. Nursery workers follow with 2,117 workers. The last three crop workers in order of descending importance are grape workers, other seasonal workers, and miscellaneous vegetable workers.

- **July** – The seasonal surge continues to 67,482 workers in July, driven by 32,302 cherry workers and 18,520 apple workers. Raspberry workers now surge from 327 workers in June to an estimated 4,578 workers in July, an increase of 1,400.0 percent in one month. The remaining top three crop workers are: 2,304 other seasonal workers, 1,829 nursery workers, and 1,480 grape workers.

- **August** – Seasonal employment drops by 25,468 workers between July and August. An estimated 15,412 apple workers now comprise 36.7 percent of the seasonal employment for August. This represents a proportionate drop from August 2005, when seasonal apple employment comprised 47.9 percent of employment. There remain 7,494 workers in the cherry harvest, 17.8 percent of total seasonal employment, compared to only 498 cherry workers in August of 2005, only 1.3 percent of seasonal employment for that month. Pears now employ 3,390 workers, up from only an estimated 167 in July. This represents a surge of 20,299.4 percent. Other tree fruit workers now employ 2,525 seasonal workers. Blueberry workers comprise the next largest employment at 2,336, a surge from July of 339.0 percent. Potato workers complete the top six crops for employment at 1,913.

- **September** – The apple harvest is in full swing in September, with 31,651 workers comprising 63.8 percent of total seasonal employment, down from 68.8 percent in September 2005. Total pear employment is now 4,863, 9.8 percent of seasonal employment this month. The remaining top four crop workers are: 2,060 other seasonal workers, 1,991 miscellaneous vegetable workers, 1,861 potato workers, and 1,688 hop workers who have surged by 856.9 percent since August.

- **October** – At an estimated 38,101 workers, the apple crop dominates employment in October and comprises 77.6 percent of total seasonal employment. Proportionate employment in apples was 77.5 percent in October 2005. The 3,649 potato workers are now the second largest group of seasonal workers. These are followed by 2,037 total pear workers, 1,241 miscellaneous vegetable workers, 1,030 raspberry workers, and 939 nursery workers.

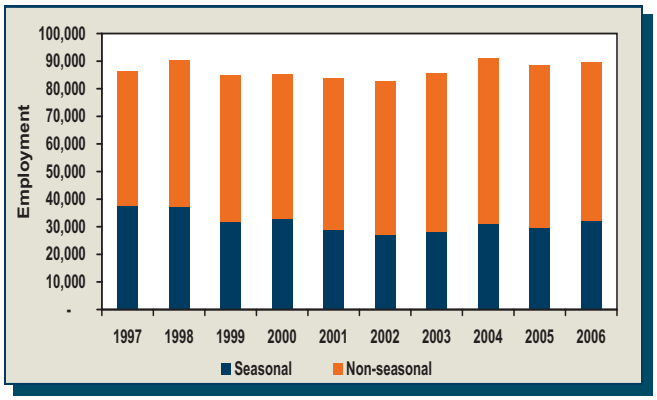
- **November** – Total seasonal employment drops by 297.1 percent compared to October. This month apple workers, at 11,042 individuals, comprise 66.8 percent of seasonal employment, an increase from 63.1 percent in 2005. Potato workers comprise the second largest group of seasonal workers at 1,104 individuals. No other crops employ as many as 1,000 workers at this time. The remaining four cropworkers in descending order are: raspberry workers, nursery workers, grape workers, and other seasonal workers.

- **December** – Total seasonal employment drops further to just 12,970 workers. The estimated 7,771 apple workers comprise 59.9 percent of the total. There are still 1,111 raspberry workers employed. The final top four crop workers are: nursery workers, potato workers, other seasonal workers, and total pear workers. All other crops employ less than 350 workers and three crops employ no seasonal labor.

## The Changing Composition of Seasonal and Non-Seasonal Employment

*Exhibit 1.11* shows the changing composition of seasonal versus non-seasonal employment in Washington state agriculture. Over the past ten years, there has been a consistent decline in the proportion of seasonal workers hired. To help adjust for annual variations in weather and market patterns, we compare average seasonal employment over the period 1997 to 1999 with the same data for the period 2004 to 2006.

**Exhibit 1.11**
Total and Seasonal Agricultural Employment, Washington State, 1997 to 2006
*Source:* ESD/LMEA




**NOTE:** Adjusted for dual job holders plus workers not covered by Unemployment Insurance.

The weighted average of total agricultural employment is an estimated 87,161 workers over the period 1997 to 1999. In contrast, for 2004 to 2006, weighted average employment is 89,788. Over the decade, total agricultural employment has grown by an estimated 2,627 workers, or 31,532 worker/months. The weighted average of seasonal agricultural employment is estimated at 35,509 workers over the period 1997 to 1999. This drops to an estimated 31,002 workers for the period 2004 to 2006. The total decrease is an estimated 4,507 workers, or 54,084 worker/months. The proportion of seasonal agricultural workers drops from 40.7 percent over the 1997 to 1999 period to just 34.5 percent over the 2004 to 2006 period.

As reported in the *2005 Agricultural Workforce in Washington State* (page 88), agriculture in Washington is estimated to rank 10th in the nation in overall total factor productivity as of 1996. Total crop output over the period 1960 to 1996 is estimated to have increased in real terms by an average of 3.2 percent a year. Total livestock output is estimated to have increased by an average of 2.8 percent over this period. While this has been occurring, total inputs have only increased by 0.7 percent a year. Intermediate inputs, that is inputs bought off of the farm and then used in production, increased an average of 2.3 percent a year. However, land inputs dropped by 0.3 percent a year over the period and labor input dropped by 0.8 percent over the period. This annual 0.8 percent drop can largely explain the drop in seasonal employment.

Assuming the above trends are continuing, these data suggest that as total output and total employment have increased over time, there has been a substitution of capital inputs embodied in the increased intermediate inputs that have led to a substitution away from the use of seasonal agricultural labor in the state, even while total agricultural employment has been rising.

## Summary

- *Total Value of Production*
    - Washington's agriculture in 2005 became a six billion dollar industry in current dollars, growing 8.9 percent compared to 2004.
    - Constant dollar growth in the industry was 4.2 percent compared to 2004.
    - Constant dollar growth since 2001 has totaled 30.2 percent.
    - The contribution to total value of production has shifted from field crops to fruit and nut crops.
    - Net value added from the agriculture sector is estimated at an average of 52.4 percent over the most recent ten-year period.
    - Directly hired agricultural labor contributes 38.3 percent to net value added.
- *Agricultural Trade Multipliers*
    - The producer employment multiplier effects vary significantly with respect to type of crop and agricultural output. The employment impacts per one billion dollars of exports range from a high of 36,420 jobs created in the cattle sub-sector to 2,645 jobs created in the wine sector.
    - The producer output multiplier also varies sharply by type of crop and agricultural output, with a high of 4.21 for cheese per dollar of export to a low of 2.10 for vegetables and melons.
- *Employment*
    - Total employment in the agriculture sector has risen over the most recent ten-year period from an estimated 87,161 workers averaged over the 1997 to 1999 period to an average of 89,788 over the period 2004 to 2006.
    - Annual seasonal agricultural employment over this period has dropped both in absolute and in relative terms, due most likely to technological innovation that has resulted in a substitution away from the employment of seasonal agricultural labor.
- *Weather Patterns Continue to be a Major Contributor to Seasonality in Employment*
    - Apple production continues to drive the seasonal pattern, but sweet cherries also played a dominant role in 2006.
    - These sharply changing patterns from year to year and crop to crop contribute to concerns by agricultural producers about labor shortages.

## Endnotes

[1] Recall that the demand for labor is a derived demand dependent upon the demand for the good or service produced by that labor. Thus, production values are directly related to the size and structure of the labor force employed.

[2] The production data provided by USDA/NASS for the state lags by one year. Thus, we are reporting on the economy's performance during 2005. Complete data for 2006 will not be available until September 2007. *Appendix Exhibits 1.2* and *1.7* display these data in current dollars. These data are taken from the *2006 Washington Annual Agriculture Bulletin*, Washington Agricultural Statistics, USDA National Agricultural Statistics Service, Washington Field Office.

[3] For this discussion, see the *2005 Agricultural Workforce in Washington State* report, Chapter 1, p. 7.

[4] Note that we have changed the base year of comparison to 2006 for this year's report. For the 2005 report, we used 1995 as the base year. Furthermore, we changed the price index employed. In the 2005 report, we used the CPI Inflation Calculator. This year we used the indices for agricultural products reported in the various issues of the *Agricultural Prices Summary*. See *Appendix Exhibit 5.2* for the exact sources.

[5] *2005 Agricultural Workforce in Washington State* report, Chapter 5, p. 88. Over the period 1960 to 1996, total factor productivity in Washington state agriculture increased at an estimated annual rate of 2.3 percent. Total output increased an average of 3.1 percent over the same time period. Among the lower 48 states, Washington ranked 10th in total factor productivity increase and 2 in total output increase over the 37-year time period being studied.

[6] See *Appendix Exhibit 5.1*.

[7] The accounting framework for these statistics corresponds closely with that of the United States Gross Domestic Product accounting system. The National Agricultural Statistics Service (NASS) revised these data as of August 31, 2006. Thus, these data differ from the data reported in *Appendix Table 4* of the report on the *2005 Agricultural Workforce in Washington State*. The total value of final agriculture sector output in *Appendix Exhibit 1.7* also differs from the comparable figure in *Appendix Exhibit 1.2*. The data in *Appendix Exhibit 1.2* measure only the total value of agriculture production. The data in *Appendix Exhibit 1.7* add to that figure the value of machine hire and custom work, forest products sold, other farm income, and gross imputed rental value of farm dwellings. After accounting for these factors, a proportionately small difference in the two data sources still remains. NASS does not attempt to reconcile these remaining differences.

[8] In addition to the total value of production, this sum includes machine hire and custom work, forest products sold, other farm income, and the gross imputed rental value of farm dwellings. See *2006 Washington Annual Agriculture Bulletin*, p. 25.

[9] *2005 Agricultural Workforce in Washington State* report, Chapter 3.

[10] More precisely, the wage rate is equal to the additional output produced by the last worker hired, times the price that additional output can gain in the market.

[11] Net government payments are subtracted out of net farm income since they do not represent a contribution to the production process. They are a transfer payment.

[12] Remember that the wage rate is the product of the quantity of output produced by a unit of labor times the price at which that output can be sold. Thus, the wage rate is a measure of value added to production. The wage rate times hours worked equals the wage bill, or total earnings.

[13] *2005 Agricultural Workforce in Washington State* report, p. 11.

[14] As *Chapter 3* shows, using employment data collected by the ESD Labor Market and Economic Analysis branch, we cannot conclusively say that total seasonal employment dropped. In fact, it appears to have remained constant based on the BLS data. It appears to have risen somewhat based on the ESD/LMEA *Agricultural Labor Employment and Wage Trends* survey for seasonal agricultural labor employed.

[15] Levine, Linda, "Farm Labor Shortages and Immigration Policy," CRS Report for Congress, Congressional Research Service, The Library of Congress, updated March 29, 2006. There is an extensive discussion, at the national level, of the evidence relating to a national shortage of agricultural labor. However, the discussion stops with 2005 data. Levine's general conclusion is that, through 2005, there is little evidence to support the existence of a general, long-term agricultural labor shortage in the United States.

# Chapter 2

## Wage Rates, Hours Worked, and Earnings

### Introduction

The agriculture sector and the agricultural labor market most closely approach the competitive market models assumed by economists. The competitive nature of the agriculture sector means that both agricultural producers and agricultural workers are price takers – neither has any effective market power to influence the prices they receive (farmers) or the wages they receive (farmworkers). In addition, this market is regional, national, and international for both agricultural products and for year-round and seasonal agricultural labor. There are many sources of competition that bear on both the product and labor markets in this industry. These diverse sources increase the competitive nature of both the product market faced by agricultural producers and the labor market faced by workers.

Workers tend to be highly mobile across the growing season and among growing regions. They are highly mobile even within a given region and season.[1] So, even though seasonal and nonseasonal agricultural workers are price takers, in general, they do not have to accept wage rates that are below market. Producers have to pay market wages to gain and keep a labor force. And, the more fragile the crop, the more the crop must be harvested at a particular time and in a particular state of ripeness, then the more the agricultural producer is constrained to pay market wage rates, even if a worker is undocumented. Finally, if unexpected events occur, such as weather changes or a change in the size of the anticipated crop to be harvested, agricultural producers may have to increase wage rates to gain extra workers or to keep the ones they have (see the discussion in *Chapter 3*).

### Agricultural Wage Rates in the National Context

**Exhibit 2.1**
Hourly Average Wage Rates of Field Workers and Production and Nonsupervisory Workers in the Private NonFarm Sector, Current Dollars
United States, 1990 to 2005
*Source*: Linda Levine, Farm Labor Shortages and Immigration Policy, CRS Report for Congress, Congressional Research Service, The Library of Congress, Table 4, updated March 29, 2006

**Hourly Average Wage Rates in Current Dollars**

| Year | Field Workers ( a ) | Production and Nonsupervisory Workers ( b ) | Ratio of (a) to (b) ( c ) |
|---|---|---|---|
| 1990 | 5.23 | 10.19 | 0.51 |
| 1991 | 5.49 | 10.50 | 0.52 |
| 1992 | 5.69 | 10.76 | 0.53 |
| 1993 | 5.90 | 11.03 | 0.53 |
| 1994 | 6.02 | 11.32 | 0.53 |
| 1995 | 6.13 | 11.64 | 0.53 |
| 1996 | 6.34 | 12.03 | 0.53 |
| 1997 | 6.66 | 12.49 | 0.53 |
| 1998 | 6.97 | 13.00 | 0.54 |
| 1999 | 7.19 | 13.47 | 0.53 |
| 2000 | 7.50 | 14.00 | 0.54 |
| 2001 | 7.78 | 14.53 | 0.54 |
| 2002 | 8.12 | 14.95 | 0.54 |
| 2003 | 8.31 | 15.35 | 0.54 |
| 2004 | 8.45 | 15.67 | 0.54 |
| 2005 | 8.69 | 16.11 | 0.54 |
| **1990-2005 Change** | **66.2%** | **58.1%** | **N/A** |

**NOTE:** Field workers are a subset of hired farmworkers who engage in planting, tending, and harvesting crops. The data relate to all field workers regardless of method of payment (i.e., those paid by an hourly rate, by the piece, or a combination of the two). Contract, custom, or other workers paid directly by agricultural service providers are excluded.

How stable have hourly wage rates been for seasonal agricultural workers? While we do not have national data for seasonal agricultural workers per se, we do have national data for field workers who perform tasks similar to seasonal agricultural workers (see the note to *Exhibit 2.1*). We see that in current dollar terms, hourly average wage rates for field workers nationwide have risen an estimated 66.2 percent between 1990 and 2005 while hourly average wage rates for production and nonsupervisory workers have risen an estimated 58.1 percent over the same time period. In addition, the ratio of hourly average wage rates paid to field vis-à-vis production and nonsupervisory workers has risen from 0.51

(or 51.0 percent) to 0.54 (or 54.0 percent) over the 16-year span of the data. These findings suggest that the demand for field workers has been rising; the supply of field labor has been falling; or some combination of the two.

However, one must note that these data for field workers are based on the *National Agricultural Statistics Service Farm Labor Survey* (FLS), for which the employer is the sample respondent. Data collected by the Department of Labor's *National Agricultural Workers Survey* (NAWS), for which the worker is the respondent, tell the opposite story. The NAWS survey data, covering the years 1990 to 2002, show estimates that the hourly average wage rate in current dollars of crop workers rose only 39.6 percent over the period, while that of production and nonsupervisory workers in the private, nonfarm sector rose by 46.7 percent. Crop workers include field packers, supervisors, and other field workers who engage in such activities as planting, tending, and harvesting crops. In addition, the NAWS data include contract workers who are generally paid less per hour than workers hired directly by the farm operator.[2]

Thus, depending on how one measures, the statistical picture gained can differ sharply. It is difficult to choose between these two surveys, but to maintain consistency in this study, and with last year's report, we will work with the NASS data.[3]

### *The Picture in 2006*

To complement the above picture, NASS estimates that hourly average wage rates rose throughout 2006. For 2006 compared to 2005, hourly average wage rates are estimated to have risen by 3 percent, 5 percent, 4 percent, and 4 percent, at the sample periods of January 8-14, April 9-15, July 9-15, and October 8-14, respectively.[4] In contrast, the Consumer Price Index-W increased approximately 3.5 percent between 2005 and 2006. Thus, in constant dollar terms, hourly average wage rates nationally are estimated to have increased in the neighborhood of one percent over the 2006 growing and harvesting year.

## Washington State in the National Context

*Exhibit 1.5* in *Chapter 1* displays hourly average wage rates for the United States, California, and Washington and Oregon combined. The data are displayed for field workers, livestock workers, and all hired workers. A striking fact is that estimated hourly average wage rates for California field workers did not rise during the 2006 sample survey periods. Wage rates for field workers were estimated at $9.12 in January and were actually lower during the peak growing and harvest periods, ending at $9.13 in October, essentially the same as at the beginning of the year. This evidence does not suggest that there was a shortage of labor in California during 2006, even though it is still possible that *spot shortages* in terms of either location or crop did occur, as was asserted for the California pear harvest.

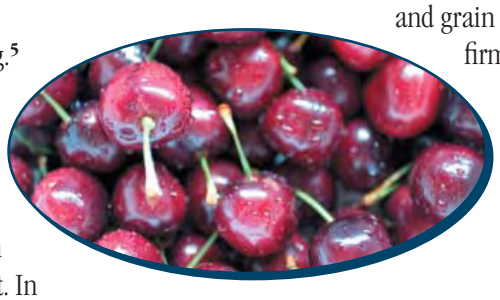
Hourly wage rates for field workers did rise nationwide from $9.15 in January to $9.25 the following October, but then they fell during the April and July sampling periods for the nation as well.

In sharp contrast, hourly average wage rates for field workers rose sharply for the two states in the Pacific Region. Wage rates were estimated to average $9.36 in January (higher than both the nation and California at that sampling period) and rose to $9.50 during the July sampling period, which was the beginning of the Washington cherry harvest. In the October sampling period, when the apple harvest was in full swing, hourly average wage rates were estimated to be $10.25 for field workers, 9.5 percent higher than at the beginning of the year. Subtracting the 3.5 percentage rate of inflation from this percent yields a constant dollar hourly average wage increase of 6.0 percent. Using this same method, the hourly average wage rate of livestock workers is estimated to have increased by 1.6 percent (5.1 percent - 3.5 percent = 1.6 percent). And, hourly average wage rates of all hired workers are estimated to have increased in Washington and Oregon combined by 2.4 percent in constant dollars. Thus, it is reasonably certain, based on these data, and the data developed by the ESD/LMEA presented in *Chapter 3*, that there was an increase in demand for labor, a decrease in supply of labor, or some combination of the two for the Pacific Region in 2006.

# Chapter 2

## Production Agriculture Compared to Value-Added Agriculture Manufacturing, Washington State

*Exhibit 2.2* displays the annual average number of firms, annual total before-tax earnings, monthly average jobs, and annual average before-tax earnings per job for 2005. It compares annual average before-tax earnings in 2005 with those in 2004. The data are from the Quarterly Census of Employment and Wages (QCEW), thus accounting for the one-year lag in reporting.[5]



### *Average Number of Firms*

The average number of firms involved in direct agricultural production dropped from 7,064 in 2004 to 6,852 in 2005 – 3.1 percent. In 2005, an estimated 42.2 percent of these firms was engaged in fruit and tree nut farming, down from 42.8 percent in 2004. Total firms in this sector fell by 133 between the two years – a drop of 4.4 percent. Consistent with these changes, total acreage statewide has generally been falling over time in tree fruit production, except in the production of sweet cherries.[6]

The next largest sub-sector in terms of total firms is oilseed and grain farming, comprising 16.4 percent of total firms in 2005, the same proportion as in 2004, though the total in 2005 dropped by an estimated 32 firms compared to 2004. Cattle ranching and farming firms remain essentially unchanged – 697 in 2005 versus 705 in 2004. However,

**Exhibit 2.2**
Total Employers, Annual Total Earnings, and Annual Average Earnings, by Industry, in Current Dollars
Washington State, 2004 and 2005
*Source:* ESD/LMEA, Quarterly Census of Employment and Wages

| Industry | Average Number of Firms 2005 | Annual Total Earnings in Dollars | Monthly Average Jobs | 2,005 Annual Average Earnings per Job | 2,004 Annual Average Earnings per Job | Percent Change 2005 Compared to 2004 |
|---|---|---|---|---|---|---|
| Production Agriculture | 6,852 | 1,334,842,737 | 74,278 | 17,971 | 17,439 | 3.1 |
| Poultry and Egg Production | 33 | 15,769,190 | 625 | 25,231 | 25,152 | 0.3 |
| Animal Aquaculture | 45 | 15,595,734 | 621 | 25,114 | 24,029 | 4.5 |
| Cattle Ranching and Farming | 697 | 106,299,585 | 4,391 | 24,209 | 23,460 | 3.2 |
| Other Crop Farming | 720 | 137,400,356 | 6,556 | 20,958 | 20,609 | 1.7 |
| Support Activities for Crop Production | 311 | 271,609,188 | 13,345 | 20,353 | 20,250 | 0.5 |
| Greenhouse, Nursery, and Floriculture | 355 | 98,893,197 | 4,866 | 20,323 | 20,172 | 0.7 |
| Other Animal Production | 126 | 7,350,642 | 359 | 20,475 | 19,721 | 3.8 |
| Vegetable and Melon Farming | 368 | 92,747,597 | 4,450 | 20,842 | 19,600 | 6.3 |
| Support Activities for Animal Production | 173 | 11,360,063 | 572 | 19,860 | 19,474 | 2.0 |
| Oilseed and Grain Farming | 1,127 | 33,938,030 | 1,833 | 18,515 | 18,332 | 1.0 |
| Hog and Pig Farming | 4 | 130,738 | 6 | 21,790 | N/A | N/A |
| Fruit and Tree Nut Farming | 2,893 | 543,748,417 | 36,654 | 14,835 | 14,273 | 3.9 |
| Value-Added Agriculture Manufacturing | 964 | 1,357,459,526 | 36,997 | 36,691 | 35,055 | 4.7 |
| Seafood Product Preparation and Packaging | 100 | 338,243,130 | 6,563 | 51,538 | 47,924 | 7.5 |
| Dairy Product Manufacturing | 21 | 41,921,184 | 999 | 41,963 | 41,708 | 0.6 |
| Grain and Oilseed Milling | 6 | 7,445,676 | 202 | 36,860 | 40,834 | -9.7 |
| Beverage Manufacturing | 192 | 146,059,656 | 3,590 | 40,685 | 39,573 | 2.8 |
| Animal Food Manufacturing | 42 | 25,359,602 | 675 | 37,570 | 36,445 | 3.1 |
| Other Food Manufacturing | 147 | 127,049,223 | 3,522 | 36,073 | 33,539 | 7.6 |
| Fruit and Vegetable Preserving and Specialty | 78 | 340,916,833 | 10,071 | 33,851 | 32,943 | 2.8 |
| Bakeries and Tortilla Manufacturing | 252 | 154,941,057 | 5,003 | 30,970 | 30,300 | 2.2 |
| Animal Slaughtering and Processing | 79 | 154,774,093 | 5,406 | 28,630 | 26,031 | 10.0 |
| Sugar and Confectionery Product Manufacturing | 47 | 20,749,072 | 966 | 21,479 | 20,757 | 3.5 |

other crop farming rose by 15 firms to a total of 720 in 2005 compared to 2004; while vegetable and melon farming dropped by an estimated 11 firms to a total of 368 in 2005.

The number of firms in *value-added agriculture manufacturing* also declined from 1,078 firms in 2004 to 964 in 2005 – down 8.9 percent. In both years, the largest sub-sector is bakery and tortilla manufacturing followed by beverage manufacturing. Seafood product preparation and packaging ranks third in both years as well.

### *Monthly Average Jobs*

There were 74,278 monthly jobs in direct agricultural production in 2005 as measured by the QCEW database, up by 1,210 jobs compared to 2004. This is a 1.7 percent increase over 2004. Fruit and tree nut farming comprised 49.3 percent of this total in 2005, down from 50.3 percent of the total in 2004. Support activities for crop production is the next largest employment sector, with 13,345 workers in 2005 compared to just 11,421 in 2004 – an increase of 16.8 percent over 2004. Employment in other crop farming remained unchanged between the two years – 6,556 workers in 2005 compared to 6,553 workers in 2004. The next largest sub-sector is greenhouse, nursery, and floriculture, where monthly average jobs dropped from 5,067 in 2004 to 4,866 in 2005. Finally of note, vegetable and melon farming provided 4,450 monthly average jobs in 2005, down from 4,649 in 2004.

In contrast to direct agricultural production, average monthly jobs in value-added agriculturemanufacturing dropped from 37,738 in 2004 to 36,997 in 2005 – a 2.0 percent drop. Fruit and vegetable preserving and specialty provided the largest number of jobs in 2005 – 10,071 jobs per month, down slightly from 10,133 monthly jobs in 2004. The next largest employment sub-sector is seafood product preparation and packaging, up from 6,432 monthly jobs in 2004 to 6,563 jobs in 2005. Monthly jobs provided in bakeries and tortilla manufacturing and animal slaughtering and processing are both down in 2005 compared to 2004 – a drop of 125 jobs in the former and 283 in the latter. Beverage manufacturing, the next largest sector, slightly increased the total monthly jobs provided from 3,541 in 2004 to 3,590 in 2005.

### *Annual Total Earnings*

Production agriculture paid out $1,333,843,000 in current dollars in 2005, up from $1,274,205,000 in 2004 – a 4.5 percent increase but only a 1.0 percent increase in constant 2005 dollars compared to 2004 (base year = 2005). In contrast, total earnings paid to workers by the value-added manufacturing sector amounted to $1,357,460,000 in 2005, an increase of 2.6 percent in current dollars compared to 2004, but a decrease of 0.9 percent in 2005 constant dollars. In both years, the largest contributor to total earnings is the fruit and vegetable preserving and specialty sub-sector and the seafood product preparation and packaging sub-sector.

### *Annual Average Before-Tax Earnings per Job – Production Agriculture*

Annual average before-tax earnings in the production agriculture sector rose by 3.1 percent in 2005 compared to 2004. But, since the Consumer Price Index-W increased over this period by 3.5 percent, constant dollar earnings (but not necessarily the hourly average wage rate) in this sector have dropped slightly between the two years.

The highest amount of annual before-tax earnings for the production agriculture sector is in the poultry and egg production sub-sector, at $25,231. In current dollars, this earnings level is essentially unchanged from 2004, when it was $25,152. In constant 2005 dollars, it is 3.2 percent lower in 2005 compared to 2004 [0.3 percent + (-3.5 percent) = -3.2 percent]. As in 2004, the lowest amount of annual earnings for 2005 is in fruit and tree nut farming, at $14,835 for the year. However, this sum is 3.9 percent higher than what was earned in 2004. Given the increase in the Consumer Price Index-W between the two years, earnings in this sub-sector rose in constant dollar terms by 0.4 percent between the two years. Using this same reasoning,

current dollar earnings rose by 4.5 percent between the two years in animal aquaculture; thus, constant dollar earnings rose by 1.0 percent. Annual total earnings fell slightly in constant dollar terms in cattle ranching and farming; they rose by 0.3 percent in constant dollar terms in other animal production. They rose by a very large 2.8 percent in constant dollar terms in vegetable and melon farming. In all other sub-sectors of production agriculture, constant dollar earnings fell between the two years, suggesting that there was no overall shortage of labor in 2005 (*see Chapter 3*).[7]

### *Annual Average Before-Tax Earnings per Job – Value-Added Agriculture Manufacturing*

The picture in value-added agriculture manufacturing is considerably different. In current dollars, annual average earnings for this sector were $36,691 in 2005. This is 4.7 percent higher in current dollars than the comparable figure for 2004 and 1.2 percent higher in constant 2005 dollars. These data are consistent with the general picture of economic growth in the state during 2005. Overall employment rose by 2.9 percent in 2005. The unemployment rate in the state dropped from 6.3 percent in 2004 to 5.5 percent in 2005 – a statistically significant difference. Annual earnings per job in the nonagricultural sector of the state economy were $45,902 in 2004 and $47,097 in 2005. This is a 2.6 percent growth rate in current dollars between the two years. Washington state is also a high-earnings state, ranking 10th nationwide in 2004 and 11th in 2005 in annual total before-tax earnings in the nonagricultural sector.[8] The fact that the state is such a high-wage state, with growing employment demand, puts pressure on the agricultural sector to increase hourly wages simply to retain its labor force.[9]

As shown in *Exhibit 2.2*, constant dollar earnings rose by 4.0 percent [7.5 percent + (-3.5 percent) = 4.0 percent] in seafood product preparation and packaging; 4.1 percent in constant dollar earnings in other food manufacturing; 6.5 percent in animal slaughtering and processing; and remained unchanged in constant dollars in sugar and confectionery product manufacturing. Constant dollar earnings fell in all the other sub-sectors in value-added agriculture manufacturing. The sharpest fall was for grain and oilseed milling, where constant dollar earnings fell by 13.2 percent [-9.7 percent + (-3.5 percent) = -13.2 percent].

## Employment, Hours, and Earnings of Workers Connected to Agriculture

In America, it is a fact that both farm owners and operators and farm workers have a differential attachment to the agriculture sector. For example, with respect to farm operators nationwide:[10]

- "Operators of smaller farms typically participate more in off-farm employment, work more hours off the farm, and have higher off-farm income than operators of larger farms."
    - "In 2004, farm households with farm sales less than $10,000 had average off-farm income of $54,600."
    - "…households with farm sales of $500,000 – $1 million average only $30,100."
    - "More than 58 percent of operations with farm sales less than $10,000 reported off-farm hours worked in 2004, versus less than 20 percent for operators of farms with sales of $500,000 – $1 million."
- "Off-farm work is less likely on farms with labor-intensive enterprises such as dairy."
- "Off-farm work has also been shown to be positively related to urban proximity and to the education and experience of the farmer."
- "Farmer's technology choices are closely linked to off-farm income."

Agricultural workers demonstrate similar differential attachments to the agriculture sector as shown in *Exhibits 2.3* and *2.4*.

*Exhibit 2.3* shows the hours, earnings, and wage rate outcomes for workers with differential attachment to the agriculture sector.

**Exhibit 2.3**
Differential Attachment of Workers to the Agriculture Sector
Washington State, 2006 Compared to 2005
Source: ESD/LMEA, UI Wage File

| | 2005 | 2006 | Percent Change 2006 Compared to 2005 |
|---|---|---|---|
| Any Work in Agriculture - Total Workers | 149,316 | 151,611 | 1.5 |
| Average Number of Employers | 2.54 | 2.59 | |
| Annual Average Hours Worked | 973 | 989 | 1.6 |
| Annual Before-Tax Earnings | $10,872 | $11,505 | 5.8 |
| Hourly Average Before-Tax Wage Rate | $11.17 | $11.63 | 4.1 |
| Worked in Agriculture Only - Total Workers | 107,137 | 107,545 | 0.4 |
| Average Number of Employers | 2.10 | 2.12 | |
| Annual Average Hours Worked | 836 | 847 | 1.3 |
| Annual Before-Tax Earnings | $9,124 | $9,625 | 5.5 |
| Hourly Average Before-Tax Wage Rate | $10.91 | $11.36 | 4.2 |
| Worked in Agriculture and Nonagriculture Sectors - Total Workers | 42,179 | 44,066 | 4.5 |
| Average Number of Employers | 3.68 | 3.72 | |
| Annual Average Hours Worked | 1,320 | 1,337 | 1.3 |
| Annual Before-Tax Earnings | $15,313 | $16,091 | 5.1 |
| Hourly Average Before-Tax Wage Rate | $11.60 | $12.04 | 3.8 |

**NOTE:** These data are from the "UI Wage File" maintained by ESD/LMEA. The worker count and subsequent data are based upon the summation of unduplicated Social Security numbers.

### *Hours*

Individuals who work only in agriculture are employed fewer hours during the year than are workers who are employed in a combination of agricultural and nonagricultural jobs. This pattern has been consistent over time for Washington. Thus, for 2006, agriculture-only workers were employed only 63.4 percent of the hours worked by those who worked in both the agriculture and the nonagriculture sectors. The same pattern shows up for 2005.

Comparing 2006 with 2005, we see that annual hours worked increased by only about one and a half working days, 1.3 percent, for those who worked only in agriculture. Of course, 107,545 workers employed an average of an extra 11 hours each during the year results in an increase of total agricultural labor of 147,874 working days, or 12,322 working months for this group of workers.

Annual total hours increased by only two working days, 17 hours or 1.3 percent, for those who worked in both agriculture and the nonagriculture sectors. In addition, the total number of workers working only in the agriculture sector increased little, if at all, by 0.4 percent, or 408 workers. However, 44,066 workers adding an additional 17 hours each to their working year adds up to a total increase of 749,122 annual hours, or 93,640 working days.

These data suggest that most of the increased labor that was demanded by the surge in the 2006 cherry harvest came from workers employed in agriculture only (whether undocumented or working legally), but that 39 percent of the additional labor was supplied by those who are attached to both sectors of the economy (93,640 / 241,514 = .388 x 100 = 38.8 percent). If seasonal and migrant workers dominate the group of individuals attached only to the agriculture sector, then, based on this data set, their numbers likely did not increase or decrease between 2005 and 2006, but their hours of work did increase (*see Chapter 3*).[11] This, then, results in an increase in the total amount of labor supplied from this source.

### *Total Before-Tax Earnings*

Consistent with the pattern on hours worked, those who work only in agriculture have lower annual total before-tax earnings than those who work in both the agriculture and nonagriculture sectors. In 2006, agriculture-only workers earned $9,625, 59.8 percent of the annual total earnings of those individuals who worked in both sectors. The proportion for 2005 is 59.6 percent – essentially unchanged compared to 2006.

Overall, however, workers in both groups earned somewhat more than five percent higher earnings in 2006 compared to 2005 (see *Exhibit 2.3*).

### *Hourly Average Wage Rates*

Workers attached only to the agriculture sector earn lower hourly before-tax average wage rates than do workers who employ themselves in both major sectors. Thus, at $11.36 per hour, agriculture-sector-only workers earn 5.6 percent per hour less than those workers who find employment in both major sectors.

Both those who worked only in the agriculture sector and those who worked in the agriculture and nonagricultural sectors experience wage rate increases in 2006 compared to 2005. In current dollars, those in the agriculture sector only experienced a 4.2 percent increase, while those working in both major sectors experienced a 3.8 percent increase in current 2006 dollars. Again, the Consumer Price Index-W increased by 3.5 percent between the two years, indicating that the constant dollar increase in the hourly average wage rate for workers in agriculture only was about 0.7 percent, while it was 0.3 percent for those individuals holding jobs in both sectors during 2006. This increase in the constant dollar value of the hourly average wage rate is consistent with the above evidence on the increase in average hours worked per year and in terms of the increase in the total number of workers employed in both the agriculture and the nonagriculture sectors.

**Exhibit 2.4**
Differential Hours Worked in Agriculture, by Attachment to Agriculture
Washington State, 2006 Compared to 2005
*Source:* See Exhibit 2.3

| | 2005 | | 2006 | |
|---|---|---|---|---|
| | Less Than 680 Hours | 680 Hours or More | Less Than 680 Hours | 680 Hours or More |
| Any Work in Agriculture - Total Workers | | | | |
| Number of Workers | 69,881 | 79,435 | 70,572 | 81,039 |
| Percent | 46.8 | 53.2 | 46.5 | 53.5 |
| Worked in Agriculture Only - Total Workers | | | | |
| Number of Workers | 58,200 | 48,937 | 58,432 | 49,113 |
| Percent | 54.3 | 45.7 | 54.3 | 45.7 |
| Worked in Agriculture and Nonagriculture Sectors - Total Workers | | | | |
| Number of Workers | 11,681 | 30,498 | 12,140 | 31,926 |
| Percent | 27.7 | 72.3 | 27.5 | 72.5 |

## Differential Hours Worked in Agriculture as a Function of Attachment to the Agriculture Sector

*Exhibit 2.4* presents one final picture of the working behavior of those attached only to the agriculture sector versus workers who found employment in both the agriculture and nonagriculture sectors in 2006. There is no fundamental shift in the proportion of agriculture-only workers who work less than 680 hours per year, for 2006 compared to 2005. The same is true of individuals who worked in both sectors. An estimated 54.3 percent of agriculture-sector-only workers worked less than 680 hours in 2005 and 2006. For those who worked in both sectors, somewhat more than 27 percent of the individuals worked less than 680 hours in agriculture during both years.

## Current and Constant Dollar Wage Rate Increases in Key Agriculture Sectors

Statistical evidence from NASS data sources indicates that constant dollar hourly wage rates rose in the Pacific Region in 2006. Data from the UI Wage File for the state of Washington maintained by LMEA are consistent with the NASS findings. The overall demand for seasonal agricultural labor is dominated by tree fruit production. *Exhibits 2.5, 2.6*, and *2.7* show the annual average changes in hourly wage rates for cherry production, apple production, and the production of pears. As is discussed more fully in *Chapter 3*, these data present further evidence concerning the issue of changing demand and/or supply of seasonal agricultural labor in the state for 2006.

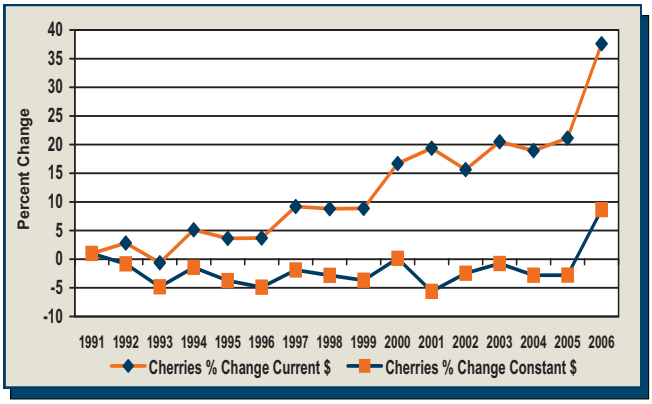
As the three exhibits show, current dollar hourly average wage rates rise for all three crops over the period 1991 to 2006. This reflects that, other things equal, farm producers must offer wage rates that take account of the general increase in the price level – inflation – over time. But, current dollar wage rates are not necessarily evidence of a rise in what are termed real or constant dollar wage rates. *It is constant dollar wage rates that are the indicator of whether, in fact, there has been an increase or decrease in the wage rate due to some factor other than inflation*.

### *Cherries*

2006 was an unusual production year for sweet cherries. The cherry harvest was larger than the previous year, the onset of harvest was later, and unfavorable weather – rain – affected the harvest process. Cherry growers needed a significant increase in labor compared to the previous year. As a result, we see that constant dollar hourly average wage rates, after

being reasonably stable for over a decade, rose sharply in one season by an estimated 8.6 percent. (The constant dollar base year is 2000 in these three exhibits.) There is consistent evidence that seasonal employment increased in response to this increase in the constant dollar hourly average wage rate. As *Chapter 3* discusses more fully, these data suggest that there was an increase in demand for seasonal agricultural labor.

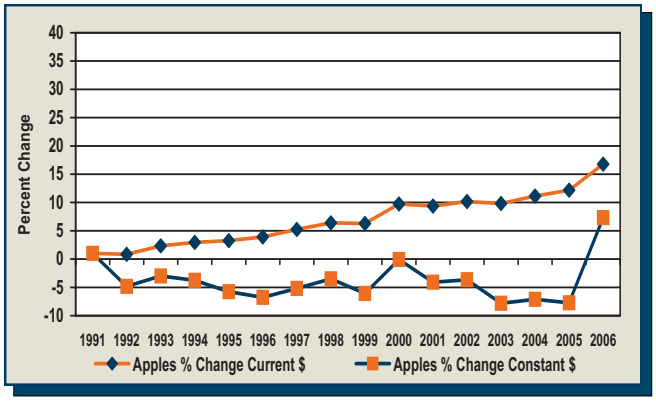
**Exhibit 2.5**
Current and Constant Dollar Percent Change in Hourly Average Wage Rate, Cherries
Washington State, 1991 to 2006, Third Quarter Data, Base Year = 2000
*Source:* ESD/LMEA, Appendix Exhibit 2.1




## *Apples*

The late onset of the cherry harvest resulted in a longer harvest season that impinged on the beginning of the apple harvest. Workers who might have shifted smoothly from picking cherries to picking apples were tied up in the cherry harvest for several more weeks. A likely outcome of this effect is to put pressure on apple growers to increase constant dollar hourly average wage rates. Such an increase would help hold the workers they currently had on board and help increase the quantity of labor supplied as well. *Exhibit 2.6* also shows a reasonably stable level of constant dollar hourly average wage rates in the apple sector, with constant dollar wage rates tending to drop from 2000 to 2005. But, constant dollar wage rates surged in 2006 by 7.3 percent – lower than the surge in cherries, but still quite large. The apple harvest in 2005 is estimated at 5,800 million pounds; for 2006 the estimate is 5,700 million pounds – slightly smaller than the previous year.[12] Apple producers did not need an increase in seasonal labor relative to 2005 in order to harvest the 2006 crop. Thus, apple producers were most likely raising constant dollar wage rates in response to the surge in demand for seasonal workers in the cherry producing sector.

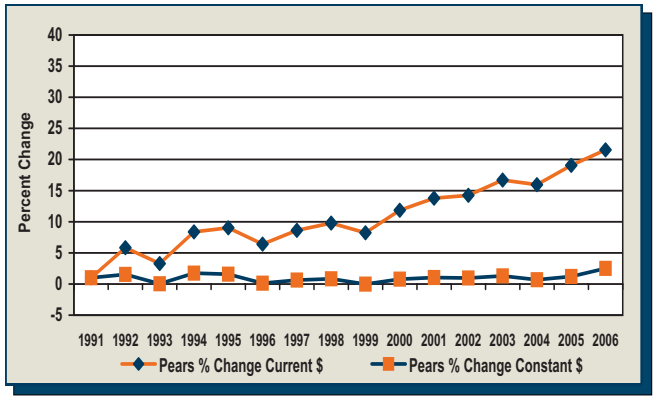
**Exhibit 2.6**
Current and Constant Dollar Percent Change in Hourly Average Wage Rate, Apples
Washington State, 1991 to 2006, Fourth Quarter Data, Base Year = 2000
*Source:* ESD/LMEA, Appendix Exhibit 2.1




## *Pears*

The situation with pears in 2006 is similar to that of apples. The harvest seasons are co-extensive, though the pear harvest peaks earlier than that for apples. In 2005, combined production of Bartlett and winter pears was 413,000 tons.[13] This fell to 367,000 tons in 2006. Yet, even with a smaller crop, constant dollar hourly average wage rates rose in pear production by 2.5 percent. Seasonal employment rose by a small amount, so that, on the whole, pear producers also appeared to be responding to the late harvest season in cherries in order to acquire and keep their harvest labor force.

**Exhibit 2.7**
Current and Constant Dollar Percent Change in Hourly Average Wage Rate, Pears
Washington State, 1991 to 2006, Third Quarter Data, Base Year = 2000
*Source:* ESD/LMEA, Appendix Exhibit 2.1



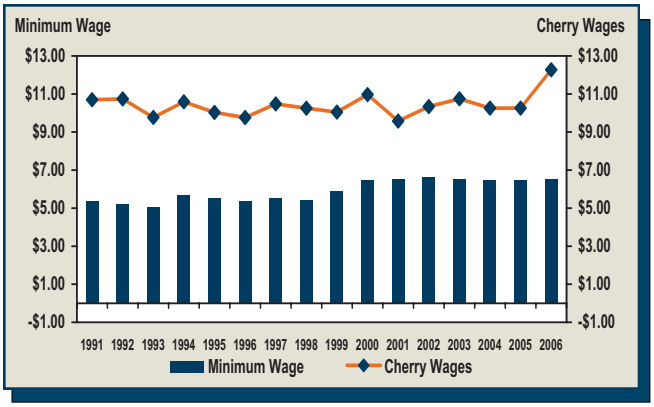
## The Minimum Wage – An Update of the Data

Consistent with the analysis begun in the *2005 Agricultural Workforce in Washington State* report, we present an update of the constant dollar relationship between the Washington state minimum wage and the constant dollar wage growth in three key tree fruit sub-sectors – cherries, apples, and pears.[14] These sub-sectors dominate the demand for seasonal labor in the state. The updated line graphs are shown in *Exhibits 2.8, 2.9,* and *2.10.*

### *Cherries*

Since the year 2000, the constant dollar value in terms of year 2000 dollars of the state minimum wage, has ranged from $6.46 (2005) to $6.61 (2002). During that period, the constant dollar, before-tax hourly average wage rate of cherry workers as reported in the LMEA UI Wage Files, has ranged from a low of $9.58 in 2001, down from $10.97 in 2000 to a high of $12.27 in 2006. The 2006 estimate is a two-dollar increase in one year during the time that the state minimum wage remained constant. While it is possible that there are some jobs that could be lost in this sub-sector due to the increase in the current dollar minimum wage from $7.35 an hour in 2005 to $7.63 in 2006, the number cannot be large.

**Exhibit 2.8**
Constant Dollar Hourly Average Cherry Wage Rates
and the State Minimum Wage
Adjusted to Year 2000 Dollars
Washington State, 1991 to 2006, Third Quarter Data
*Source:* ESD/LMEA, Appendix Exhibit 2.2

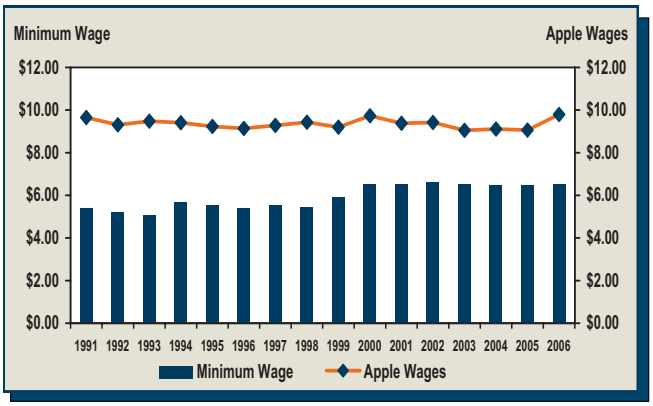



Note that the current dollar value of the hourly average wage rate for field hands in Washington and Oregon combined for 2006 is $10.25. In a competitive market, agricultural producers who offer only the minimum wage are not going to find many takers. Finally, note that in the final analysis, wage rates in the agriculture sector are going to be driven by wage rates in the overall state, regional, and national economies. Thus, while economic theory unambiguously predicts a loss in jobs as the minimum wage rate is increased, any effect in the real world has to be related to the overall wage level and economic activity in the economy, not just in agriculture.[15]

### *Apples*

As graphed in *Exhibit 2.9*, the constant dollar hourly average wage rate in apple production has varied from a low of $9.05 in 2003 to a high of $9.79 in 2006. In 2000, when the current state minimum wage law took effect, the constant dollar value of the hourly average wage rate in apples was $9.73. It was as high as $9.65 in 1991. However, in 2005 the estimate was $9.06 and the wage rate jumped to $9.73 in one year, while the constant dollar value of the state minimum wage was essentially unchanged.

**Exhibit 2.9**
Constant Dollar Hourly Average Apple Wage Rates
and the State Minimum Wage
Adjusted to Year 2000 Dollars
Washington State, 1991 to 2006, Fourth Quarter Data
*Source:* ESD/LMEA, Appendix Exhibit 2.2

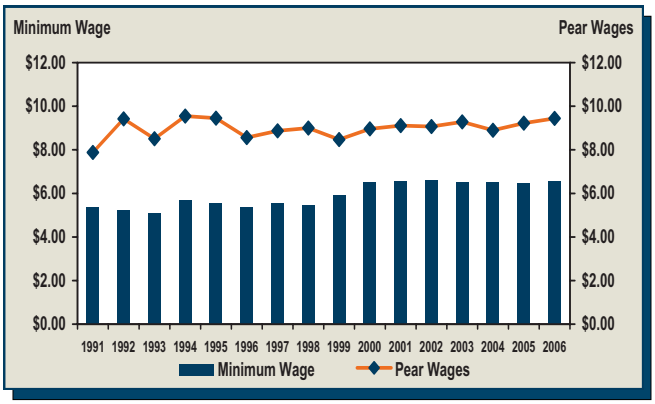



### *Pears*

The experience in pear production, though not as dramatic as in cherries, or as quantitatively important for the agricultural labor market as apples, is consistent with the accounts for cherries and apples. In 2000, the constant dollar hourly average wage rate was estimated at $8.96 per hour. Its highest constant dollar value occurred in 1994, estimated at $9.55 per hour.

In 2005, it was estimated at $9.22 per hour. It jumped up in constant dollar terms to $9.44 in 2006, still below its estimated high in 1994.

**Exhibit 2.10**
Constant Dollar Hourly Average Pear Wage Rates and the State Minimum Wage
Adjusted to Year 2000 Dollars
Washington State, 1991 to 2006, Third Quarter Data,
*Source:* ESD/LMEA, Appendix Exhibit 2.2




In summary, it appears that the hourly average wage rates in the tree fruit industry are, on the average, too high to be affected by the state minimum wage to any policy-significant degree.

## The Adverse Effect Wage Rate[16]

In contrast to the previous discussion concerning the state's minimum wage, the *Adverse Effect Wage Rate* (AEWR) can actually have some bite in it if immigration reform results in an enforced Guest Worker Program that specifies an AEWR plus compensation for housing and transportation.[17] Should the annual influx of undocumented immigrants from Mexico and Central America be effectively shut down and agricultural producers become reliant on some new version of the H-2A Program, then it is likely that growers will have to face significant issues with respect to what crops to plant as well as issues of capital/labor substitution, in light of the fact that labor will become relatively more expensive than capital in constant dollar terms.[18]

*Exhibits 2.11* and *2.12* set forth the simple dimensions of the issue. For 2006, for the Pacific Region (Washington and Oregon), the AEWR for all hired workers is set at $10.37 per hour. For field workers only, it is set at $9.68 per hour and for field and livestock workers it is set at $9.77 per hour. All of these hourly wage rates are much higher than the 2006 state minimum wage rate of $7.63. Referring to previous discussion, pear and apple production can clearly be affected, while cherries may have some breathing space.

**Exhibit 2.11**
Total Workers Potentially Affected in Agriculture Sub-sectors Paying Hourly Average Wage Rates Below the Washington Adverse Effect Wage Rate and the State Minimum Wage Rate
Washington State, 2006
Source: ESD/LMEA, UI Wage File and NASS, Farm Labor, released November 17, 2006, as well as the following website:
**http://www.nass.usda.gov/Newsroom/Notices/ADVERS.pdf**

| | Adverse Effect Wage Rate | | | Minimum Wage |
|---|---|---|---|---|
| | All Hired | Field | Field and Livestock | Rate |
| | $10.37 | $9.68 | $9.77 | $7.63 |
| NAICS Paying Below The AEWR or the State Minimum | $9.78 Corn Farming - 224 Workers<br>$9.85 Grape Vineyards - 5,902 Workers<br>$9.96 Strawberry Farming - 374 Workers<br>$10.26 Apple Orchards - 35,711 Workers | $9.18 Tree Nut Farming – 17 Workers | None | None |
| Total Workers | 42,211 | 17 | 0 | 0 |
| Mean Wage Rate, Estimated by NASS October 8-14, 2006 | $10.85 | $10.25 | $10.31 | |

**NOTE:** The unit of observation is the total number of workers with unduplicated Social Security numbers ever employed in a given sub-sector. This is not a count of the number of jobs affected. Hourly average wage rates by NAICS are compared with the specific AEWR for 2006.

**Exhibit 2.12**
Agriculture Sub-sectors Paying Hourly Before-Tax Average Wage Rates Above $13.00 per Hour
Washington State, 2006
*Source:* ESD/LMEA, UI Wage File

| Hourly Average Wage Rate | Sub-Sector | Workers Affected |
|---|---|---|
| $13.02 | Wheat Farming | 2,550 |
| $13.18 | Hog and Pig Farming | 6 |
| $13.22 | Dairy Cattle and Milk Production | 3,751 |
| $13.29 | Other Poultry Production | 27 |
| $13.66 | Horses and Other Equine Production | 156 |
| $13.83 | Crop Harvesting, Primarily by Machine | 199 |
| $13.91 | All Other Animal Production | 111 |
| $14.42 | Poultry Hatcheries | 10 |
| $14.49 | Cattle Feed Lots | 506 |
| $15.28 | Chicken Egg Production | 768 |
| $16.82 | Shellfish Farming | 587 |
| $17.04 | Broilers and Other Meat-type Chicken Production | 51 |
| $18.23 | Soil Preparation, Planting and Cultivating | 959 |
| $18.98 | Fin Fish Farming and Fish Hatcheries | 144 |
| **Total Workers Affected** | | **9,825** |

**NOTE:** The unit of observation is the total number of workers with unduplicated Social Security numbers ever employed in a given sub-sector. This is not a count of the number of jobs affected.

### *Potential Impact of the AEWR in Washington*

However, for 2005, given that housing and transportation must also be supplied by the farm operator using H-2A workers, the full cost of the AEWR was estimated to be about $12.74 per hour.[19] Given all of the uncertainties involved, let us simply round this up to $13.00 per hour. It is now possible to compare this hourly average wage rate with the array of hourly average wage rates paid across the full range of agriculture sub-sectors in 2006. The results are instructive.

First, as *Exhibit 2.11* shows, at the AEWR rate of $10.37 for all hired agricultural workers, it is clear that about 42,000 agricultural workers will be affected in the state, most of whom are workers in the apple production sub-sector. Grape vineyards are also significantly affected. The AEWR for field workers alone only affects 17 tree nut farming workers. As is shown, the AEWR for field and livestock workers and the state minimum wage are below the current estimated hourly average wage rates. But the apple sub-sector is hit and would require about a one percent increase in the current dollar wage rate, not counting the additional costs of housing and travel that must be paid to H-2A contract workers.

Next, go to *Exhibit 2.12*. This exhibit shows the workers in the agriculture sector who are paid well above an average of $13.00 per hour. Only about 10,000 workers (9,825) escape the effect of the AEWR minimum. An estimated 2,550 are in wheat farming, which is very land intensive and capital intensive. Another 3,751 workers are estimated to be in dairy cattle and milk production. The rest are scattered among 12 other sub-sectors. Remember again that these data are not a count of the number of jobs, but rather the number of workers who have held a job in the given sector, for however long, during the 2006 production year.

Finally, consider all those workers who are currently paid an hourly average wage above $10.37 per hour, but who earn $12.99 per hour or less during 2006. This number, a count of unduplicated Social Security numbers ever employed in agriculture during the 2006 production year, amounts to 90,000 workers (by actual count, 89,998). It is a given that housing and transportation will have to be paid. Some farm operators and farmer representatives are proposing that a one to two dollar an hour premium be added to the AEWR in lieu of farm producers having to provide housing on site. If Congress ultimately adopts this suggestion, then the AEWR would rise to $12.37 per hour for 2006. Only sweet cherry pickers, at an average of $12.27 per hour, came anywhere close to this number in 2006 in the tree fruit sub-sector.

In summary, the AEWR, depending on the level at which it is set, can have a large impact on agricultural employment in the state.

## General Summary

### *The Economic Setting:*

- Hourly average wage rates in agriculture rose nationally during 2006, but the increase in the Pacific Region – Oregon and Washington – at 9.6 percent was approximately twice as high as the national average.

- The increase in demand for seasonal agricultural labor due to the sweet cherry harvest is part of the reason for this increase, but the booming Washington state economy is also a contributor since agricultural wage rates are set

largely by the nonagriculture sector of the economy. Farmers must raise the wage rates they offer to keep needed workers from drifting away into the nonagriculture sector. Note that in 2005, annual average earnings in direct agriculture production were only $17,971 compared to $36,691 in value-added agriculture manufacturing. The incentives to workers presented by such a very large earnings (not hourly wage rate) differential are easy to see.

- At 6,852 firms, the number of firms in Washington involved in direct agriculture production dropped by 3.0 percent in 2005 compared to 2004.
- At 964 firms, the number of firms involved in value-added manufacturing dropped by 8.9 percent in 2005 compared to 2004.
- The 74,278 jobs in direct agriculture production for 2005 represent a 1.7 percent increase over 2004.
- Total jobs in value-added agriculture manufacturing fell by 2.0 percent over the same time period.
- Annual total earnings in direct agriculture production rose by 4.5 percent in current dollars; this represents a 1.0 percent increase in constant dollars for 2005 compared to 2004.
- In contrast, annual total earnings in value-added agriculture manufacturing rose by 2.6 percent in current dollars but fell by 0.9 percent in constant dollars.
- Annual average before-tax earnings per job in production agriculture rose by 3.1 percent in current dollars, but fell by 0.4 percent in constant dollars for 2005 compared to 2004.
- Annual average before-tax earnings per job in value-added agriculture manufacturing rose by 4.7 percent in current dollars and 1.2 percent in constant dollars over the same period.

### *Wage Rate Changes in Key Agriculture Sectors:*

- Estimated hourly average wage rates in cherry production rose 8.6 percent in constant dollars during the 2006 production year.
- The comparable figure for apples, which dominate seasonal agricultural employment, is 7.3 percent.
- The figure for pears is 2.5 percent.

### *The State Minimum Wage*

Overall labor demand conditions, and not the minimum wage, are likely the major influence on the increase in constant dollar wage rates in 2006. Hourly average wage rates were about $2.00 an hour higher than the state minimum wage rate. At the margin, some jobs could still be affected by the state minimum wage rate. Estimates indicate that the number of jobs affected for the agriculture and nonagriculture sectors, statewide, would be small.

### *The Adverse Effect Wage Rate*

Should a new immigration reform bill be passed that results in an enforced Guest Worker Program, the Adverse Effect Wage Rate will become an important concern affecting the costs of agricultural labor in the state. The jobs held by all but 10,000 or so workers employed in direct agriculture production in the state would be affected by the AEWR in 2006.

## Endnotes

[1] There is impressionistic information suggesting that the widespread use of cell phones is making the market more competitive in favor of the workers (*see Chapter 3*).

[2] Levine, Linda, "Farm Labor Shortages and Immigration Policy," CRS Report for Congress, Congressional Research Service, The Library of Congress, updated March 29, 2006, p. CRS-14.

[3] The NASS data are collected quarterly. These NASS data are the basis for setting the Adverse Effect Wage Rate – one more reason for working with these data rather than the NAWS data.

[4] United States Department of Agriculture, National Agricultural Statistics Service, *Farm Labor.* Editions released in 2006 on February 17, May 19, August 18, and November 17.

[5] Comparable data are shown in *Appendix Table 10* in: *2005 Agricultural Workforce in Washington State*, July, p. 108.

[6] *Washington Fruit Survey 2006*, posted online December 4, 2006, p. 7. Apples, Bartlett pears, winter pears, all pears, peaches, apricots, and prunes and plums have all reduced acreage between 2001 and 2006. Sweet cherries, tart cherries, and nectarines have all increased acreage over this time period.

[7] Recall that earnings are the product of the hourly wage rate times the hours worked for each individual worker. Thus, if constant dollar earnings did not change between the two years, even if the hourly average wage rate rose, then hours worked had to have fallen. If hours worked fell per worker and the number of workers changed little if at all, this is also suggestive of no apparent shortage of labor.

[8] Washington State Economic and Revenue Forecast Council, *Washington State Economic Climate Study*, Volume XI, October 2006, Table 1, p. 7; Table 6, p. 17; and Table 14, p. 33.
**http://www.erfc.wa.gov/pubs/clim1005.pdf**

[9] As agricultural workers age, they tend to drift away from agriculture and take up jobs in the nonagriculture sector. Levine, Linda, "Farm Labor Shortages and Immigration Policy," CRS Report for Congress, Congressional Research Service, The Library of Congress, updated March 29, 2006, p. CRS-6. Note also that 26,323 workers who were employed only in agriculture in 2005 became employed in nonagriculture sectors in 2006, earning an average of $13.43 per hour. Source: ESD/LMEA, UI Wage File.

[10] This discussion is taken directly from: United States Department of Agriculture, Economic Research Service, "Off-Farm Income, Technology Adoption, and Farm Economic Performance," Economic Research Report Number 36, January 2007, pp. iii-iv.

[11] Recent evidence suggests that the flow of migrant workers from Mexico did not slacken until after the midpoint of 2006. Pew Hispanic Center, "Indicators of Recent Migrant Flows from Mexico," *Fact Sheet*, Washington, D.C. May 30, 2007.

[12] United States Department of Agriculture, National Agricultural Statistics Service, Press Release, "Washington's 2006 Apple Production Lower, 2006 Grape Production Lower," released October 12, 2006.

[13] United States Department of Agriculture, National Agricultural Statistics Service, *AGRI-FACTS*, posted online January 29, 2007.

[14] Holland, David W. and Sanjoy Bhattacharjee, and Leroy Stodick, *Assessing the Economic Impact of Minimum Wage Increases on the Washington Economy: A General Equilibrium Approach*, Working Paper Series, WP 2006-12, School of Economic Sciences, Washington State University, Pullman, WA 99163, September 25, 2006, p. 14. This study uses a more general (realistic) version of input-output analysis to estimate the net impact of increasing the Washington state minimum wage in 2002 by 5 percent in one year. In their estimation, the range of job loss, on a base of 85,000 minimum wage jobs in the state at that time, is on the order of 2,000 to 4,000 jobs – a loss of 2.4 percent to 4.7 percent of the minimum wage job pool. The wage bill for all remaining minimum wage job holders would increase by an estimated $22.6 million, while losses elsewhere in the state economy are estimated to be about $14 million. The net gain in benefits to the state is the difference between these two estimates, $8.6 million. Low income households have a slight increase in economic well being and high income households have a slight decrease in economic well being. The authors point out that "National cyclical effects or even price shocks in important industries can generate state level employment effects far larger that (sic) the total economy job impacts estimated in this paper."

[15] Emerson, Robert D. "Agricultural Labor Markets and Immigration," *Choices*, Vol. 22, No. 1, 2007, p. 58.
**www.choicesmagazine.org.**

[16] The AEWR is a type of "prevailing wage" measure. It is calculated by NASS using data from its quarterly sample survey of agricultural producers. The following email exchange from Chris Messer, director of the NASS office for Washington state to Dan Fazio, Director of Employer Services, Washington Farm Bureau, dated February 5, 2007, is instructive:

> "In response to your questions and concerns below, I can give you some details on the quarterly samples. First, samples are drawn from the population of operations that meet the USDA farm definition – produce and sell $1,000 worth of products in a year, or normally sell $1,000 worth of products in a year. The sample is stratified or put in categories based on two criteria – the priority is based on the peak number of hired workers in a year. The secondary factor is a calculated farm value of sales. We also sample some labor intensive, uncommon commodities to make sure we have those uncommon farm types represented. Those are nurseries, mushrooms, fruits, tobacco, potato, dairy, cotton, peanuts, rice, sugar beets, and sugarcane. Obviously, not all of these commodities apply to Washington or to the Pacific Region (Oregon and Washington). Response rates vary due to the activities conducted, weather related issues, and other factors. We strive to get the best information we possibly can for the reference week in our short data collection window. Our quarterly sample size for the Pacific Region is over 500."

[17] The bill in question, defeated in the Senate, is the Comprehensive Immigration and Reform Act of 2007 (S1348). An earlier version, the Comprehensive Immigration and Reform Act of 2006 (S2611), was passed by the Senate in May 2006.

[18] The example of the mechanization of California's processing tomatoes is instructive. As of 1960, approximately 45,000 Mexican seasonal agricultural workers picked the California processing tomato crop. The Bracero Program was shut down in 1964. In response, there was a sharp increase in agricultural wage rates. In 1961, in California, 25 mechanical tomato pickers were employed. By 1968, approximately 80 percent of the crop was harvested mechanically. Government-funded research helped fund a research program that resulted in a processing tomato crop that ripened simultaneously, thus allowing efficient mechanical harvesting. See Martin, Philip, "Farm Labor Shortages: How Real, What Response?" Department of Agricultural Economics, University of California – Davis. June 2, 2007, pp. 6-7. See also Emerson, Robert D., "Agricultural Labor Markets and Immigration," *Choices*, Vol. 22, No. 1, 2007, p. 60. **www.choicesmagazine.org.**

[19] Washington State Employment Security Department, Labor Market and Economic Analysis Branch. *2005 Agricultural Workforce in Washington State*, July 2006, footnote 45, p. 28.

# Chapter 3

## Agricultural Employment and the Issue of a 2006 Seasonal Labor Shortage[1]

### Introduction

Agricultural producers in Washington state have a continuing concern over the availability of a trained seasonal labor force at the times of increased demand for seasonal workers. This concern is heightened by two factors.

First, there is concern over the impact of weather on the maturation of harvest, and the quality and quantity of each season's crops, as well as the ripening and storage characteristics of each crop relative to the optimal time frame for harvest. This set of phenomena can be thought of as contributing yearly to a short-run, seasonal shortage (or surplus) across the growing and harvesting season, among crops, and across locations. Thus, such shortages (surpluses) can be localized or statewide. They can vary from month to month, and by crop. The highlighted boxes of media headlines starting on page 29 demonstrate the variety of opinions on such "spot" shortages over the course of the harvest season across the state. Note that local opinions fall on both sides of the issue, depending on time and place.

Second, there is a concern that changes in immigration policy and enforcement of immigration laws may permanently reduce the year-to-year supply of seasonal agricultural workers.

These phenomena – weather, growing and harvest periods, crop yield, and national policy on immigration – create significant week-to-week and even day-to-day uncertainty in the agriculture production process. It is this uncertainty that creates and intensifies the concern over a chronic shortage of labor.

### *Question: Was There a Season-to-Season Shortage in 2006?*

The example of the fresh sweet cherry harvest between 2005 and 2006 is illustrative of a season-to-season shortage concern. Changes in weather conditions change the onset of the harvest season for any given crop, thus affecting the timing of the surge in demand for experienced, seasonal agricultural labor. This happened to the sweet cherry crop in 2006 compared to 2005. The situation created a significant challenge to cherry growers, and, subsequently, to apple growers, since workers who harvest cherries are close substitutes to workers who harvest apples.[2]

Size and quality of harvest vary by year. *Exhibit 3.1* shows that between 2005 and 2006, total acreage planted in sweet cherries increased 3.45 percent while the total harvest of sweet cherries increased 14.7 percent, from 102,695 tons to 117,788 tons![3] Clearly, these year-to-year fluctuations in total harvest *alone* are enough to give concern to cherry producers over the adequacy of their day-to-day seasonal labor supply.

Annual variations in weather conditions add an extra measure of uncertainty. First, in 2005 the surge in seasonal labor demand for harvesting cherries peaked in June. However, in 2006, the surge peaked in July. As a result, the cherry harvest overlapped into the onset of the apple harvest. Second, "Heavy rain and cool weather caused problems for...cherry producers during harvest."[4]

Contrast the monthly pattern of demand during the cherry harvest for seasonal labor in 2005 with that of 2006. Labor demand increased in May 2006 by a factor of 2.4 times, or 240 percent (1,396 / 581 = 2.40 x 100 = 240 percent). For June 2006, it fell by 27.3 percent of June 2005. For July 2006, seasonal employment surged again by a factor of 2.4 times (240 percent) compared to the previous year. For August, the seasonal quantity of labor supplied in the cherry harvest was 15.05 times larger in 2006 compared to 2005!

**Exhibit 3.1**
The Surge in Seasonal Employment in Total Cherry Production Washington State, 2006 Compared to 2005
*Source:* For Bearing Acreage: USDA, NASS, *2006 Washington Annual Agriculture Bulletin*. For Sweet Cherry Production, Washington State Only, *Washington Fruit Commission, Yakima, Washington. Phone conversation: May 3, 2007*. ESD/LMEA *Agricultural Labor Employment and Wage Trends* for Seasonal Agricultural Labor Employed

| | Seasonal Labor Employed | | | | | |
|---|---|---|---|---|---|---|
| Year and Percent Change | Total Cherry Production | | | | Sweet Cherries Only | |
| | May | June | July | August | Bearing Acreage | Total Tons Harvested |
| 2005 | 581 | 22,663 | 13,446 | 498 | 29,000 | 102,695 |
| 2006 | 1,396 | 16,475 | 32,302 | 7,494 | 30,000 | 117,788 |
| 2006 as a Percent | 240.0 | -27.3 | 240.0 | 1,505.0 | 3.45 | 14.7 |

As noted, the end of the cherry harvest overlaps with the beginning of the apple harvest. In August 2005, only an estimated 498 workers were continuing their activities in the cherry orchards. However, for August 2006, there were 7,494 seasonal agricultural workers still laboring in the state's cherry orchards. Other things equal, there were 7,000 fewer seasonal workers immediately available in August to assist in the state's apple harvest, since this number of workers was committed to harvesting cherries. In sum, these dramatic year-to-year seasonal changes explain much of the concern of agricultural producers over the adequacy and timeliness of the supply of seasonal agricultural workers.

> "We're a little tight in Mattawa, but we seem to be getting the job done,…" *Wenatchee World*. "No serious shortage of labor in this area (Wenatchee). Cherries: 'A little tight,' but 'getting the job done.'" ***June 28, 2006***

### *Question: What Defines a Shortage That Can Persist Over Time?*

One can also think of a chronic, year-to-year inadequate supply of labor induced by such factors as tightening of the United States-Mexico border, increased frequency of raids to apprehend undocumented workers, a costly and bureaucratically complex H-2A program, or a shift of agricultural workers, regardless of legal status, out of agriculture and into other occupations and industries.[5] These types of political and economic shocks can lead to a permanent, long-run decline in the supply of seasonal agricultural labor. The result, until wage rates are increased, is the reality or perception of a labor shortage.

## What Happened? Seasonal Agricultural Employment — 2005 Compared to 2006

As *Exhibit 3.2* shows, there was an overall *increase* of annual average seasonal workers employed in 2006 compared to 2005. The numbers increased from 29,842 in 2005 to 32,015 in 2006. This 7.3 percent increase represents an additional 2,173 workers or 26,076 worker/months.[6] Annual average employment in apple production was maintained between the two years at around 15,000 workers. But annual average employment in total cherry production increased by 57.6 percent from an estimated 3,230 workers in 2005 to 5,092 in 2006. This is an increase of over 22,000 worker/months (5,092 - 3,230 = 1,863 x 12 months = 22,344 worker/months). Thus, about 86 percent of the increase in demand for seasonal workers in 2006 was due to conditions in a single crop – cherries.

**Exhibit 3.2**
Seasonal Agricultural Employment by Region and Crop
Washington State, 2005 Compared to 2006
*Source:* ESD/LMEA, Agricultural Labor Employment and Wage Trends

| | 2005 Annual Average Employment | 2006 Annual Average Employment | 2005-06 Change | 2005-06 Percent Change |
|---|---|---|---|---|
| **State Totals** | **29,842** | **32,015** | **2,173** | **7.3%** |
| **Area Totals** | | | | |
| Western Area 1 | 3,885 | 4,071 | 186 | 4.8% |
| South Central Area 2 | 7,233 | 9,314 | 2,081 | 28.8% |
| North Central Area 3 | 8,482 | 8,510 | 28 | 0.3% |
| Columbia Basin Area 4 | 5,326 | 4,606 | (720) | -13.5% |
| South Eastern Area 5 | 5,656 | 5,118 | (538) | -9.5% |
| Eastern Area 6 | 304 | 395 | 91 | 30.0% |
| **Crop Totals** | | | | |
| Apples | 15,011 | 15,478 | 467 | 3.1% |
| Cherries | 3,230 | 5,092 | 1,862 | 57.6% |
| Pears | 727 | 1,091 | 364 | 50.0% |
| Other Tree Fruit | 882 | 699 | (183) | -20.7% |
| Grapes | 1,047 | 1,183 | 136 | 12.9% |
| Blueberries | 341 | 344 | 3 | 0.8% |
| Raspberries | 879 | 1,018 | 139 | 15.9% |
| Strawberries | 381 | 233 | (148) | -38.7% |
| Bulbs | 168 | 305 | 137 | 81.5% |
| Hops | 300 | 448 | 148 | 49.2% |
| Nurseries | 1,486 | 1,310 | (176) | -11.8% |
| Wheat/Grain | 166 | 170 | 4 | 2.3% |
| Asparagus | 1,147 | 1,029 | (118) | -10.3% |
| Cucumbers | 205 | 56 | (149) | -72.5% |
| Onions | 909 | 512 | (397) | -43.6% |
| Potatoes | 820 | 1,186 | 366 | 44.6% |
| Misc. Vegetables | 854 | 789 | (65) | -7.6% |
| Other Seasonal Crops | 1,291 | 1,073 | (218) | -16.9% |

### *Changes in Annual Average Employment by Agricultural Reporting Areas*

Annual average seasonal employment by agricultural area varies sharply between 2005 and 2006. Seasonal agricultural employment in the South Central area increased from an annual average of 7,233 seasonal workers to an annual average of 9,314 seasonal workers, or by 28.8 percent. (See *Appendix Exhibit 3.1* for a map of the Agricultural Reporting Areas and the counties they contain.) In contrast, the South Eastern area annual average employment of seasonal workers dropped from

5,656 workers to 5,118 seasonal workers, or a decline of 9.5 percent. The annualized supply and demand for seasonal agricultural labor remained essentially unchanged for the North Central area between 2005 and 2006. And in the Columbia Basin area, the annual average employment of seasonal agricultural labor actually decreased by 13.5 percent between 2005 and 2006.

> "Longtime berry growers, …, discuss their labor shortages July 9 in Woodland. Farms across the state are facing a huge labor shortage this growing season, as tighter security across the U.S.-Mexico border has crimped the supply of migrant farm workers." *The Bellingham Herald*. "Labor shortage leaves berries unpicked." ***July 18, 2006***

In summary, seasonal agricultural labor allocated itself much differently geographically between 2005 and 2006. As the seasonal agricultural labor force adjusts to these regional differences in the demand for labor, regional short-term spot labor shortages can develop.

Given the restricted time frames for optimal harvest quality for a given crop or crop variety, such spot labor shortages, even if lasting only a few days, are of major concern for growers. In just a few days, an apple intended for the fresh produce market can turn into a juice apple, with a resulting loss in revenue. If a sufficient labor force cannot be found to work the crops at a labor cost that will still yield the growers a profit, growers will lose revenue while fruit stays on the trees unpicked. At the very least, farmers will have to choose which acreage to harvest and which to let go, and when to cut off harvest in terms of the marketability of the produce in question.

### *Other Changes in Annual Average Employment by Crop*

As the discussion of cherry and apple production above demonstrates, the changes in annual average employment by other crops reveal additional shifts and dislocations in the supply and demand of labor that can develop between growing years. Though the absolute number of workers involved is relatively small, employment in pears surged 50.0 percent between 2005 and 2006. Grape employment increased between the two years by 12.9 percent; again, the absolute increase in workers employed is small – 136 workers, or 1,632 worker/months.

In contrast, asparagus continued its long-term decline in employment by 10.3 percent, from 1,147 an annual average of workers in 2005 to 1,029 workers in 2006.[7]

Other tree fruit, strawberries, nurseries, cucumbers, onions, miscellaneous vegetables, and other seasonal crops all experienced declines in employment, totaling 1,336 workers, or about 16,032 worker/months.

## Economic Evidence of a Labor Shortage During 2006 Based on Employer Interviews

Given the concern in recent months over illegal immigration, this chapter also focuses on grower concerns over a continuing year-to-year seasonal labor shortage caused by such factors as tightening of the border and increased raids to find and deport undocumented workers. This issue is discussed by contrasting wage rates and employment in 2005 versus 2006.

### *Conceptual Definition of a Labor Shortage*

A labor shortage can be defined and measured statistically as *an excess demand for labor at the wage rate currently being offered*. For this kind of shortage to exist, the offered wage rate has to be below that which workers are willing to accept in a free and informed labor market. *Thus, an* ***increase*** *in the offered wage rate is evidence that employers do not have all the labor they need and are seeking additional workers.*

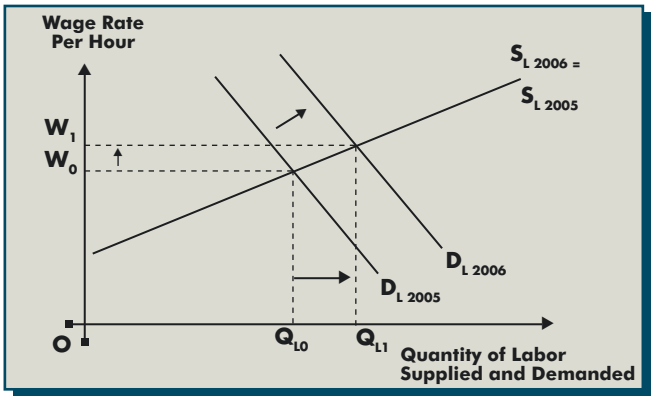
Thus, when producers experience a shortage of labor, they must pay higher wages in order to attract *and/or* keep a work force. Once a new equilibrium wage rate has been reached – the wage rate where supply of and demand for labor is balanced – the quantity of labor supplied will be adequate for the quantity of labor demanded, as more workers are willing to work at the higher wage rate. This is particularly true in the agricultural labor market of Washington state, since the seasonal agricultural labor force is highly mobile geographically and the seasonal labor market is competitive.[8]

It is important to note, however, that when one observes an actual empirical increase in the hourly wage rate, this increase could be due to a change in the demand for labor, a change in the supply of labor, or some combination of the two. Thus, a shortage that arises due to an increase in the demand for seasonal agricultural workers, holding seasonal labor supply constant, cannot be attributed to changed immigration policy.

### *Conceptual Discussion of a Shortage Due to an Increase in Demand for Seasonal Agricultural Workers*

*Exhibit 3.3* graphically depicts an economic model of the situation that can exist in the labor market for seasonal agricultural workers when the demand for seasonal labor increases for whatever reason, while the supply of labor does not change.

**Exhibit 3.3**
The 2006 Harvest Has Increased, Harvest Timing Has Changed, or Both – A Hypothetical Example




***Discussion:*** Increased border security and raids for undocumented workers have had little effect on the 2006 supply of seasonal agricultural labor. Instead, the demand for seasonal agricultural labor increased due to increased harvests, change in the timing of harvest for crops competing for the same labor, or some combination of the two. The result is that more workers are hired and they are paid higher hourly wage rates.

A standard demand curve and a standard supply curve for seasonal agricultural labor are shown. The supply curve shows that, as the wage rate offered by employers increases, the quantity of labor supplied offered by workers will increase. As the wage rate offered by employers increases, either more workers will enter that market, or workers will offer more hours of labor, or some combination of the two. The labor demand curve shows that as the wage rate for seasonal agricultural labor decreases, employers will move down along their demand curve for labor and demand greater quantities of labor, other things equal, either in terms of hiring more workers or by employing their current work force for a greater number of hours. Symmetrically, as the wage rate increases, employers will hire less labor and the labor they do hire will be of higher productivity – the farmers will tend to keep the better workers and to use them in higher economic value activities.

> "One reason for the labor shortage for apple picking is the dynamics of the state's recent cherry harvest." (Wapato) *The Seattle Times*. "Growers say fruit's ready, but workers are scarce." ***August 30, 2006***

The analysis of *Exhibit 3.3* displays a seasonal shift, an increase, in the demand for seasonal agricultural workers. This apparent demand shift for 2006 is particularly noticeable in cherries, but also in pears, and to a small extent, apples. *Exhibit 3.3* thus shows the demand curve for labor shifted up and out to the right. This shift has two effects. First, hourly average wage rates rise and second, in response to the rise in hourly average wage rates, the *quantity of labor supplied* (note the *Supply Curve*: $S_{L2006} = S_{L2005}$ which remains unaffected in this example) has increased. Thus, the *demand for labor increases* and the *quantity of labor supplied increases* in response to an *increase in the hourly average wage rate or its equivalent piece rate*.

*Exhibit 3.2* shows that the number of workers employed in cherries, apples, and pears increased between 2005 and 2006, though the average increase in apple employment is very small.

*Exhibit 2.5* shows a very sharp increase in the constant dollar hourly average wage rate for cherries, which reflects, at least in part, the strong surge in the demand for workers to harvest cherries in 2006 compared to 2005. Between 2005 and 2006, the constant dollar hourly average wage rate rose from $10.26 per hour to $12.27 per hour, a 19.6 percent increase *(refer back to Chapter 2, Exhibits 2.5, 2.6, and 2.7)*.

An orchardist in East Wenatchee "said he put out a sign on Monday looking for pickers and got so many he sent several to his neighbor's orchard." The *Wenatchee World*. "Worker shortage may leave fruit unpicked: Some companies having to sacrifice lower-value varieties to ensure premium fruit is harvested." ***September 21, 2006***

*Exhibit 2.6* shows the increase in the constant dollar hourly average wage rate for apples. The increase is not as sharp as for cherries but it reflects, at least in part, the response of apple growers to their realization that labor is being drained away by the continuing surge for seasonal workers in cherries. Between 2005 and 2006, the hourly average wage rate rose from $9.06 to $9.79 per hour, an 8.1 percent increase.[9]

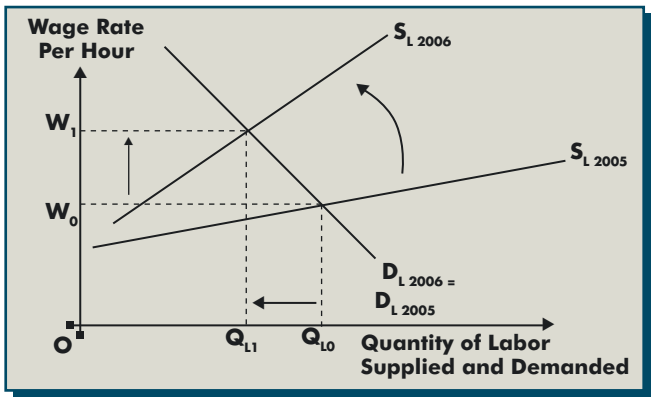
*Exhibit 2.7* shows the current and constant dollar hourly average wage rate for pears from 1991 to 2006. Between 2005 and 2006, the constant dollar hourly average wage rate for pears increased from $9.22 to $9.44 per hour, a 2.4 percent increase.

## *Conceptual Discussion of a Shortage Due to a Decrease in Supply of Seasonal Agricultural Workers*

Another phenomenon can be occurring in the seasonal agricultural labor market, even as the above apparent shift in demand is occurring. *Exhibit 3.4* depicts the hypothetical situation in which the demand for seasonal agricultural labor does not change, but the supply of seasonal agricultural labor is shifted sharply back and up to the left in response, for example, to the increased patrolling of the United States-Mexico border and in response to increase raids to discover and deport undocumented workers.

In this economic model of the seasonal labor market, the demand for labor does not change between 2005 and 2006. Instead, the supply of labor shifts back – *there are fewer seasonal agricultural workers available for work at any wage rate or piece rate*. As before, hourly average wage rates rise, but the *quantity demanded of labor drops back and to the left along the horizontal axis of the diagram*.

**Exhibit 3.4**
Illegal Border Crossing is Reduced and Raids for Undocumented Workers Are Increased – A Hypothetical Example




***Discussion:*** The demand for seasonal agricultural labor is known. Demand in 2006 is assumed to be the same or similar to 2005. However, increased policing of the border and increased raids for undocumented workers shift the supply of available seasonal agriculture up and to the left. Also, labor supply becomes less responsive to a given increase in hourly wage rates. The result is that fewer workers are hired in 2006 and they are paid higher wage rates.

In this case, the agricultural producers find themselves paying a higher wage rate, but working with fewer laborers at that higher wage rate. These fewer workers will, in general, be allocated to more productive activities.

## *Decrease in Supply or Increase in Demand? – A Resolution*

It is possible, though we cannot be absolutely certain, that both of the phenomena depicted above have occurred during 2006. Even though annual total average employment of seasonal agricultural workers increased, this does not mean that there could not have been a reduction in the supply of seasonal agricultural workers due to increased policing of our southern border and other actions taken to reduce the flow of undocumented workers from across the United States-Mexico border.[10] Such actions might also unsettle the usual migration pattern of workers up from California and Oregon into Washington. On the other hand, the offer of higher hourly wage rates could have induced workers in other sectors of the economy to enter the seasonal agricultural labor force, or induced individuals who are typically out of the labor force, such as high school students, to enter the seasonal agricultural labor force.[11]

The ESD/LMEA *Agricultural Labor Employment and Wage Trends* survey asks growers to identify the geographic origin of their hired seasonal agricultural labor force. The geographic categories are: *local, intra-state, inter-state, foreign,* and *unknown*. It is possible to compare the year-to-year geographic composition of the seasonal agricultural labor force. With respect to the question immediately above, we investigate the changing composition of *inter-state* and *foreign* seasonal agricultural workers employed in Washington during 2005 and 2006 (see *Appendix Exhibit 3.2* for the basic data).

*Exhibit 3.5* shows that, on net, the estimated total of inter-state plus foreign seasonal agricultural workers has decreased in 2006 compared to 2005 by 34,107 versus 37,886.[12] However, this is not the whole story.

"There's $3,500 an acre sitting here on these trees, and to be tied up without workers is ludicrous." Orchardist in Wapato. *Tri-City Herald*. "Where are the workers?" ***September 25, 2006***

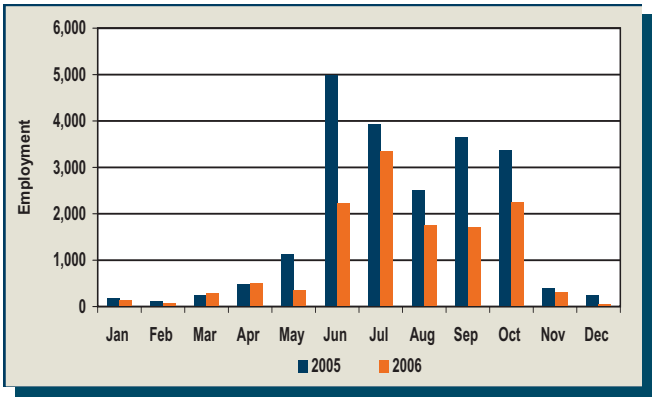
**Exhibit 3.5**
Change in Composition of Inter-State, Foreign, and Unknown Geographic Sources of Seasonal Agricultural Workers
Washington State, 2006 Compared to 2005
*Source:* ESD/LMEA, Appendix Exhibit 3.2

| Geographic Location of Agricultural Workers | June Workers | June Percent | July Workers | July Percent | August Workers | August Percent | September Workers | September Percent | October Workers | October Percent | Total Worker/Months |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **2006** | | | | | | | | | | | |
| **Total** | **56,168** | **100.0%** | **60,028** | **100.0%** | **43,341** | **100.0%** | **48,795** | **100.0%** | **45,786** | **100.0%** | **254,118** |
| Local | 31,865 | 56.7% | 41,732 | 69.5% | 31,369 | 72.4% | 33,471 | 68.6% | 24,674 | 53.9% | 163,111 |
| Intra-State | 859 | 1.5% | 498 | 0.8% | 1,074 | 2.5% | 1,049 | 2.1% | 1,542 | 3.4% | 5,022 |
| Inter-State | 2,226 | 4.0% | 3,354 | 5.6% | 1,749 | 4.0% | 1,707 | 3.5% | 2,256 | 4.9% | 11,292 |
| Foreign | 5,013 | 8.9% | 3,659 | 6.1% | 1,999 | 4.6% | 6,409 | 13.1% | 5,735 | 12.5% | 22,815 |
| Unknown | 16,205 | 28.9% | 10,785 | 18.0% | 7,149 | 16.5% | 6,160 | 12.6% | 11,585 | 25.3% | 51,884 |
| **2005** | | | | | | | | | | | |
| **Total** | **59,702** | **100.0%** | **55,724** | **100.0%** | **39,303** | **100.0%** | **51,135** | **100.0%** | **47,624** | **100.0%** | **253,488** |
| Local | 43,454 | 72.8% | 38,626 | 69.3% | 29,269 | 74.5% | 29,029 | 56.8% | 27,478 | 57.7% | 167,856 |
| Intra-State | 1,486 | 2.5% | 3,000 | 5.4% | 400 | 1.0% | 1,642 | 3.2% | 1,585 | 3.3% | 8,113 |
| Inter-State | 4,999 | 8.4% | 3,926 | 7.0% | 2,506 | 6.4% | 3,650 | 7.1% | 3,375 | 7.1% | 18,456 |
| Foreign | 3,056 | 5.1% | 2,613 | 4.7% | 4,023 | 10.2% | 5,326 | 10.4% | 4,412 | 9.3% | 19,430 |
| Unknown | 6,728 | 11.3% | 7,560 | 13.6% | 3,105 | 7.9% | 11,488 | 22.5% | 10,773 | 22.6% | 39,654 |

## *Evidence on the Movement of Inter-state Seasonal Agricultural Workers – Critical Harvest Months*

*Exhibits 3.6* and *3.7* graphically show the change between 2005 and 2006 for seasonal agricultural workers reported as inter-state arrivals to the Washington agricultural labor market.

**Exhibit 3.6**
Seasonal Agricultural Workers Identified by Growers as Being of Inter-State Origin, by Month
Washington State, 2006 Compared to 2005
*Source:* Exhibit 3.5

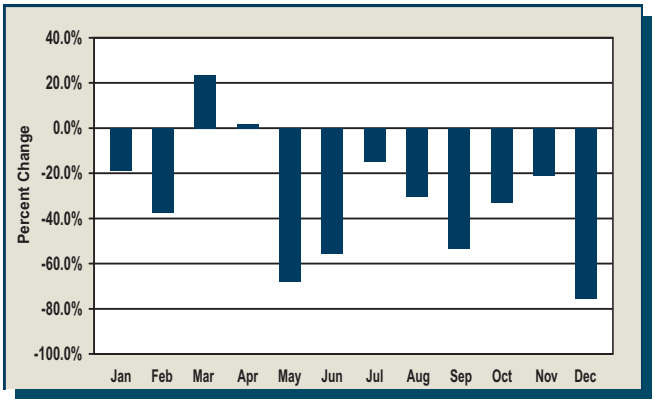



"Gregoire said the state departments of Agriculture, Employment Security, and Labor and Industries are trying to help farmers locate workers, but that farmers are having to pay a premium to get crews when the labor market is so tight." *Tri-City Herald*. "Governor to tour Mexico border, warns of farmworker shortage." ***September 25, 2006***

*Exhibit 3.6* shows that, for the critical growing and harvest months – May to November, reported inter-state seasonal agricultural workers decreased in every month in 2006 compared to 2005. In the critical month of June 2006, when the cherry harvest surged sharply, inter-state seasonal agricultural workers were down by an estimated 2,773 workers. The June 2006 surge in the harvest was 6,188 workers higher than for the same time period in 2005. The reported reduction in inter-state workers in June 2006 was equal to 44.8 percent of the surge (2,773 / 6,188 = 0.448 x 100 = 44.8 percent). Thus, it is possible that the reduction in inter-state workers contributed to the relatively high increase in hourly average wage rates in cherries, about 20 percent, as growers raised wage rates to gain more experienced seasonal agricultural workers.[13]

*Exhibit 3.7* shows that the reported flow of inter-state seasonal agricultural workers was down 55.5 percent in June 2006 compared to June 2005 (2,226 - 4,999 = -2,773 / 4,999 = -.5547 x 100 = 55.47 percent). This deficit moderated to a year-to-year shortfall of 14.6 percent in July, but increased to a 30.2 percent shortfall in August and then to a 53.2 percent shortfall in September when the apple harvest was just getting into full swing.

**Exhibit 3.7**
Month-to-Month Percentage Difference in Inter-State Seasonal Agricultural Workers
Washington State, 2006 Compared to 2005
*Source:* Exhibit 3.5




Over the 2005 growing and harvest cycle, a reported 21,755 worker/months of inter-state seasonal agricultural labor were supplied to the Washington state agricultural economy. In 2006, this dropped to 13,052 worker/months, only 60.0 percent of the previous year's flow of reported inter-state seasonal labor. This suggests, other things equal, that one component of the supply of seasonal agricultural labor shifted back, decreased, in 2006 at least in part due to the decrease in the flow of inter-state seasonal agricultural workers into Washington state (see also *Appendix Exhibit 3.2*). But, other things were not equal.

## *Evidence on the Movement of Foreign Seasonal Agricultural Workers*

In contrast to the overall reduction in the flow of inter-state seasonal agricultural workers into Washington, seasonal agricultural laborers identified as foreign workers *increased* their net flow into the agriculture sector during 2006 compared to 2005, regardless of the perception or reality of increased tightening of the United States-Mexican border.[14]

As shown in E*xhibit 3.8*, in June 2006, when the cherry harvest labor needs surged, a reported 5,013 seasonal agricultural workers identified by their immediate employers as foreign were counted – a 64.0 percent increase over the 3,056 foreign workers reported in June 2005. These reported year-to-year increases by month were 40.0 percent for July, a drop of 49.7 percent for August, and increases of 20.3 percent for September and 30.0 percent for October. For the 2006 June-to-September growing and harvesting season, reported foreign workers comprised 9.0 percent of the total seasonal worker/months of labor supplied. This contrasts to only 7.7 percent for 2005.

**Exhibit 3.8**
Seasonal Agricultural Workers Identified by Growers as Being of Foreign Origin - by Month
Washington State, 2006 Compared to 2005
*Source:* Exhibit 3.5

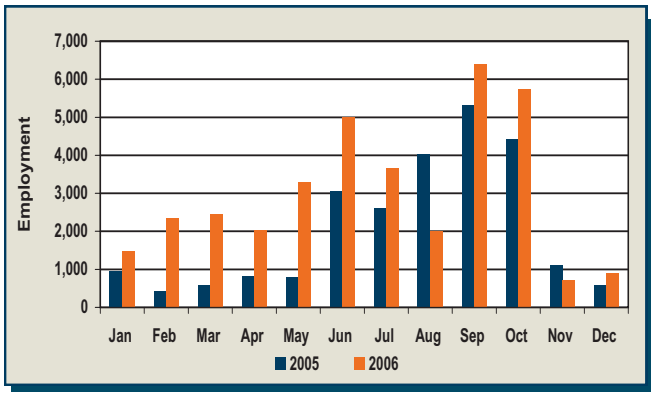
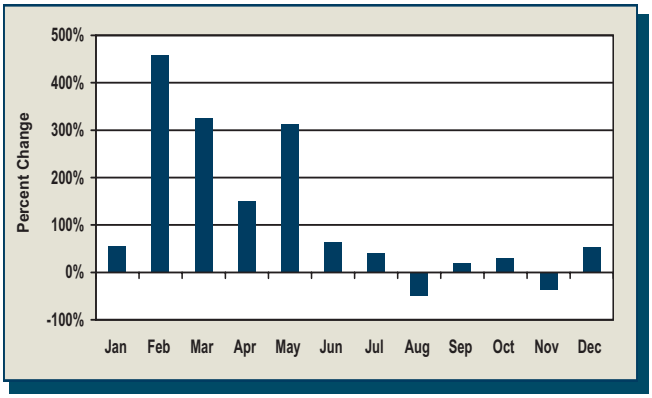


**Exhibit 3.9**
Month-to-Month Percentage Difference in Foreign Seasonal Agricultural Workers
Washington State, 2006 Compared to 2005
*Source:* Exhibit 3.5




### *A Final Assessment and a Caveat on Interpreting These Worker Origin Data*

*Exhibit 3.5* also reports the number and percent of *unknown origin* workers. In 2005, this number equaled 39,654 worker/months over the June-to-October growing and harvest season. This number increases by 30.8 percent to 51,884 worker/months for 2006. In 2006, agricultural employers were unable or unwilling to identify the geographic origin of 20.4 percent of the seasonal agricultural workers they hired. Assume all of these unidentified workers were either inter-state or foreign. If this is so, then foreign workers increased by 3,385 worker/months between the two years; inter-state workers decreased by 7,164 worker/months, and unknown origin employment increased by 12,230 worker months. Summing these estimates, total worker months increased by 8,451 worker/months. Dividing this sum by five (five months) yields an estimated increase of 1,690 combined inter-state and foreign workers. This number is clearly an upper-bound estimate, since some of the unknown origin workers most surely are either local or intra-state. In any case, the overall picture suggests a net increase in worker/months and an increase in workers responding to increases in hourly average wage rates. About 630 additional workers supplied about 7,560 worker/months in 2006 based on these estimates.

### Recent Efforts to Measure Seasonal Labor Shortage Based on Employer Interviews

The previous data and analysis notwithstanding, in July 2006, two questions dealing with seasonal labor shortage were added to the monthly seasonal agricultural survey that is conducted by the ESD Labor Market and Economic Analysis branch. These questions asked the following of agricultural producers:

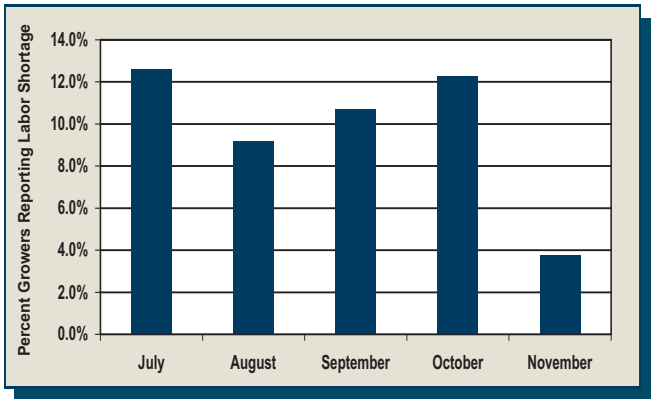
- During this month's work period which includes the 12th, have some tasks you normally do not been completed due to a lack of available seasonal agricultural labor?
  Yes [ ] No [ ]

- How many additional seasonal workers would you have hired if they were available?
  _____# of Workers

The results for the months of July through November are detailed in *Exhibit 3.10*. These results are not weighted by employment. Estimates range from 12.6 percent of growers reporting a shortage in July, due to peak cherry harvest activity, to reports of a shortage by 3.7 percent of the growers in November, when the apple harvest is finishing. Agricultural reporting areas 2, 3, 4, and 5 report the largest percentage of growers experiencing a shortage *(see Appendix Exhibit 3.1 for a map of the reporting areas and Appendix Exhibit 3.3 for the detailed data)*. For July, 20.9 percent and 23.1 percent of growers in areas 2 and 3, respectively, report a shortage. These estimates drop somewhat for areas 2 and 3 in August and then rise in September and October. With only areas 4 and 5 in August as exceptions, at least ten percent of the growers report a shortage in areas 2, 3, 4, and 5 for July through October *(see Appendix Exhibit 3.3)*.

"And many workers who live in the Mid-Columbia (valley) have moved from agricultural jobs to construction, landscaping, and retail,..." *Yakima Herald-Republic*. "Grape harvest short of workers too." ***October 10, 2006***

**Exhibit 3.10**
Percent of Washington Growers Reporting a Labor Shortage for Their Operations, Unweighted by Employment Size
Washington State, July to November 2006
*Source:* ESD/LMEA, Agricultural Labor Employment and Wage Trends, 2006



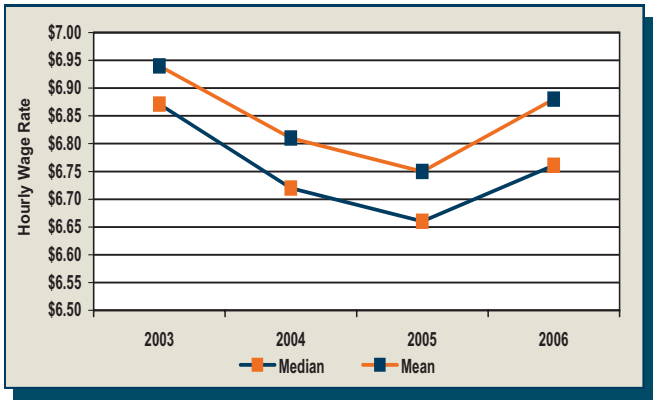

## *Wage Rate Evidence Concerning a Seasonal Agricultural Labor Shortage in 2006*

We attempt to determine if constant dollar seasonal agricultural wage rates have increased during the last few years in response to continuing concerns over seasonal labor shortages. As discussed before, if there has been an increase in constant dollar wage rates, either the supply of seasonal agricultural labor has decreased, the demand for seasonal agricultural labor has increased, or there has been some combination of the two changes.

We measure the hourly average wage rates for seasonally employed agricultural workers from the ESD monthly *Agricultural Labor Employment and Wage Trends* survey for the years 2003 through 2006. These monthly hourly average wage rate data by agricultural reporting area are used to examine year-to-year constant dollar wage rate differences. There are approximately 60 observations for each of the four years. We focus only on hourly average wage rates due to the difficulty of standardizing piece rates for analysis. Piece rates and hourly wage rates are highly correlated, however, if the agricultural labor market is competitive, which it most surely is.

A statistical test of differences between two means is computed for various combinations of years from 2003 to 2006. This test helps determine if pairs of hourly average wage rates are equal to or different from each other in a statistical sense. Our primary interest is the comparison of hourly average wage rates between 2005 and 2006.

**Exhibit 3.11**
Mean and Median of Constant Dollar Seasonal Hourly Agricultural Wage Rates,
Washington State, 2003 to 2006, Year 2000 = 100
*Source:* ESD/LMEA, Agricultural Labor Employment and Wage Trends - Various Years




The current (unadjusted for inflation) hourly average wage rate increased an estimated 4.3 percent for seasonal agricultural labor across the state between 2005 and 2006.[15] However, this increase in the current hourly wage rate could be due to inflation. Thus, we calculate the constant dollar, or inflation-adjusted, hourly average wage rate, using the CPI-W and 2000 as our base year. We then find that real hourly average wage rates increased an estimated 13 cents an hour, or 1.9 percent, between 2005 and 2006 (see *Exhibit 3.11*). The odds are 51 out of 1,000 that the true difference between the two years is actually zero. Thus, the estimated difference is statistically significant.

This result suggests that there has been a labor shortage in 2006 compared to 2005 and that growers responded by increasing the constant dollar hourly wage rate offered in order to attract and keep an adequate labor force through their harvest season. But, to re-emphasize, this increase could be due to an increase in labor demand, a decrease in labor supply, or some combination of the two. *Note also that the wage increases resulted in a seasonal labor force in 2006 that was essentially the same as in 2005.*

### *Clarifying Perceptions: Current Versus Constant Dollar Wage Rate Changes*

*Exhibits 3.12* and *3.13* show details of the year-to-year tests. A contrast of current versus constant dollars provides some insight into the continuing perception of a shortage by growers. *Exhibit 3.12* shows that except for the change between 2003 and 2004, hourly average wage rates in current dollars always rose from year to year. Due to inflation, typical growers would have to increase current dollar wage rates just to maintain their current labor needs – not to gain more workers than were demanded the season before.

**Exhibit 3.12**
Paired Year-by-Year Comparisons of Current Dollar Hourly Average Wage Rate Increases for Seasonal Agricultural Labor Washington State, 2003 to 2006
*Source:* ESD/LMEA, Agricultural Labor Employment and Wage Trends

| Year-by-Year Comparison | 2003 | 2004 | 2005 | 2006 |
|---|---|---|---|---|
| 2003 | 7.47 | Not Statistically Significantly Different | Statistically Significantly Different | Statistically Significantly Different |
| 2004 | -- | 7.51 | Statistically Significantly Different | Statistically Significantly Different |
| 2005 | -- | -- | 7.67 | Statistically Significantly Different |
| 2006 | -- | -- | -- | 8.00 |

However, the situation shown by the data in *Exhibit 3.13* is different. Constant wage rates dropped between 2003 and 2004. Constant hourly average wage rates were not statistically different from each other between 2004 and 2005 – the means suggest a small decline between the two years, but statistically, there was no change. However, there was a 13 cent constant dollar hourly average wage rate increase between 2005 and 2006. There was a shortage and growers responded with a wage rate increase. It is this difference in current versus constant dollar wage rate increases that may have growers thinking there is a perennial shortage. However, the effects of inflation have to be netted out of the discussion to determine if there has been an actual, true increase in constant dollar wage rates.

**Exhibit 3.13**
Paired Year-by-Year Comparisons of Constant Dollar Hourly Average Wage Rate Increases for Seasonal Agricultural Labor Washington State, 2003 to 2006, 2000 = 100
*Source:* ESD/LMEA, Agricultural Labor Employment and Wage Trends

| Year-by-Year Comparison | 2003 | 2004 | 2005 | 2006 |
|---|---|---|---|---|
| 2003 | 6.94 | Statistically Significant Difference of .036 | Statistically Significant Difference of .001 | Not Statistically Significantly Different |
| 2004 | -- | 6.81 | Not Statistically Significantly Different | Not Statistically Significantly Different |
| 2005 | -- | -- | 6.75 | Statistically Significant Difference at a Probability of .051 |
| 2006 | -- | -- | -- | 6.88 |

## Final Judgment

- There was no overall shortage of seasonal labor in 2006.
- There is evidence of spot shortages of seasonal agricultural workers in 2006 compared to 2005. Constant dollar hourly average wage rates rose for seasonal agricultural labor. Typically, this increase in constant dollar hourly wage rates will occur when, at existing hourly wage rates, employers find they do not have sufficient workers to efficiently manage their production activities. The increase in the constant dollar wage rate attracts more workers and the spot shortage is eliminated.
- However, it is also the case that, statewide, estimated total seasonal agricultural employment slightly increased between 2005 and 2006.
- Reported inter-state workers decreased, workers of foreign origin are reported to have increased, and workers of unknown origin are reported to have increased. Overall, there was a net increase of reported seasonal workers.

## Endnotes

[1] This analysis of labor shortage was conceived by John Wines and the chapter is jointly authored with him.

[2] The usual harvesting season for sweet cherries begins the first 10 days of June, becomes intensified during the remaining days of June and the first 20 days of July, and ends in the last 10 days or so of July. The apple harvest normally begins the last two-thirds of August, becoming intensified after the first third of September with the intensive period lasting until the end of October. The harvesting season typically winds up the first third of November. The intensive period of Bartlett pear harvest is co-extensive with the start-up period of the apple harvest. The intensive period of the winter pear harvest is co-extensive with the intensive period of apple harvest.

[3] The harvest of tart cherries was also predicted to increase from 8,250 tons in 2005 to an estimated 10,750 tons in 2006. In 2005, tart cherries had a value of only $2,469 per acre while sweet fresh cherries had a value of $11,535 per acre. Demand for labor in the sweet fresh cherry market can be seen to be the driving force for demand for seasonal cherry pickers.

[4] *2006 Washington Annual Agriculture Bulletin,* USDA, NASS, p. 12.

[5] See, for example, "And many workers who live in the **Mid-Columbia** (valley) have moved from agricultural jobs to construction, landscaping and retail,..." *Yakima Herald-Republic*. "Grape harvest short of workers, too" October 10, 2006.

[6] These estimates are gained by summing the estimates of the total number of workers employed in seasonal agriculture each month, a measure of worker/months, into an annual worker/month total and then dividing that total by 12.

[7] As recently as 2000, an estimated 1,682 seasonal workers were employed annually in asparagus production. For a discussion of this decline in asparagus production and employment, see the *2005 Agricultural Workforce in Washington State*, pp. 19-20. **www.workforceexplorer.com**

[8] The following quote from a farmer in the Wapato area is illustrative: "It's a laborer's market right now. My pickers all look at me and say, 'How much are you going to pay?'... They all have cell phones, and all they have to do is call up the road and see if anybody else is paying a little more." *Tri-City Herald*, September 25, 2006. See also, the *Tri-City Herald*, October 30, 2006. "Farmworkers packing cell phones are finding they have unprecedented power in a harvest with too few workers available to pick too many apples...Some farmers say they have lost crews in the middle of a work day, after their workers made a few calls and found a better deal."

[9] Remember that, because cherries, pears, and apples, among the tree crops, compete with each other for labor, if cherry growers raise wages to attract more labor, apple and pear growers will also have to raise wages in order to just keep the workers they already have.

[10] Washington Farm Bureau, *Employer Essentials*, "Illegal Immigrants Detained in First-ever U.S. 101 Traffic Checkpoint," April 2007, p. 10.

[11] The economy of the state of Washington was booming during 2006, which also had an impact on the wage rates and employment in the agricultural labor force – leading to shortages and subsequent increases in the wage rate in response. On a month-to-month comparison between 2005 and 2006, the state unemployment rate ranged from .8 of one percent lower in January, February, and March to .2 of one percent lower in December for 2006 compared to 2005. For the state, a statistically significant difference in the statewide unemployment rate is equal to .4 of one percent. From April through November, the unemployment rate was at least .4 of one percent lower except for the months of July

and August when it was .3 of one percent lower in 2006 compared to 2005. Seasonal statewide employment increased an average of 62,000 workers over the April through October growing and harvest season. See *Resident Civilian Labor Force and Employment in Washington State, Not Seasonally Adjusted*, Benchmark: 1st Quarter, 2006, updated May 2, 2007.
**www.workforceexplorer.com/admin/uploadedPublications/1886_laus_historical.xls**

[12] There is the possibility of double counting and mis-identification with respect to these two categories. In the monthly survey that is sent to agricultural producers in the state, there is no definition provided for "inter-state workers." The increasing political and legal pressure to not hire undocumented workers may also have distorted these data in some unknown manner.

[13] What was the grower's incentive to raise wage rates so much? In 2005, the value per harvested acre of sweet cherries in current dollars was $11,535 – the highest acreage value among all crops produced in the state in 2005. There has been a sharp increase in demand for sweet cherries. In 2004, a comparable bumper crop year, the estimated value per harvested acre was $8,159. This 41.4 percent increase in the value of the sweet cherry crop suggests a shift in demand for this crop. Such a shift in demand will translate into a shift in demand for the labor that produces that crop, since the demand for labor is a derived demand that is dependent on the demand for the product that the labor in question produces. See 2006 Washington Annual Agriculture Bulletin, "Total Value of Production and Value Per Harvested Acre, Washington, 2003-2005," U.S. Department of Agriculture, National Agricultural Statistics Service, p. 6.

[14] Though this is only a conjecture, it is possible that foreign workers, already in the U.S., especially California, may have migrated north in response to the perceived likelihood that workplaces would be monitored more intensively in California compared to Oregon and Washington. The following quote is instructive: "Over the last two decades, the U.S. has greatly increased the resources it devotes to controlling illegal immigration. The government has, in particular, beefed up enforcement at specific U.S. border cities. *While the U.S. has criminalized the hiring of illegal immigrants, the government devotes few resources to monitoring U.S. worksites for the employment of unauthorized workers*." Gordon M. Hanson, "Illegal Migration from Mexico to the United States," *Journal of Economic Literature*, December 2006, Vol. 44, Number 44.

[15] The National Agricultural Statistics Service (NASS) reports for the week of October 8-14, 2006 that the current dollar wage rates for hired agricultural workers nationwide increased by 4 percent while total annual employment decreased by 5 percent compared to the same time period in 2005. Direct comparisons between the NASS findings and the LMEA survey data must be taken with extreme caution, since the statistical data collection methods and definition of employment differ between the two statistical sources. See *Farm Labor,* U.S. Department of Agriculture, Agricultural Statistics Board, NASS, released November 17, 2006.

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# Chapter 4

## Employment, Unemployment, Unemployment Insurance, and WorkSource Center Services

### Introduction

This chapter focuses on the statewide structure of employment and unemployment to shed light on the continuing question of the adequacy of seasonal and migrant agricultural labor supply for Washington state during 2006. It presents employment, unemployment, and job vacancy data for the agricultural sector and for those counties that have a high percentage of agricultural production. Finally, it documents the role of the WorkSource centers in assisting agricultural workers and producers in meeting each other's needs.


### Overall Situation of Employment Growth

The Washington state agriculture sector operates in the context of the overall national economy. Events in the national economy have a significant impact on employment, hours worked, wage rates, and earnings of agricultural workers across the state and the nation.[1] Thus, a discussion of the broad changes in the national economy sets the stage for a discussion of the Washington state economy and the agriculture sector within the state's economy.

#### *Employment*

The United States labor force grew by 1.4 percent between 2005 and 2006, increasing from 149,320,000 to 151,428,000 workers. The labor force includes individuals who were either employed or out of work and looking for work. During the same period of time, the Washington state labor force grew an estimated 1.4 percent, from 3,292,200 to 3,339,700 workers.[2] Nationally, civilian employment grew by 1.9 percent, whereas civilian employment in Washington grew by 2.0 percent – somewhat higher than that of the nation as a whole.[3] During these two years, the annual agricultural labor force in the state remained essentially unchanged at an estimated 93,582 workers (*see Chapter 1*). Thus, while the state economy was growing overall, employment in the agriculture sector just held its own. Most importantly, as reported in *Chapter 3*, the seasonal and migrant labor force, overall, did not decline between the two years.

#### *Unemployment*

At the national level, the unemployment rate dropped from 5.1 percent in 2005 to 4.6 percent in 2006. This drop is statistically significant. For the state, the unemployment rate dropped from 5.5 percent in 2005 to 5.0 percent in 2006. This also is a statistically significant drop.

In short, the national and the state economies both exhibit historically low measured unemployment rates for 2006. This low rate of unemployment statewide puts pressure on the agriculture sector and can contribute to the increase in hourly average wage rates documented elsewhere in this report.

### County and MSA/MD Unemployment Rates, 2006 Versus 2005

*Exhibit 4.1* shows the estimated monthly unemployment rates in key agricultural counties and selected MSAs/MDs during the peak growing and harvest months, contrasting 2006 with 2005.[4] As endnote 4 indicates, these are calculated means, not sample statistics. We are interested mainly in the direction of change. We take as strong evidence of change a difference between month/years of at least 0.5 of one percent.[5]

#### *Metropolitan Statistical Areas (MSAs) and Metropolitan Divisions (MDs)*

Viewing the bottom panel in *Exhibit 4.1*, we see that for three of the six peak seasonal months, for May, June, and October, estimated unemployment rates fell by at least 0.5 of one percent for the Seattle-Bellevue-Everett and Tacoma Metropolitan Divisions (MDs), and the Spokane MSA. In August and September, estimated rates fell for four of the five MSAs and MDs, the exception being Bremerton. Mean rates calculated for the five MSAs/MDs are uniformly lower in 2006 compared to 2005, but only Seattle-Bellevue-Everett and Tacoma are lower by at least 0.5 of one percent. Overall, ignoring our 0.5 percent standard, unemployment rates fell in each month for

**Exhibit 4.1**
Comparison of Selected Unemployment Rates by Month
Washington State, by Selected Counties, MSAs, and MDs, 2005 and 2006
*Source:* ESD/LMEA, Resident Civilian Labor Force and Employment, Benchmark: 1st Quarter, 2006
**http://www.workforceexplorer.com/admin/uploadedPublications/1886_laus_historical.xls**

| | Unemployment Rate | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | May | | June | | July | | August | | September | | October | | 2005 | 2006 |
| County/MSA/MD | 2005 | 2006 | 2005 | 2006 | 2005 | 2006 | 2005 | 2006 | 2005 | 2006 | 2005 | 2006 | Mean | Mean |
| Key Agricultural Counties | | | | | | | | | | | | | | |
| Yakima | 6.8 | 6.7 | 5.9 | 6.0 | 6.5 | 5.7 | 7.1 | 6.8 | 5.1 | 4.9 | 5.0 | 4.6 | 6.1 | 5.8 |
| Chelan-Douglas | 6.0 | 5.3 | 4.5 | 4.4 | 4.1 | 3.7 | 5.9 | 5.5 | 3.9 | 3.8 | 3.9 | 3.5 | 4.7 | 4.4 |
| Benton-Franklin | 5.3 | 5.6 | 5.5 | 5.7 | 5.8 | 5.8 | 5.9 | 5.6 | 5.3 | 4.9 | 5.3 | 6.6 | 5.5 | 5.7 |
| Grant | 6.6 | 6.7 | 6.4 | 5.5 | 5.7 | 5.4 | 5.7 | 5.3 | 4.8 | 4.4 | 4.8 | 4.2 | 5.7 | 5.3 |
| Okanogan | 6.8 | 6.2 | 5.9 | 5.9 | 4.7 | 5.0 | 6.1 | 6.1 | 4.7 | 4.7 | 4.6 | 4.4 | 5.5 | 5.4 |
| Whatcom | 4.8 | 4.5 | 5.2 | 4.9 | 5.0 | 4.7 | 4.9 | 4.6 | 4.5 | 4.2 | 4.2 | 3.8 | 4.8 | 4.5 |
| Walla Walla | 5.2 | 5.4 | 5.4 | 5.4 | 5.3 | 5.2 | 5.3 | 5.1 | 4.8 | 4.5 | 4.6 | 4 | 5.1 | 4.9 |
| Skagit | 5.7 | 5.1 | 6.0 | 5.4 | 5.6 | 5.1 | 5.5 | 5.1 | 4.9 | 4.6 | 4.7 | 4.2 | 5.4 | 4.9 |
| **Mean** | **5.9** | **5.7** | **5.6** | **5.4** | **5.3** | **5.1** | **5.8** | **5.5** | **4.8** | **4.5** | **4.6** | **4.0** | | |
| MSAs and MDs | | | | | | | | | | | | | | |
| Seattle-Bellevue-Everett MD | 4.9 | 4.4 | 4.9 | 4.4 | 4.5 | 4.1 | 4.3 | 4.0 | 4.9 | 4.4 | 4.7 | 4.1 | 4.7 | 4.2 |
| Tacoma MD | 5.8 | 5.1 | 6.1 | 5.5 | 5.8 | 5.4 | 5.8 | 5.3 | 5.2 | 4.8 | 5.0 | 4.5 | 5.6 | 5.1 |
| Spokane MSA | 5.3 | 4.8 | 5.6 | 5.1 | 5.4 | 5.1 | 5.5 | 5.0 | 4.9 | 4.4 | 4.7 | 4.1 | 5.2 | 4.8 |
| Bremerton MSA | 5.0 | 4.7 | 5.4 | 5.2 | 5.0 | 5.1 | 5.0 | 5.0 | 4.6 | 4.6 | 4.6 | 4.2 | 4.9 | 4.8 |
| Olympia MSA | 4.9 | 4.5 | 5.3 | 4.9 | 5.1 | 4.9 | 5.0 | 4.6 | 4.6 | 4.0 | 4.4 | 4 | 4.9 | 4.5 |
| **Mean** | **5.3** | **4.9** | **5.5** | **5.1** | **5.2** | **4.9** | **5.2** | **4.9** | **4.8** | **4.5** | **4.7** | **4.2** | | |

all of the MSAs/MDs except Bremerton, and for Bremerton, the unemployment rate fell in all but August and September. All but Spokane are, of course, the largest labor market areas in the state, though they are in the western portion of the state, separated from the dominant agricultural areas in the east of the state by the Cascade mountain range.

To repeat, these seasonal differences that tighten up the labor market, other things equal, can put pressure on employment and earnings in other areas of the state.

## *Key Agricultural Counties*

The top panel of *Exhibit 4.1* shows the year-to-year, monthly seasonal variation in calculated unemployment rates in key agricultural counties. First, looking at the overall annual average, though ignoring our 0.5 percent standard, monthly unemployment rates declined uniformly between 2005 and 2006. This suggests a tightening of employment in all eight of these key agricultural counties. However, it is only in Skagit County that the year-to-year difference is as great as 0.5 of one percent.

Viewing the year-to-year monthly changes, and ignoring our 0.5 percent standard, there is a uniform drop in the calculated unemployment rate for all eight key agricultural areas for the months of August, September, and October, with the exception of Benton-Franklin in October, when the estimated unemployment rate actually rose from 5.3 percent to 6.6 percent. It is only in May and October, though, that the differences exceed 0.5 of one percent for at least three of the eight areas. In May, calculated unemployment rates actually rose, but not by at least 0.5 of one percent, for Benton-Franklin, Grant, and Walla Walla. And in June, the unemployment rate rose for Yakima and Benton-Franklin, but again, not by as much as 0.5 of one percent.

Adopting our more rigorous 0.5 percent standard, we note that on the whole, estimated unemployment rates did not change between the two years across the peak seasonal months with the exception of October. In October, unemployment fell in three key agricultural counties and rose in one, but the average for all counties fell from 4.6 percent to 4.0 percent.

Though our precision of measurement is not high, the *consistency* of the direction of effect suggests that the labor markets in the MSAs and MDs tightened up during 2006. With respect to the key agricultural counties, the dominant picture, following our 0.5 percent standard, is that unemployment did not decrease or rise. *However, it is also the case that total employment increased statewide and total employment did not decrease in the agriculture production sector.*

## Estimates of Unemployed Workers Available for Work

*Exhibit 4.2* takes a different look at the same unemployment data, this time comparing the absolute number of workers unemployed in January against the absolute number of workers unemployed in the peak month of employment. The contrast is again between 2005 and 2006 for both key agricultural counties and for the MSAs and MDs.

**Exhibit 4.2**
Total Unemployed Workers Available for Work
Washington State, January vs. Peak Month, 2005 and 2006
*Source:* ESD/LMEA, Resident Civilian Labor Force and Employment, Benchmark: 1st Quarter, 2006
**http://www.workforceexplorer.com/admin/uploadedPublications/1886_laus_historical.xls**

| | 2005 January | 2005 Peak Month | 2005 Difference | 2006 January | 2006 Peak Month | 2006 Difference |
|---|---|---|---|---|---|---|
| **Key Agricultural Counties** | | | | | | |
| Yakima | 11,700 | 8,000 | -3,700 | 10,600 | 7,400 | -3,200 |
| Chelan-Douglas | 4,610 | 2,810 | -1,800 | 3,760 | 2,710 | -1,050 |
| Benton-Franklin | 8,300 | 6,800 | -1,500 | 8,300 | 6,800 | -1,500 |
| Grant | 3,860 | 2,030 | -1,830 | 3,470 | 1,750 | -1,720 |
| Okanogan | 2,080 | 1,270 | -810 | 1,720 | 1,300 | -420 |
| Whatcom | 6,200 | 4,700 | -1,500 | 5,000 | 4,700 | -300 |
| Walla Walla | 2,120 | 1,380 | -740 | 1,990 | 1,180 | -810 |
| Skagit | 3,360 | 3,210 | -150 | 2,950 | 2,960 | 10 |
| **MSAs and MDs** | | | | | | |
| Seattle-Bellevue-Everett MD | 66,800 | 60,900 | -5,900 | 60,100 | 58,700 | -1,400 |
| Tacoma MD | 24,600 | 19,100 | -5,800 | 20,100 | 18,400 | -1,700 |
| Spokane MSA | 15,900 | 12,700 | -3,200 | 13,200 | 11,900 | -1,300 |
| Bremerton MSA | 6,800 | 5,600 | -1,200 | 5,800 | 5,500 | -300 |
| Olympia MSA | 6,900 | 5,600 | -1,300 | 6,000 | 5,700 | -300 |

### *Key Agricultural Counties*

Consider the case of Yakima County in the top panel of *Exhibit 4.2.* In 2005, the number of workers calculated to be unemployed in January stood at 11,700. In the *peak employment month* of July for that county, the unemployed workers available for work were down to 8,000 – a seasonal drop of 3,700 workers. Now, in 2006, calculated unemployment in January is estimated at 10,600, 1,100 less than in 2005. In addition, in the peak month of July 2006, only 7,400 individuals were out of work and available for work, a difference of 3,200 compared to January 2006. Thus, between the two years, the labor market tightened in Yakima County. In summary, note that the base seasonal unemployment level dropped by about 1,100 workers and the peak seasonal unemployment dropped by about 600 workers between the two years, for a total tightening of the labor market of about 1,700 workers.

Except for Benton-Franklin, the direction of effect – a decrease in the estimated unemployment rate – for the other key agricultural areas in the state is similar to that of Yakima. In Benton-Franklin, no measured change in the seasonal difference occurs between the two years.

Year-to-year comparisons by month are also an important way to view the data. Note that between January 2005 and January 2006, the calculated number of unemployed workers dropped in all key agricultural areas except Benton-Franklin. And, except for Benton-Franklin, Okanogan, and Whatcom counties, the number of unemployed also fell during the peak employment month for those counties.

### *MSAs and MDs*

The picture is the same for the MSAs and MDs. From January 2005 to January 2006, the number of unemployed workers declined for the two MDs and three MSAs as well as Whatcom County, which is the Bellingham MSA and which has a peak employment month the same as that of the MSAs and MDs. Furthermore, there is less slack in the labor market in these MSAs on a seasonal basis in 2006 compared to 2005. Again,

these MSAs are relatively and absolutely large labor markets in the state and so will exert pressure on wage rates and available workers in nearby areas and counties.

## Estimates of Total Employment Levels and Seasonal Changes[6]

*Exhibit 4.3* compares the total number of employed workers in 2006 for the key agricultural areas and for the MSAs and MDs during January and for the peak months of employment. No labor market in a key agricultural area is much larger than 100,000 workers and some are quite small, such as Okanogan with only a calculated 16,730 workers employed in January 2006. In contrast, all of the MSAs and MDs have employed labor forces greater than 100,000, and employed workers in Seattle-Bellevue-Everett are calculated at slightly over 1.3 million in January 2006.

**Exhibit 4.3**
Total Employment: January to Peak Month Seasonal Surge
Washington State, 2006
*Source:* ESD/LMEA, Resident Civilian Labor Force and Employment, Benchmark: 1st Quarter, 2006
**http://www.workforceexplorer.com/admin/uploadedPublications/1886_laus_historical.xls**

| | January 2006 | Peak Month 2006 | Difference | Percent Change |
|---|---|---|---|---|
| **Key Agricultural Counties** | | | | |
| Yakima | 102,200 | 7: 128,200 | 26,000 | 25.4 |
| Chelan-Douglas | 51,390 | 7: 69,790 | 18,480 | 36.0 |
| Benton-Franklin | 102,200 | 6: 111,900 | 9,700 | 9.5 |
| Grant | 32,440 | 10: 40,330 | 7,890 | 24.3 |
| Okanogan | 16,730 | 7: 24,970 | 8,240 | 49.3 |
| Whatcom | 98,300 | 12: 102,100 | 3,800 | 3.9 |
| Walla Walla | 26,070 | 10: 28,510 | 2,440 | 9.4 |
| Skagit | 52,650 | 8: 55,010 | 2,360 | 4.5 |
| **MSAs and MDs** | | | | |
| Seattle-Bellevue Everett MD | 1,324,700 | 12: 1,350,300 | 256,000 | 19.3 |
| Tacoma MD | 355,100 | 12: 365,400 | 10,300 | 2.9 |
| Spokane MSA | 214,400 | 12: 223,500 | 9,100 | 4.2 |
| Bremerton MSA | 117,500 | 12: 119,100 | 1,600 | 1.4 |
| Olympia MSA | 118,200 | 12: 121,600 | 3,400 | 2.9 |

The peak months for the employment surge are all in December for the MSAs and MDs and for Whatcom County (the Bellingham MSA). In contrast, the peak months vary for the key agricultural counties as a function of dominant crops and weather, as we would expect.

Except for Seattle-Bellevue-Everett, none of the MSAs or MDs, plus Whatcom County, has a seasonal employment surge that exceeds about four percent. Seattle-Bellevue-Everett has a large seasonal surge in December of 19 percent.

Yakima County, on the other hand, has a surge of 25 percent during its peak employment month. The surge is approximately 24 percent in Grant County. It is 36 percent and 49 percent in Chelan-Douglas and Okanogan counties, respectively. It is 9 percent in Benton-Franklin and Walla Walla counties. In absolute terms, 26,000 workers surge into Yakima County, about 18,000 surge into Chelan-Douglas counties, and between 8 and 10 thousand surge into Benton-Franklin, Grant, and Okanogan counties during the peak employment months.

The key point to make is, that based on a comparison with the data in *Exhibit 4.2*, most of the seasonal and migrant workers employed in these agricultural areas must come from outside the labor market area in question. Furthermore, the surge is very large, and so the available calculated unemployed workers in each of those areas simply cannot meet the needed surge. This, then, implies that the WorkSource centers can at best work at the margins to help supply the needed surge in employment demand for each of these key agricultural areas.

*Even so, WorkSource centers could be particularly helpful in ameliorating spot shortages of seasonal labor, since to some degree spot shortages occur due to the incomplete exchange of information between persons offering jobs at a given location and the workers who are available to accept these jobs either at the same or other locations in the state.*

# Chapter 4

## Job Vacancies Over Time

Job vacancies are another indicator of how loose (easy for employers to find workers at existing wage rates) or tight (hard for employers to find workers at the existing wage rates) the labor market has become. At the wage rates being offered by agricultural employers, these vacancies represent an unmet demand for labor. Note, however, that if agricultural employers with vacancies were to increase the wage rate they are offering, at least some vacancies would be filled and overall measured vacancies for the occupations in question would fall. The reverse would be the case if agricultural employers were to offer wage rates below the market wage rate for the advertised occupations in question – many vacancies would not be filled (*see Chapter 3*).

*Exhibits 4.4.* and *4.5* display the results of the annual April and October job vacancy surveys conducted by the Labor Market and Economic Analysis branch of the Employment Security Department. Results are reported for the direct production agriculture sector as a whole by Workforce Development Areas. A map of the counties that comprise each WDA is presented in *Exhibit 1.7*.

### *April Job Vacancies*

Note first that job vacancies have increased between 2005 and 2007. Vacancies are estimated at 1,525 in April 2005; they rise to 1,700 in April 2006; and they increase further to 2,745 in April 2007. Thus, at the wage rates currently offered in each of those time periods, we see a secular rise in vacancies. *Either the demand for labor is increasing, the supply of labor is decreasing, or some combination of the two is occurring.*

These estimates are heavily influenced by changes in job vacancies in Workforce Development Area (WDA) 8, comprised of Adams, Chelan, Douglas, Grant, and Okanogan counties. About three-tenths of the agricultural workforce is employed in this area on an annual basis. Employers in WDA 8 were looking for an estimated 506 workers in April 2005, of which only 4 percent were permanent positions and only 7 percent were new positions. By April 2006, vacancies had doubled to 1,060, with only 2 percent permanent, but 64 percent reported as new. In April 2007 we see the vacancies rise to almost two thousand openings (1,983), with only 5 percent permanent and 70 percent reported as new. With a pattern over time similar to that of WDA 8, WDA 3, comprised of Skagit and Whatcom counties,

**Exhibit 4.4**
Job Vacancy Data for the Direct Production Agriculture Industry Sector
Washington State, April 2005, 2006, and 2007 (NAICS 11)
*Source:* ESD/LMEA, Job Vacancy Survey

| Workforce Development Area | 2007 Vacancies | 2007 Percent Full Time | 2007 Percent Permanent | 2007 Percent New | 2006 Vacancies | 2006 Percent Full Time | 2006 Percent Permanent | 2006 Percent New | 2005 Vacancies | 2005 Percent Full Time | 2005 Percent Permanent | 2005 Percent New |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 01 | 15 | 100% | 50% | 50% | 29 | 100% | 33% | 0% | 26 | 100% | 88% | 13% |
| 02 | 13 | 100% | 75% | 0% | 31 | 100% | 30% | 70% | 33 | 80% | 87% | 13% |
| 03 | 415 | 12% | 8% | 3% | 83 | 60% | 10% | 0% | 70 | 24% | 12% | 0% |
| 04 | 47 | 44% | 28% | 6% | 29 | 63% | 0% | 100% | 86 | 95% | 5% | 5% |
| 05 | 15 | 100% | 75% | 0% | 53 | 93% | 40% | 53% | 110 | 86% | 8% | 14% |
| 06 | --- | --- | --- | --- | 118 | 6% | 0% | 94% | 28 | 100% | 92% | 25% |
| 07 | 17 | 100% | 60% | 0% | 16 | 50% | 0% | 0% | 13 | 100% | 100% | 20% |
| 08 | 1,983 | 26% | 5% | 70% | 1,060 | 84% | 2% | 64% | 506 | 84% | 4% | 7% |
| 09 | 134 | 92% | 8% | 8% | 27 | 75% | 25% | 38% | 370 | 97% | 68% | 0% |
| 10 | 2 | 100% | 100% | 100% | 92 | 87% | 7% | 7% | 27 | 100% | 8% | 0% |
| 11 | 68 | 53% | 53% | 16% | 124 | 94% | 44% | 6% | 218 | 100% | 9% | 90% |
| 12 | 35 | 67% | 27% | 7% | 38 | 100% | 8% | 0% | 37 | 100% | 38% | 63% |
| **Total/Percent** | **2,745** | **30%** | **9%** | **52%** | **1,700** | **79%** | **8%** | **53%** | **1,525** | **89%** | **27%** | **19%** |

is the second largest area driving these changes in vacancies in April. WDA 3 employs 7 percent of the agricultural labor force on an annual basis. Across these two WDAs, the high proportion reported as "new" suggests an increase in demand. The low proportion reported as "permanent" suggests that seasonal workers are being sought.

In contrast, vacancies in WDA 9, comprised of Yakima, Kittitas, Klickitat, and Skamania counties which also employ about three tenths of the annual agricultural labor force, presents no strong pattern of job vacancy increase. In fact, the absolute number of vacancies advertised is small and they decline sharply from 2005 to 2006. Vacancies then rise in 2007, but are only one third as large as the same month in 2005. An estimated 68 percent of the positions are reported as permanent in 2005; this drops to 8 percent by 2007.

### *October Job Vacancies*

*Exhibit 4.5* compares October job vacancies for 2005 and 2006. There is no consistent picture between the two years. In 2005, WDA 10, which is largely the wheat, barley, pea, and lentil growing region of the state, reports 462 job vacancies. This drops to 35 the next year – a drop by a factor of 13. In contrast, WDA 5, which is King County, reports 84 job vacancies in 2005 and this rises sharply to 1,017 in 2006 – an increase by a factor of 12. WDA 10 dominates the vacancy data in 2005 and WDA 5 dominates the vacancy data in 2006. The pattern is so disparate it is difficult to discern what might be operating in the agriculture sector between the two years.

But then that is the story: vacancies rise overall in October between the two years, just as they rise overall among the three years for April. This suggests an overall increase in demand. However, the data in October reveal no consistent pattern, whereas the data in April tend to point in a similar direction among the WDAs.

## Unemployment Compensation: Agriculture Compared to Nonagriculture[7]

A final method to view the issue of increasing demand for labor and potential shortage of labor is to compare the unduplicated continuing claims for unemployment compensation benefits in direct production agriculture with those claims in the nonagriculture sector of the Washington economy.

Since 2003, the estimated statewide unemployment rate has dropped from 7.4 percent to 5.0 percent in 2006. In 2003, the total employment growth rate for the state was estimated at 0.1

**Exhibit 4.5**
Job Vacancy Data for the Direct Production Agriculture Industry Sector
Washington State, October 2005 and 2006 (NAICS 11)
*Source:* ESD/LMEA, Job Vacancy Survey

| | 2006 | | | | 2005 | | | |
|---|---|---|---|---|---|---|---|---|
| Workforce Development Area | Vacancies | Percent Full Time | Percent Permanent | Percent New | Vacancies | Percent Full Time | Percent Permanent | Percent New |
| 01 | 43 | 100% | 100% | 41% | 5 | 100% | 100% | 0% |
| 02 | 53 | 100% | 100% | 16% | 20 | 83% | 83% | 0% |
| 03 | 29 | 100% | 100% | 34% | 13 | 100% | 100% | 0% |
| 04 | 88 | 100% | 100% | 21% | 6 | 0% | 100% | 0% |
| 05 | 1,017 | 99% | 96% | 30% | 84 | 100% | 0% | 0% |
| 06 | 66 | 100% | 100% | 0% | | | | |
| 07 | 62 | 100% | 100% | 35% | | | | |
| 08 | 7 | 100% | 100% | 0% | 86 | 100% | 44% | 0% |
| 09 | 24 | 100% | 100% | 47% | 61 | 0% | 0% | 0% |
| 10 | 35 | 100% | 88% | 17% | 462 | 35% | 68% | 0% |
| 11 | 11 | 100% | 100% | 0% | 28 | 100% | 100% | 0% |
| 12 | 89 | 100% | 100% | 9% | 5 | 100% | 100% | 0% |
| WDA Unknown | 1 | 100% | 100% | 0% | | | | |
| **Total/Percent** | **1,524** | **99%** | **97%** | **26%** | **770** | **52%** | **55%** | **0%** |

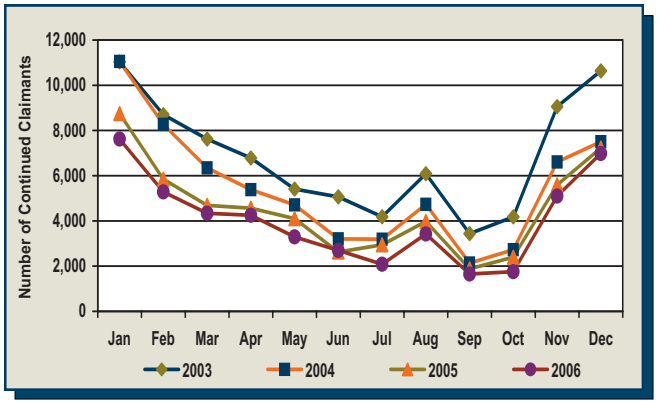
**NOTE:** Percentages may not equal 100 due to rounding.

percent; by 2005 it was estimated at 2.9 percent, the 9th highest rate in the nation that year.[8] It is projected to grow at an average rate of 1.9 percent over the period 2004 to 2009.[9] These broad economic indicators are reflected in the annual and seasonal changes in the number of unduplicated continuing claims for unemployment compensation in the state. The data are shown graphically in *Exhibits 4.6* and *4.7*. The specific values in which the line graphs are based are shown in *Appendix Exhibit 4.1*.

## *Agriculture*

*Exhibit 4.6* shows that the seasonal pattern of continued claimants has been reasonably stable over time. However, note that the line graph is dropping steadily between 2003 and 2006. From the standpoint of the issue of labor demand and the potential shortage of labor, this means that there is a smaller pool of registered unemployment insurance continued claimants that the WorkSource centers can direct to employers needing labor. For example, take September, the beginning of the peak demand for apple harvest workers. In 2003, there was a pool of 3,436 available unemployed agricultural workers available. By September 2006, this pool has shrunk to 1,651 – less than half of its number four years previously. Indeed, even in January, the pool is about 3,400 workers smaller in 2006 than it is in 2003. Annually, the mean number of continued claimants has dropped from 6,849 in 2003 to 4,040 in 2006. *In short, the unemployed in agriculture are being absorbed back into both the agriculture and nonagriculture sectors of the state economy.*

**Exhibit 4.6**
Unduplicated Continued Claimants for Unemployment
Primary Agriculture Production Sector
Washington State, 2003 to 2006
*Source:* ESD/LMEA, Appendix Exhibit 4.1

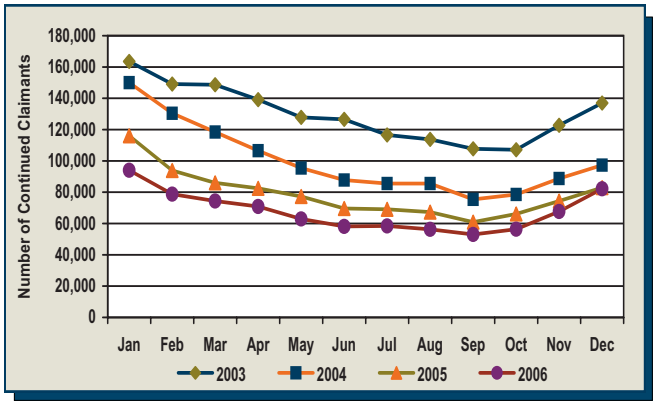



## *Nonagriculture Industries*

As shown in *Exhibit 4.7*, the patterns for the nonagriculture sector are similar to that of the agriculture sector, though the numbers involved are much larger. The key phenomenon to note is that monthly average continued claimants in the nonagriculture sector have dropped from 129,970 in 2003 to only 67,750 in 2006 – a drop of 62,223 continued claimants. Continued claimants drop by 47.9 percent for this sector and by only 41.0 percent for the agriculture sector over the four-year period.

Thus, the booming economy of the state is absorbing proportionately fewer workers who are continued claimants in the agriculture sector than are being absorbed in the nonagriculture sector.

**Exhibit 4.7**
Unduplicated Continued Claimants for Unemployment
Nonagriculture Industry Sectors
Washington State, 2003 to 2006
*Source:* ESD/LMEA, Appendix Exhibit 4.1




## Seasonal Patterns in Agriculture – Employment Versus Continued Claimants

*Exhibit 4.8* rounds out this discussion of the employment/unemployment picture for agriculture by comparing the experience of 2006 with that of 2005.

**Exhibit 4.8**
Seasonal Pattern of Unduplicated Continued Claimants and Seasonal Employment in Agriculture
Washington State, 2006 Compared to 2005
*Source:* ESD/LMEA

| | 2005 | | | 2006 | | |
|---|---|---|---|---|---|---|
| Month | Continued Claimants | Seasonal Employment | Continued Claimants as a Percent of Seasonal Employment | Continued Claimants | Seasonal Employment | Continued Claimants as a Percent of Seasonal Employment |
| January | 8,702 | 9,460 | 87.1 | 7,619 | 12,771 | 59.7 |
| February | 5,865 | 14,672 | 40.0 | 5,285 | 15,756 | 33.5 |
| March | 4,703 | 17,687 | 26.6 | 4,339 | 19,027 | 22.8 |
| April | 4,574 | 20,994 | 21.8 | 4,253 | 22,454 | 18.9 |
| May | 4,108 | 22,782 | 18.0 | 3,292 | 24,516 | 13.4 |
| June | 2,627 | 58,132 | 4.5 | 2,697 | 51,906 | 5.2 |
| July | 2,938 | 52,628 | 5.6 | 2,086 | 67,482 | 3.1 |
| August | 3,991 | 39,133 | 10.2 | 3,421 | 42,014 | 8.1 |
| September | 1,891 | 50,063 | 3.8 | 1,651 | 49,629 | 3.3 |
| October | 2,395 | 46,806 | 5.1 | 1,757 | 49,119 | 3.6 |
| November | 5,575 | 14,900 | 37.4 | 5,095 | 16,533 | 30.8 |
| December | 7,206 | 10,845 | 66.4 | 6,982 | 12,970 | 53.8 |
| Monthly Average | 4,548 | 29,842 | 15.2 | 4,040 | 32,015 | 12.6 |

**NOTE:** Unduplicated Continued Claimaints are individuals who have filed at least one UI claim. They are an unduplicated count of people legally eligible to register for a waiting period credit or to request benefit payments for one or more weeks on unemployment. This is the single most comprehensive measure of individuals in the UI system at any point in time.

As noted elsewhere in the report, estimated seasonal agricultural employment actually increased by a small amount in 2006 compared to 2005. It is not likely that this small increase is statistically significant. *However, note that in particular, measured agricultural employment did not decrease between the two years*. This finding is quite contrary to the general impression of an overall shortage of labor reported in the media during 2006. Though, again, spot shortages could have existed across areas and at different times due to a variety of factors, such as imperfect information from area to area concerning actual job openings and the wage rates farm operators were offering to pay.

Even so, the average number of continued claimants dropped between 2005 and 2006 by over 500 claimants. Claimants as a percent of seasonal employment dropped from 15.2 percent in 2005 to 12.6 percent in 2006. Peak seasonal employment occurred in June in 2005 at 58,132 workers compared to the pool of 2,627 continued claimants at that time – 4.5 percent of total seasonal employment that month. In 2006, due to the cherry crop, peak seasonal employment occurred in July at 67,482 workers while there were only 2,086 continued claimants, or 3.1 percent of the total of seasonal employment.

Again we see that total employment has risen at key months during 2006 compared to 2005. Continued claimants have been absorbed into the economy at a higher rate in 2006 compared to 2005.[10] We are led to conclude that there was no generalized shortage of labor in the Washington state agriculture sector during 2006.

## H-2A Employment[11]

What is the possibility that the needed surge of seasonal and migrant workers can be met through the existing H-2A Program? Nationwide, certified H-2A workers increased from 44,619 in 2004 to 48,366 in 2005 to 59,112 in 2006. Most of these workers are employed in the Eastern United States.[12] While there was a proportionately large jump between 2005 and 2006, absolutely, the increase nationwide is relatively trivial. For Washington state, from January 1, 2006 to December 31, 2006, a total of 16 employers sent in applications. Fifteen were

approved and one was withdrawn. A total of 777 workers were certified – less than one percent of total agricultural employment in the state for that year. The H-2A Program, as currently constituted, is not a comprehensive and significant source of migrant and seasonal farm labor.

## Services Delivered by WorkSource Centers

WorkSource centers can assist in alleviating spot shortages of labor across the agricultural economy. Over the program year July 1, 2004 to June 30, 2005, 11,472 agricultural workers and 301,728 nonagricultural workers sought the assistance of the state's WorkSource cCenters. For the program year July 1, 2005 to June 30, 2006, 12,891 agricultural workers sought the assistance of the WorkSource centers while this is true of 293,730 nonagricultural workers. These data represent *unduplicated counts* of individuals seeking assistance. In 2004 to 2005, agricultural workers received an average of 5.9 services of all types; this rose to 6.7 in the 2005 to 2006 program year. In contrast, for the 2004 to 2005 program year, nonagricultural workers received an average of about 4.8 services. This figure rose to 6.1 in the 2005 to 2006 program year.[13] In short, service provision activity rose in 2006 compared to 2005.

### *Services Related to Getting a Job*

*Exhibit 4.9* provides detail on the structure of services provided to workers seeking assistance from WorkSource centers. The typical client from the agricultural-worker sector received slightly more than one job referral while the nonagricultural worker received slightly less than one job referral. If we focus

**Exhibit 4.9**
Comparison of Services Provided to All Agricultural Workers, Including Migrant and Seasonal Workers and All Other Nonagricultural Workers Based on Unduplicated Counts of Social Security Numbers
Washington State, Program Year July 1, 2005 to June 30, 2006
*Source:* ESD/LMEA, Workforce Administration, SKIES Data Warehouse

| | All Agricultural Workers, Including Migrant and Seasonal Farm Workers N = 12,891 Unduplicated Workers | | Nonagricultural Workers N = 293,730 Unduplicated Workers | |
|---|---|---|---|---|
| Type of Service Delivered | Total Services | Percent Total Services | Total Services | Percent Total Services |
| Module 1 - Orientation and Job Search Preparation | 2,951 | 3% | 74,759 | 4% |
| Job Referrals | 13,414 | 15% | 290,497 | 16% |
| Job Search and Placement Assistance | 8,726 | 10% | 221,633 | 12% |
| Service Orientation | 2,127 | 2% | 25,822 | 1% |
| Provided Labor Market Information | 11,492 | 13% | 186,611 | 10% |
| Follow-up Services | 1,368 | 2% | 11,166 | 1% |
| Staff-assisted Job Matching | 5,021 | 6% | 90,991 | 5% |
| Provided Training/Retraining Information | 2,235 | 3% | 29,136 | 2% |
| Job Search Planning | 989 | 1% | 42,638 | 2% |
| Employment Referrral | 1,117 | 1% | 32,861 | 2% |
| Referred to Supportive or Intensive Services | 2,840 | 3% | 5,138 | @ |
| Vocational/Employment Guidance Services | 1,701 | 2% | 10,462 | 1% |
| Resource Room Assistance | 2,471 | 3% | 82,004 | 5% |
| Translation/Interpretation Services Provided | 4,506 | 5% | 3,324 | @ |
| Outreach Services | 2,563 | 3% | 14,736 | 1% |
| Placement Assistance | 1,423 | 2% | 8,712 | @ |
| Job Search Review Program Services | 2,209 | 3% | 62,611 | 4% |
| Unemployment Assistance | 4,398 | 5% | 49,338 | 3% |
| Internet Technical Assistance | 473 | 1% | 31,816 | 2% |
| All Other Services | 14,818 | 17% | 511,742 | 29% |
| Total Discrete Services Provided | 86,842 | 100% | 1,785,997 | 100% |
| Average Services Received per Worker | 6.7 | | 6.1 | |

**NOTE:** @ = less than one percent

on services directed to immediately securing one a job, we see that in the 2004 to 2005 program year, 40.0 percent of all services offered to agricultural workers were directly job related – 17.5 percent were job referrals; 8.3 percent were job search and placement assistance; and 14.2 percent were the provision of labor market information. For the 2005 to 2006 program year, the services were 15 percent, 10 percent, and 13 percent, respectively for agricultural workers, yielding a total of 38 percent of all services received. In contrast, in the 2004 to 2005 program year, nonagricultural workers received 43.6 percent of total services in direct job-seeking services. This proportion dropped to 38 percent in the 2005 to 2006 program year. The most notable change for services provided by WorkSource centers between the two program years was the relative decline of *looking for work on the Internet*. About 13.5 percent of nonagricultural workers received this service in 2004 to 2005, but the service category is not reported for 2005 to 2006.

Finally, note that workers requested somewhat fewer job search services directly focused on getting a job during the 2005 to 2006 program year, a phenomenon consistent with the overall increase in demand for workers of all kinds in the state of Washington.

## Summary and Conclusion

*Chapter 3* focuses specifically on the issue of a general, statewide labor shortage during the 2006 agricultural production year. This chapter provides evidence that is complementary to the discussion of the issue of a statewide labor shortage. The following broad facts stand out.

- The dominant nonagriculture sector has a significant influence on labor demand, labor supply, and wage rates in the agriculture sector.
- Total employment in the state and the nation grew during 2006.
- Total employment in the agriculture sector did not decline, and, in fact, remained constant during 2006 compared to 2005.
- The unemployment rate for the state and the nation dropped to historic lows during 2006.
- The seasonal and annual pattern of continued claimants dropped consistently from 2003 to 2006.
- The countywide patterns of estimated unemployment generally exhibit downward trends in the peak growing and harvest months during 2006 compared to 2005. This is true for counties that contain the MSAs and MDs for those counties where agricultural employment is concentrated.
- Job vacancies drop significantly between the two years, though in each year, the dominant source of the drop varies.
- Forty-three percent of agricultural workers applying for help from the WorkSource centers receive services that focus on direct job acquisition, while nonagricultural workers receive an estimated 46 percent of their services in the form of help for direct job acquisition.
- The increased demand for agricultural workers statewide was met in part by a reduction of continued claimants in the state.
- H-2A workers were not an important source of seasonal and migrant labor for the state in 2006. Serious concerns continue to exist on the part of growers with respect to the operation of the H-2A Program in the state during 2007.[14]
- Though spot shortages of migrant agricultural labor apparently occurred, the above evidence, combined with that of *Chapter 3*, suggest that there was no generalized shortage of agricultural labor during 2006.
- Instead, what we observe is an increase in labor demand over the entire economy and state. This increase in demand also occurs in agriculture and the primary evidence of such an increase is the increase in hourly average wage rates in cherries, apples, and pears.

### Update on the Unemployment Insurance Law – Tax Changes

- **2005 – EHB 2255** reduced the maximum tax rate for agriculture from 6.5 percent to 6.0 percent. It also established a "zero" social cost factor for certain industries, which is terminated at the end of 2007.
- **2006 – ESSB 6685** reduced the maximum rate for agriculture from 6.0 percent through rate year 2007 and 5.7 percent for rate year 2008 and thereafter.

### Update on the Unemployment Insurance Law – Benefit Changes

- **2005 –** The claimant's weekly benefit amount (WBA) is calculated using 3.85 percent of the claimant's average earnings in the two highest quarters of the base year. This represents a change from the previous four-quarter averaging times 1.0 percent. Benefits paid that exceed the benefits, that would have been paid if the WBA had been calculated as 1.0 percent of annual wages, are not charged to contribution-paying employers' experience rating accounts. This method applies through July 1, 2007.
- **2006 –** The WBA calculation change in 2005 is made permanent and the charging section to employers is changed as though the weekly benefit amount is 1.0 percent in all four quarters of the base year.

## Endnotes

[1] The continuing and relatively stable drift of workers out of agricultural employment and into employment in the nonagriculture sectors is the chief manifestation of this phenomenon. Between the second quarter of 2005 and the second quarter of 2006, it is estimated that the total employment of foreign-born Hispanics in all industries increased by 7.8 percent from an estimated 10.3 million workers to 11.1 million. While the agriculture, forestry, fishing, and mining employment of this group increased by 14.5 percent, construction increased an estimated 21.9 percent. Some of this increase will be from existing workers in the United States, and some of it will come from new entrants, whether legal or illegal. See Kochhar, Rakesh, "Latino Labor Report, 2006: Strong Gains in Employment." Pew Hispanic Center, Washington, D.C., September 27, 2006, Table 10, p. 20. Data from the U.S. Department of Labor National Agricultural Workers Survey (2001 to 2002) indicates that from 15 percent to 20 percent of the workers surveyed have less than one year's experience working in agriculture in the United States. This phenomenon suggests that as these new workers flow into the agriculture sector at the bottom, a similar proportion flows out into the nonagriculture sector. Those flowing out of agriculture are drawn by the opportunities in the overall economy. This flow is also correlated with the age of the agricultural worker, with older workers flowing out at the top, and younger, inexperienced workers flowing in at the bottom. See Levine, Linda, "Farm Labor Shortages and Immigration Policy," CRS Report for Congress, Congressional Research Service, The Library of Congress, updated March 29, 2006.

[2] Washington State Employment Security Department, Labor Market and Economic Analysis Branch, Economic and Policy Analysis Unit, *2006 Washington State Labor Market and Economic Report*, January 3, 2006.

[3] The civilian labor force does not include members of the Armed Forces.

[4] These unemployment rates are calculated from several data sources and are not sample statistics with known sampling errors. In addition, to the extent that there is estimation error in these averages, they are likely to be larger for smaller

counties, MSAs and MDs. Thus, we are interested primarily in the change in direction of these averages. That is, does the average increase, decrease, or stay the same between 2005 and 2006?

[5] These estimates are not sample statistics. Rather, they are estimates developed from several different data sources. There is a relatively large estimation error in these estimates that increases as the county labor force becomes smaller. For a rule of thumb, a change of at least one half of one percent is considered to be a statistically significant difference.

[6] Using year-to-year comparisons by quarter of the year, tabulations from the *Current Population Survey* conducted by the Pew Hispanic Center indicate that the annual increase in total employment of foreign-born Hispanics declined in 2005 compared to similar quarters in both 2004 and 2006. In July to September 2004, there was an estimated increase of 721,000 foreign-born Hispanics working in the United States. This fell to an increase of 496,000 for the same period in 2005, and rose to an increase of 913,000 in 2006. From an estimated increase of 877,000 such workers employed in the fourth quarter of 2006, employment dropped to an increase of 350,000 in the first quarter of 2007. In short, if tightening of the border with Mexico and increased enforcement are having their effect on reducing the supply of seasonal and migrant labor, the effects will likely show up in 2007. See Pew Hispanic Center, "Indicators of Recent Migrant Flows from Mexico," *Fact Sheet*, Washington, D.C., May 30, 2007, Figure 5.

[7] See Washington State Employment Security Department, Labor Market and Economic Analysis Branch, Economic and Policy Analysis Unit, *2006 Washington State Labor Market and Economic Report*, January 3, 2006, Chapter 4, for a detailed discussion of unemployment compensation that compares all industries in the state with agriculture.

[8] Washington State Economic and Revenue Forecast Council, *Washington State Economic Climate Study*, Volume XI, October. **http://www.erfc.wa.gov/pubs/clim1006.pdf**

[9] Washington State Employment Security Department, Labor Market and Economic Analysis Branch, Economic and Policy Analysis Unit, *2006 Washington State Labor Market and Economic Report*, January 3, 2006.

[10] Compared to 2005, the continued claimants (not unduplicated claimants) in 2006 had a higher percentage of female workers and a higher percentage of both the youngest and the oldest workers. Otherwise, the primary demographic characteristics of workers submitting claims between the two years are relatively similar. Note also that continued claimants dropped in all major agricultural areas except crop preparation, where they actually rose by 4.3 percent. In particular, continued claimants dropped by 12.2 percent in the deciduous tree fruit sector and 8.1 percent in field crops (see *Appendix Exhibits 4.2* and *4.3)*.

[11] This program was revised in the recent Senate initiative to respond to the illegal immigrant/undocumented worker problem. A key component of the revision is to allow agricultural employers to "attest" to the presence of a labor shortage, rather than having the U.S. Department of Labor certify that such a shortage exists for any given grower in any given region.

[12] These data are from the U.S. Department of Labor, Employment and Training Administration, *H-2A Regional Summary* for the years 2004, 2005, and 2006. Google, for example: **http://www.foreignlaborcert.doleta.gov/h-2a_region2006.cfm**.

[13] *2005 Agricultural Workforce in Washington State*, Table 18, p. 77 for detail on WorkSource services provided during the 2004-2005 program year.

[14] Email memo from Dan Fazio to Greg Weeks, et al. as of June 8, 2007.

# Chapter 5

## The Wine Grape and Wine Industry in Washington State

### Introduction – Changes in Agricultural Land Use in Washington

Viticulture and the wine industry have become significant economic sectors in the United States' economy. The United States is now the fourth largest producer of wine in the world, behind France, Italy, and Spain. Consistent with this development, the economic importance of these two sectors in the Washington economy and its agriculture sector have grown dramatically over the past three decades.

In 2005, the United States Department of Agriculture estimated that the value per harvested acre of wine grapes in Washington state was $3,654 while the per acre value for winter wheat was $215.[1] This wide disparity in value of yield has contributed to two related changes in agricultural land use in Washington. First, there is a continuing *shift in demand* – an increase – for certain types and locations of agricultural land for use in viticulture. This is occurring to a considerable extent in areas that were initially devoted to the production of apples, wheat, or other grains, for example. Thus, in these areas, there has been a *shift in demand* – a reduction – *out of* wheat and other agricultural production. Simultaneous with this reallocation of the use of land, there has been a reallocation in the quantities and types of labor and capital used as well. Unlike wheat, in which the production is capital-intensive and land-extensive, viticulture production is relatively labor-intensive and land-intensive, though considerable capital and complex technology are used as well.[2] Thus, the growth of viticulture and wineries has significant implications for the composition of agricultural labor being used in these regions of the state where viticulture is economically important, such as the Yakima Valley and the Walla Walla regions.[3]

### *Washington in the National Context*

In 2006, the gross domestic product of the United States was estimated at $13,246.6 billion in current dollars. Of this total, an estimated $162.0 billion can be attributed to the United States' wine industry, grapes (wine, table, and raisins), and grape products (juice, must, etc.) in terms of direct, indirect, and induced economic effects.[4] This represents about 1.2 percent of the United States' economy for that year. The industry and its linkages to other sectors in the economy have become significant. For example, the United States' wine market grew by 13.7 percent between 2002 and 2006 in terms of volume, and by more than 15 percent in terms of total revenue earned.[5]

In 2005, total grape production of all types in the United States was 6,978,000 tons. California accounted for about 89.1 percent of this production, of which 48.6 percentage points were wine grapes. Washington state is the next largest producer at 5.3 percent of total grape production in 2005, of which 1.4 percentage points were wine grapes. Small by comparison with California, Washington wine grape production since 1976 has grown by a factor of 18 (or 1,804.5 percent) as of 2006, from just 6,650 tons to 120,000 tons harvested![6] In terms of value of utilized wine grape production, over the same period, current dollar revenues increased by a factor of 71.7 (or 7,172.6 percent), from $1.6 million to $113.0 million. Just as significant, most of this growth has been in the premium wine market, where wine sells for at least $7.00 a 750 ml. bottle. And, indeed, the Washington production is shifting toward the production of ultra-premium wines that sell for $14.00 and over in current dollars.[7]

Finally, between 1999 and 2005, the number of bonded wineries in the United States grew from an estimated 2,688 to 4,929. This is an increase of 83.3 percent. In contrast, the number of bonded wineries in Washington state grew from 163 to 454. This is an increase of about 178.5 percent – the fastest growth in the nation over this time period.[8]

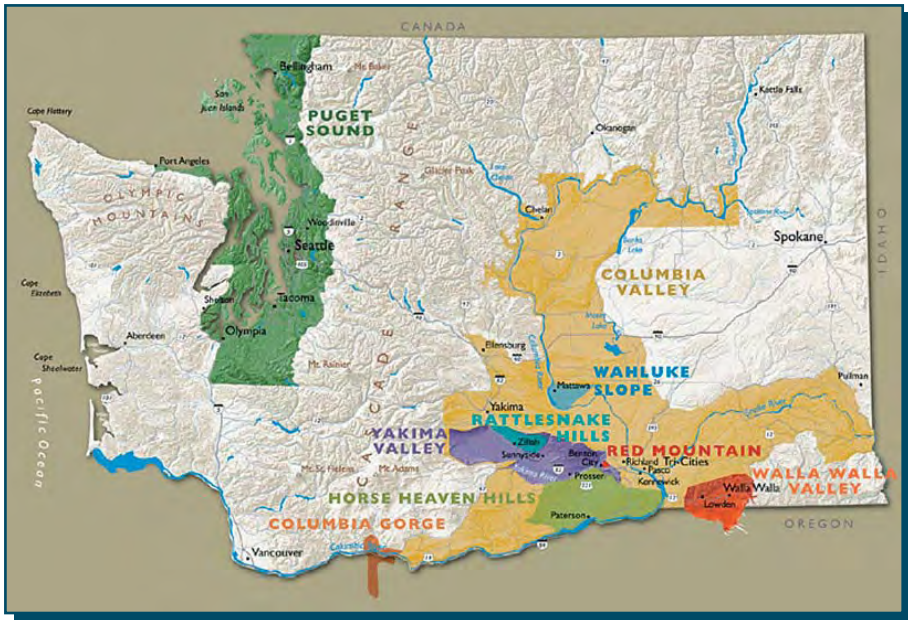
## The Historical Development of Washington State Viticulture and Wineries

### *American Viticultural Areas*

While the first commercial-scale plantings of wine grape vineyards began in the 1960s[9], perhaps one can date the arrival of Washington wines on the national and international market from 1983, the year in which the Yakima Valley was recognized as a major *American Viticultural Area* (AVA). Since that date, eight more AVAs in the state have been recognized, with two more pending, as shown in *Exhibit 5.1*.

Between 1981 and 2006, the number of wineries has grown from 19 to over 460 – an increase by a factor of over 24, or 2,421 percent.[10] More recently, between 1999 and 2005, the number of bonded wineries in the state has grown from 163 to 454, an increase over the seven-year period of 178.5 percent, or, in terms of a simple average, 25.5 percent a year (*see Appendix Exhibit 5.4*).

**Exhibit 5.1**
Washington's American Viticultural Areas (AVAs)
Washington State, as of 2006
*Source:* U.S. Department of Agriculture – National Agricultural Statistics Service (2006). The *Washington Vineyard Acreage Report*. Susan R. O'Hara. Washington Wineries, Wines and Wine Country. Wines Northwest™, Vancouver, Washington. **http://www.winesnw.com/wahome.html**




**Other Unofficial Wine Country Regions**

- **Lake Chelan Valley** – Proposed AVA
- **Spokane Area** – Unofficial wine region
- **North Central Washington** (Columbia Cascade Region)
- **Ancient Lakes Area** (Central Washington)

**Official AVAs and Acreage Planted in 2006:**

- **Yakima Valley:** Established 1983; 9,485 acres planted – 6,213 in white varieties – 3,272 in red varieties
- **Columbia Valley:** Established 1984; 6,693 acres planted – 2,620 in white varieties – 4,073 in red varieties
- **Walla Walla Valley:** Established 1984; 1,000 acres planted – 163 in white varieties – 837 in red varieties
- **Puget Sound:** Established 1995; 130 acres planted – 64 in white varieties – 66 in red varieties
- **Red Mountain:** Established 2001; 680 acres planted – 94 in white varieties – 586 in red varieties
- **Columbia Gorge:** Established 2004; 210 acres planted – 114 in white varieties – 96 in red varieties
- **Horse Heaven Hills:** Established 2005; 6,667 acres planted – 2,803 in white varieties – 3,864 in red varieties
- **Wahluke Slope:** Established 2006; 4,755 acres planted – 1,059 in white varieties – 3,696 in red varieties
- **Rattlesnake Hills:** Established 2006; 1,380 acres planted – 519 in white varieties – 861 in red varieties

## *Industry Concentration*

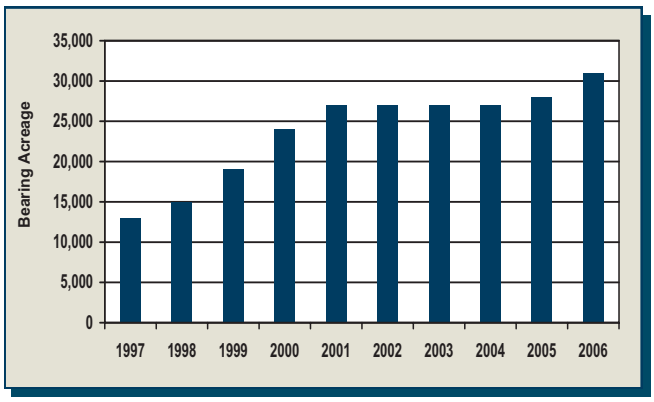
The wine industry in the state is highly concentrated. In 2006, the top 50 wineries in the state produced an estimated total of 6,575,348 cases. The top five largest wineries, owned by just two firms, produced about 72.6 percent of this output. The next nine largest wineries produced an additional 17.5 percent. The remaining 36 largest wineries produced 9.9 percent of the total production of the top 50.

The picture is similar in terms of the total cases sold during 2006, with the top five wineries selling 80.4 percent of the total cases, and the top 14 accounting for 88.5 percent of the total sales of the top 50 wineries (*see Appendix Exhibit 5.5*).

## *Bearing Acreage*

In the past ten years, wine grape growing acreage in the state has increased by a dramatic 238.5 percent, from 13,000 acres to 31,000 acres (*see Exhibit 5.2*). Taking a three-year average, average yield in tons per acre was 4.37 over the 1997 to 1999 period. This decreased to an average of 3.92 tons per acre over the period 2004 to 2006. A number of factors affect the ton yield per acre, including the grape variety, irrigation practices, and other aspects of the viticulture art and science. Thus, this decrease in tonnage does not necessarily represent a decrease in productivity.

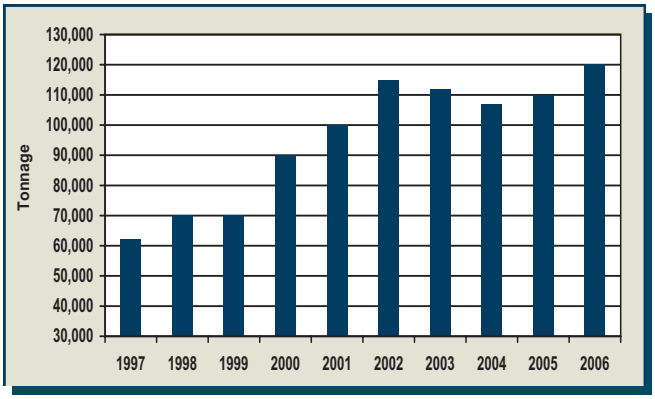
**Exhibit 5.2**
Wine Grape Bearing Acreage
Washington State, 1997 to 2006
*Source:* Appendix Exhibit 5.1




## *Quantity Produced and Utilized*

As *Exhibit 5.3* shows, an estimated 62,000 tons of wine grapes were produced in 1997. This tonnage increased to 120,000 nine years later. This is an increase of 93.5 percent, or a simple average increase per year of about 9.4 percent. Even more dramatic, however, is the comparison with period 1976 to 1978. Averaged annual tonnage over this period was 6,950 tons. Averaged annual production for the 2004 to 2006 period is 112,300 tons. Thus, over the 30-year period, the tonnage output of wine grapes increased by 1,615.8 percent, or by a factor of about 16.2 times.[11]

**Exhibit 5.3**
Wine Grape Quantity Produced and Utilized in Tons
Washington State, 1997 to 2006
*Source:* Appendix Exhibit 5.1

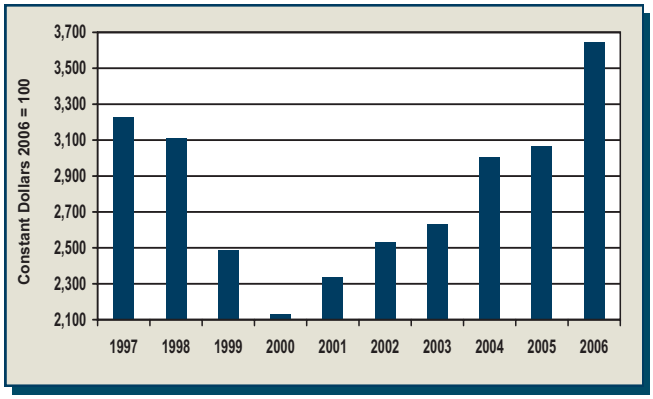



## *Value Per Bearing Acre*

Wine grape value per bearing acre is displayed in *Exhibit 5.4*. The data are reported in constant dollars deflated to the base year 2006. Because of seasonal fluctuations in production, we compare the three-year average for 1997 to 1999 with the three-year average for 2004 to 2006. An increase in demand for Washington's wine grapes is indicated by the fact that the acreage planted increased (supply increased), the total ton supply of wine grapes increased (supply increased), and the total revenue earned per acre increased over the relevant time period from an estimated $2,942 per acre to an estimated $3,238 per acre – a 10.1 percent increase. Therefore, for the price of wine grapes to have increased while the supply of wine

grapes was simultaneously increasing, demand for wine grapes has to also be increasing. This phenomenon is borne out further with respect to the average price paid per ton of wine grapes.

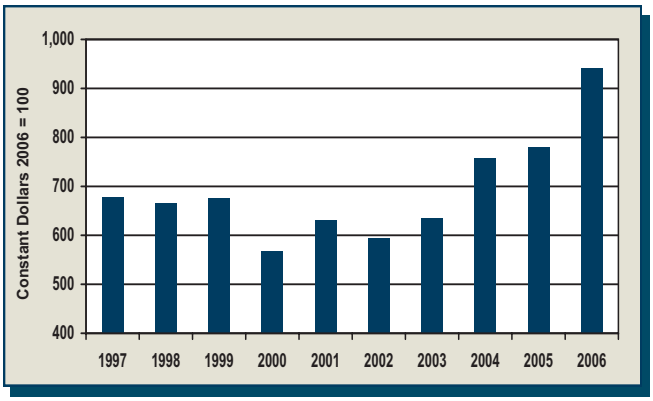
**Exhibit 5.4**
Wine Grape Value per Bearing Acre in Constant Dollars, 2006 = 100
Washington State, 1997 to 2006
*Source:* Appendix Exhibit 5.1




## *Average Price Per Ton*

*Exhibit 5.5* displays the historical change in the average price per ton of wine grapes produced and utilized. Again, we compare constant dollar prices to the base year 2006. As above, we take a three-year average for 1997 to 1999 and 2004 to 2006. Average annual price per ton was $673 over the period 1997 to 1999. It rose by 22.8 percent to an annual average price per ton of $827 over the period 2004 to 2006.[12]

**Exhibit 5.5**
Wine Grape Average Price per Ton in Constant Dollars, 2006 = 100
Washington State, 1997 to 2006
*Source:* Appendix Exhibit 5.1

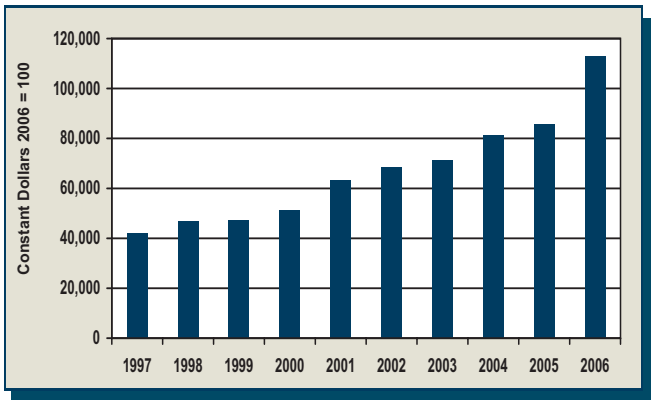



## *Value of Utilized Production*

The value of utilized production in constant dollars has increased from an annual average amount of $45,296,000 over the period 1997 to 1999 to an annual average amount of $93,313,000 over the period 2004 to 2006. This represents an increase of about 206 percent, or an increase by a factor of two times. In short, the revenue value of the industry (in constant dollar terms) has doubled in ten years.

However, the contrast is even greater when one compares the constant dollar value of production over the past 30 years. The constant dollar (2006) value of production was an estimated annual $8,118,000 averaged over the period 1976 to 1978. Thus, the value of output increased by a factor of 11.5 times ($93.313m / $8.118m = 11.49). Since the demand for labor is a derived demand, based on the demand for the product, one can see that this much revenue growth in the industry has had a significant impact on employment and earnings in Washington agriculture, as is discussed in the section on *Employment and Earnings*.

**Exhibit 5.6**
Wine Grape Value of Utilized Production in $1,000s of Constant Dollars, 2006 = 100
Washington State, 1997 to 2006
*Source:* Appendix Exhibit 5.1



# Chapter 5

## Interactions of the Viticulture and Wine Industry with the Rest of the Economy — Overall United States Effects Compared with Washington State Effects

As with the agriculture sector overall, the economic impact of the viticulture and wine industry extends well beyond the initial stage of direct production of agricultural outputs.[13]

## Impacts for the American Economy Overall

### *Revenues*

*Exhibit 5.7* details the estimates of the direct, indirect, and induced economic effects of the United States' viticulture and wine industry on the national economy for the year 2007.[14] These estimates are driven largely by the viticulture and wine industry in California, as one would expect.

Total direct revenue in 2007 is estimated to be $56.6 billion. Indirect economic effects add an additional $33.9 billion, and induced economic effects are estimated to add a further $38.6 billion. The total economic effect of the industry is about $129.1 billion. The economic *multiplier* for the industry is very large – 2.279. This means that for every dollar directly generated by the industry, an estimated additional 1.28 dollars in revenue is created.

### *Total Before-Tax Earnings*

The total impact of the industry on before-tax earnings is even greater than the impact on total revenues. The direct effect on earnings is estimated at about $9.9 billion. But the indirect effect on earnings is estimated at about $10.4 billion and the induced effect is estimated at about $12.7 billion. The overall earnings *multiplier* is 3.327. This implies that for every dollar of earnings directly generated by the industry, an additional $2.33 dollars of earnings is created. This is a very large multiplier effect.

We have only direct effects on winery and vineyard employees. Nationwide, winery employees are estimated to earn $1.4 billion in 2007, and vineyard employees are estimated to earn $698,400,000.

**Exhibit 5.7**
Summary of Economic Impact of Wine, Grapes, and Grape Products on the American Economy, Revenues, and Earnings: Input-Output Model Estimates
*Source:* MFK Research LLC. The Impact of Wine, Grapes and Grape Products on the American Economy 2007: Family Business Building Value, St. Helena, CA., 2007, Tables 1 and 3. **www.mkfresearch.com**

| | Economic Impact | | | | |
|---|---|---|---|---|---|
| **Statistic** | **Direct** | **Indirect** | **Induced** | **Total** | **Multiplier[1]** |
| **Revenue in $Millions** | 56,649 | 33,896 | 38,578 | 129,124 | 2.279[2] |
| Winery Sales Only | 11,372 | — | — | — | — |
| Retail and Restaurant Wine Sales | 9,782 | — | — | — | — |
| **Earnings in $100,000** | 9,888.2 | 10,355.3 | 12,658.6 | 32,902.1 | 3.327 |
| Winery Employees | 1,395.9 | — | — | — | — |
| Vineyard Employees | 698.4 | — | — | — | — |
| **Total Employment 2005 – Workers** | 513,793 | 237,984 | 336,567 | 1,088,344 | 2.118 |
| Vineyards | 35,170 | — | — | — | — |
| Vineyard Contracted Services | 15,860 | — | — | — | — |
| Wineries | 33,560 | — | — | — | — |

**NOTES:** [1]The results of this input-output model are driven largely by the California wine, grapes, and grape products industries.

- In terms of value of utilized production for all grapes, California accounted for $2,727,406,000 out of a total of $3,013,418,000 in 2005 – 90.5 percent. Washington is second with $141,950,000 – 4.7 percent.
- In 2005, California had 474,000 acres in grapes of all kinds, out of a national total of 608,750 acres. Washington state came in second with 54,000 acres.
- In terms of total production, California produced 6,130,000 tons of grapes of all kinds in 2005 out of a national total of 6,974,900 tons, followed by Washington state with 415,000 tons.

[2]For comparison, for 2005, the producer output multiplier as estimated for wines by the U.S. Department of Agriculture Economic Research Service is 2.60. The producer output multiplier includes the activity embodied in the commodity as it leaves the farm gate or manufacturer door. This multiplier does not include household sector (induced) effects. See: U.S. Department of Agriculture, Economic Research Service, *Data Sets*, Agricultural Trade Multipliers: ERS Estimates. **http://www.ers.usda.gov/Data/TradeMultiplier/ERSestimates.aspx**

### *Total Employment Effects for 2005*

Total employment effects nationwide are estimated for 2005 at 513,793 workers. The indirect employment created is estimated at 237,984 employees and the induced effect is estimated at 336,567 employees, for a total employment of 1,088,344 workers. The multiplier is estimated at 2.118, which implies that for every job directly created in the industry, an estimated 1.12 additional jobs are created overall (one direct job plus 1.118 indirect and induced jobs = 2.118 total jobs).

## Impacts for the Washington State Economy Overall

The most recent input-output results for the viticulture and wine industry in Washington are for 1999. Eight years have passed which have changed the size of the industry considerably as previously discussed. In addition, technological changes have also occurred, which in terms of 2006 data are not reflected in the 1999 data. On the other hand, the same input-output estimation method is used for the Washington results and the national economy. *In any case, due to the dramatic increase in the industry, the estimated values below should only be taken as indicative of general size and direction of effect.*

### *Revenues*

For 1999, the wine industry in Washington is estimated to have created $695,200,000 in direct revenues. Indirect revenues are estimated at $263,800,000 and induced revenues are estimated at $192,500,000. The total impact is estimated at $1,151,500,000. The overall economic multiplier is 1.658, which is similar to the overall multiplier of 1.7 for agriculture as a whole in the state in the year 2000 (*see Exhibit 5.8*). Thus, for every dollar directly generated by the industry, an additional $0.66 of total revenue is generated.

This multiplier is much lower than that for the national economy as previously discussed. A possible contributing reason for this lower estimated value may be that the industry in Washington imports much of its vines, technology, and equipment from the rest of the nation, mainly California. Such imports constitute a leakage of spending power from the Washington state economy, just as imports from foreign nations constitute a leakage for the United States' economy overall – that is, revenues generated in the state are spent outside of the state and thus reduce the estimated multiplier effect within Washington.[15]

### *Total Before-Tax Earnings*

*Exhibit 5.8* shows that total before-tax earnings directly generated in 1999 are estimated at $182,100,000. Indirectly generated earnings are estimated at $80,500,000 and induced earnings are estimated at $60,600,000. The earnings impact multiplier is estimated at 1.775. Thus, for every dollar of earnings created directly by the industry, an additional $0.78 is generated. This multiplier impact is much lower than that estimated for the overall economy, wherein one dollar of earnings directly generated creates an additional $2.33 dollars. Leakages from the state economy may be responsible for part of this difference. Of course, the time periods over which the two estimates are made also differ and thus, given the dramatic changes in the Washington state industry, account for the estimated differences in part.[16]

**Exhibit 5.8**
Summary of Economic Impact of Wine and Wine Grape Industries on the Washington State Economy, Revenues, and Earnings for 1999 Compared to Agriculture Overall for the Year 2000, Current Dollars: Input-Output Model Estimates
*Source:* For the State of Washington Wine Industry: MFK Research LLC., *Economic Impact of the Washington State Wine and Wine Grape Industries*, St. Helena, CA., March 2001. pp. 34 and 35. For the State of Washington Agricultural Sector: Ghosh, Joydeep and David W. Holland, "The Role of Agriculture and Food Processing in the Washington Economy: An Input-Output Perspective," TWP-2004-114, Department of Agricultural and Resource Economics, College of Agriculture, Washington State University, August 2004

| | | Economic Impact | | | |
|---|---|---|---|---|---|
| **Statistic** | | | | | |
| **Year - 2000** | **Direct** | **Indirect** | **Induced** | **Total** | **Multiplier** |
| All Washington Direct Agricultural Production, 2000 | 4,088,292,002 | 1,611,231,921 | 1,200,456,961 | 6,899,980,821 | 1.7 |
| Farm Sector Only | 3,090,917,888 | 74,351,320 | 12,404,028 | 3,177,673,216 | — |
| Food Processing Sector Only | 7,986,925,128 | 3,495,095,874 | 1,900,664,403 | 13,382,685,145 | — |
| **Year - 1999** | | | | | |
| Wine Industry Overall in $1,000s | 695,200 | 263,800 | 192,500 | 1,151,500 | 1.658 |
| Winery Sales Only | 288,667 | — | — | — | — |
| Retail and Restaurant Wine Sales (in Washington) | 575,902 | — | — | — | — |
| Wine Grapes | 63,700 | — | — | — | — |
| Total Before-Tax Earnings in $1,000s | 182,100 | 80,500 | 60,600 | 323,200 | 1.775 |
| Winery Employees | 21,023 | — | — | — | — |
| Wine Grape Vineyard Employees Only[17] | 12,718 | — | — | — | — |

## Covered Employment and Earnings

### *Establishments Covered by the Unemployment Insurance Program*

Estimates based on the reports generated from the payment of Unemployment Insurance taxes generate a somewhat different picture than the previous discussion presents. The data in this section of the report are the Quarterly Census of Employment and Wages (QCEW), based primarily on data from the ES 202 forms for firms that report workers covered by the Unemployment Insurance Program at the state and federal level.[18]

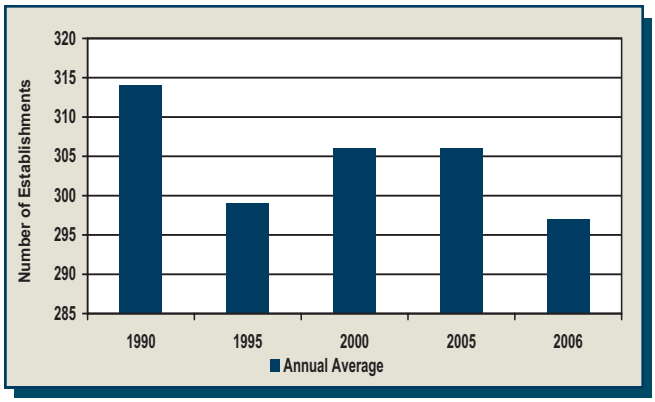
If a winery or a vineyard does not hire workers outside of the family unit, there is a possibility that such an establishment will not be represented in the data set. For example, the Washington Wine Commission estimates that in 2006 there are over 460 wineries and 350 wine grape growers in the state. The QCEW data report 297 covered vineyards of all grape varieties and 157 covered wineries for 2006.[19] Thus, almost 300 wineries are relatively small and are not covered by the Unemployment Insurance Program. It is not clear how many wine grape vineyards are not covered, since the vineyard estimate includes all grapes, not just wine grape vineyards.

Given these qualifications to the QCEW data, the following trends are important. Our data begin in 1990 for both vineyards and wineries, since in that year UI coverage was increased to cover almost all vineyards in the state. Recall that in 1983, the Yakima Valley region was the first wine grape region in the state to be designated an American Viticultural Area.

### *Growth in Covered Establishments – Vineyards*

*Exhibit 5.9* displays the total number of covered vineyard establishments, for all grapes, for selected years. The number of vineyards has declined from 314 establishments in 1990 to 297 establishments in 2006. Since planted acreage has increased dramatically over this time, as previously discussed, the most likely reason for this decline is that there has been some consolidation of vineyards in the industry.

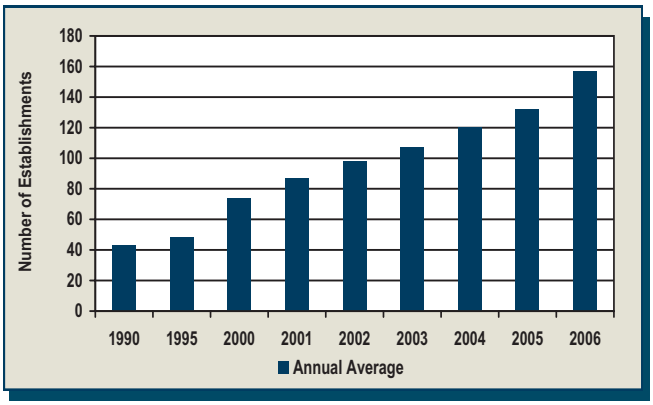
**Exhibit 5.9**
Covered Vineyard Establishments, All Grape Types
Washington State, Selected Years, 1990 to 2006
*Source:* Appendix Exhibit 5.3




### *Growth in Covered Establishments – Wineries*

Compared to the establishment of new vineyards of all types, the growth in covered winery establishments increased from 43 in 1990 to 157 in 2006, for an increase of 365 percent over the 17-year period. The simple annual average increase has been a steady 21.5 percent a year over this period (see *Exhibit 5.10*).

**Exhibit 5.10**
Covered Winery Establishments
Washington State, Selected Years, 1990 to 2006
*Source:* Appendix Exhibit 5.3

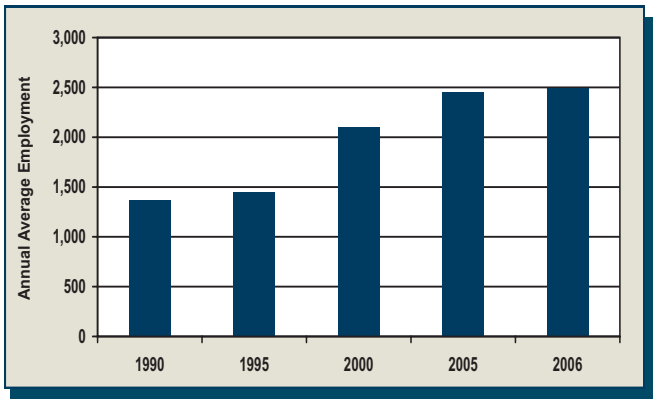



### *Growth in Covered Annual Average Employment – Vineyards*

*Exhibit 5.11* shows covered annual average employment in vineyards for all types of grapes. Since 1990, total annual average employment has approximately doubled from 1,373

workers in 1990 to 2,493 workers in 2006. This is an 81.6 percent increase over the 17-year period, for a simple annual average increase in covered employment of 4.8 percent a year.

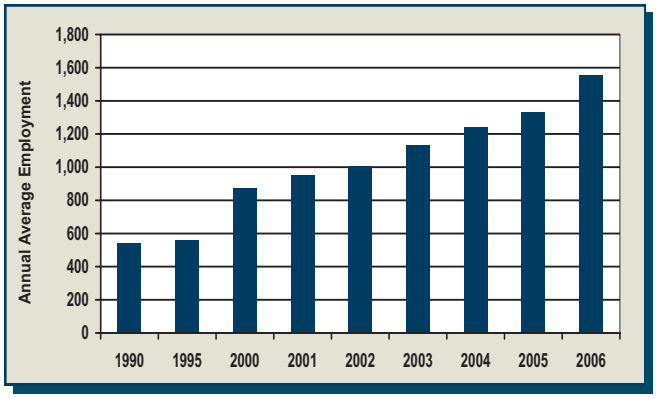
**Exhibit 5.11**
Covered Annual Average Employment in Vineyard Establishments, All Grape Types
Washington State, Selected Years, 1990 to 2006
*Source:* Appendix Exhibit 5.3




## *Growth in Covered Annual Average Employment – Wineries*

As *Exhibit 5.12* shows, annual average covered employment in wineries grew from 541 workers in 1990 to 1,555 workers in 2006. This is an increase over the 17-year period of 287.4 percent, or an increase by a factor of 2.87. This is a simple average growth of 16.9 percent a year over the period. Thus, covered winery employment has grown much faster than covered employment in vineyards – roughly three times faster.

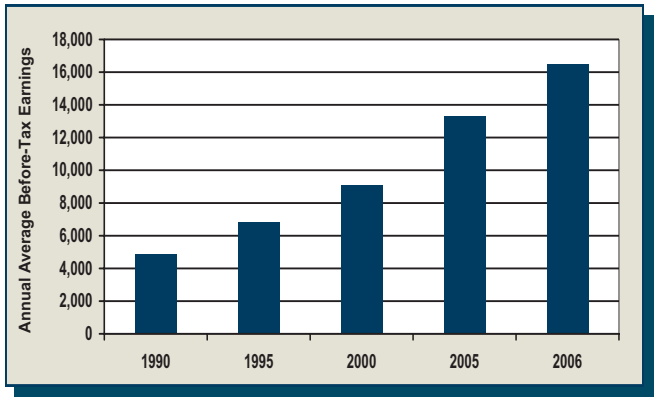
**Exhibit 5.12**
Covered Annual Average Employment in Winery Establishments
Washington State, Selected Years, 1990 to 2006
*Source:* Appendix Exhibit 5.3




## *Growth in Covered Annual Average Before-Tax Earnings – Vineyards*

*Exhibit 5.13* displays annual average before-tax earnings for covered vineyard workers expressed in constant dollars to the base year 2006.[20] We see that constant dollar annual average earnings in 1990 were $4,871. These earnings increased to $16,482 by 2006, an increase by a factor of 3.38, or 338.4 percent. In current dollars, the increase is more modest, but still large, starting at $7,783 in 1990 and rising to $16,482 in 2006, for a factor increase of 2.12 or 211.7 percent. Thus, even as covered employment has grown, so has annual earnings per worker.

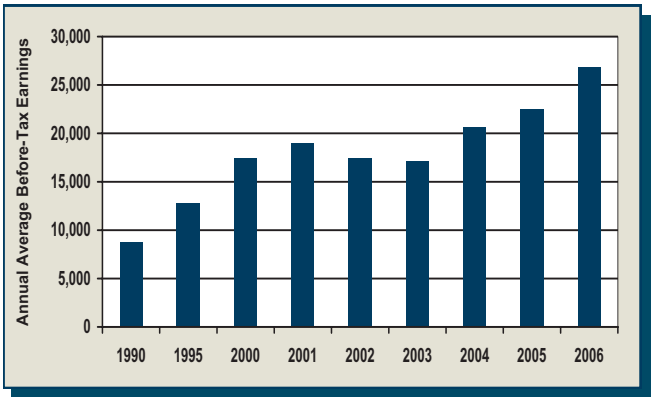
**Exhibit 5.13**
Covered Annual Average Before-Tax Earnings in Vineyard Establishments, All Grape Types, Constant Dollars, 2006 = 100
Washington State, Selected Years, 1990 to 2006
*Source:* Appendix Exhibit 5.3




## *Growth in Covered Annual Average Before-Tax Earnings – Wineries*

Annual average earnings are considerably higher in covered winery employment than in covered vineyard employment as is shown in *Exhibit 5.14*. Starting out at $8,700 in constant dollars in 1990, they have grown to $26,823 by 2006, an increase by a factor of 3.08 or 308.3 percent. Compared to vineyard workers, in 1990 winery workers earned 1.79 times more per year. For 2006, compared to vineyard workers, this ratio had narrowed to1.63 times, or 162.7 percent.

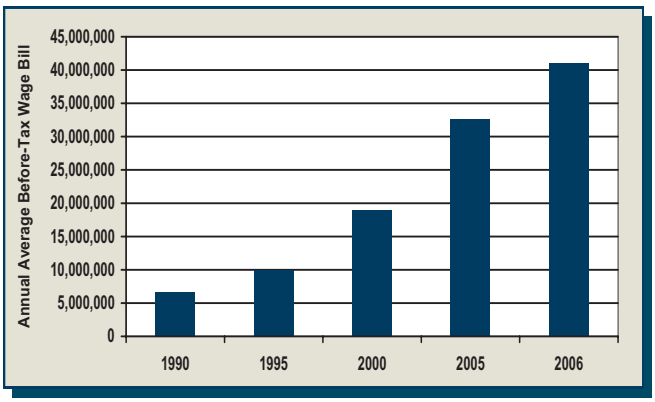
**Exhibit 5.14**
Covered Annual Average Before-Tax Earnings in Winery Establishments, Constant Dollars, 2006 = 100
Washington State, Selected Years, 1990 to 2006
*Source:* Appendix Exhibit 5.3




### *Growth in Covered Annual Total Before-Tax Wage Bill – Vineyards*[21]

The total wage bill in constant, before-tax dollars for workers in covered vineyards has increased dramatically over the period from 1990 to 2006. In 1990, the year when coverage was extended to almost all vineyards in the state, the constant dollar annual wage bill (total wage expenditures by the vineyard owners) was only $6,687,678. This increased to $41,089,212 by 2006. This is an increase by a factor of 6.14, or 614.4 percent! Thus, while the number of covered workers almost doubled, the wage bill increased six times. The factor increase in current dollars is almost as large; the current dollar wage bill increased by a factor of 3.84 times.

**Exhibit 5.15**
Covered Annual Total Before-Tax Wage Bill in Vineyard Establishments, All Grape Types, Constant Dollars, 2006 = 100
Washington State, Selected Years, 1990 to 2006
*Source:* Appendix Exhibit 5.3

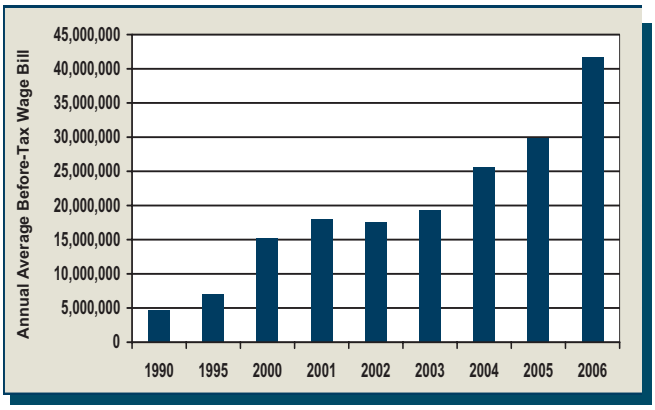



### *Growth in Covered Annual Total Before-Tax Wage Bill – Wineries*

Though covered wineries employ considerably fewer workers than do covered vineyards, the constant dollar wage bill rose even more dramatically over the period from 1990 to 2006. In 1990, the constant dollar wage bill was $4,706,907. By 2006 it had become $41,709,609, for a factor increase of 8.86 times, or 886.1 percent! The current dollar increase was also very large. In 1990, in current dollars, the wage bill was $7,521,423; it grew to $41,709,609 by 2006, for a factor increase of 5.55, or 554.5 percent.

In summary, though the industry has started from a small base, as a totality, in one generation it has become one of the major growth industries in Washington agriculture.

**Exhibit 5.16**
Covered Annual Total Before-Tax Wage Bill in Winery Establishments, Constant Dollars, 2006 = 100
Washington State, Selected Years, 1990 to 2006
*Source:* Appendix Exhibit 5.3




## The Competitive Nature of the Wine Industry and Prospects for Growth in Demand

The *2005 Agricultural Workforce in Washington State* annual report discusses the special case of agriculture in household consumption to show how the demand for agricultural food products changes as household income changes.[22] These concerns are important for the wine industry as well.

- The income elasticity of demand indicates how the overall demand for wine consumption will increase as household income increases; and

- The price elasticity of demand for wine indicates how the quantity demanded of wine changes as the price of wine changes.

These economic measures are of considerable importance for the Washington wine industry since the Washington wine industry is specializing in the premium wine market where a 750 milliliter bottle of wine is priced above $7.00. There is a heavy focus on varietals and an increasing focus on the particular origin, the *terrior*,[23] of Washington wines. *Thus, these elasticities reflect the growth possibilities for the industry, and therefore, the employment, wage rates, and earnings that agricultural workers in the vineyard and winery subsectors can expect over time.*

### *Income Elasticity of Demand*

One way to place this discussion in context is to compare the income elasticity of demand of food in general with the income elasticity of demand for wine. In America, the income elasticity of demand for food in general is about .14. That is, a 10 percent increase in household income will result, on average, in a 1.4 percent increase in the demand for food. This is a very low income elasticity. The income elasticity of demand for wine, however, is estimated by Jon P. Nelson[24] to be about .93. That is, as household income rises by, say 10 percent, the demand for wine will increase about 9.3 percent.[25] In short, as incomes rise in America and in its prime wine export destinations, total revenue in the winery subsector will increase almost proportionately for the near future.

### *Canada and the United Kingdom*[26]

Canada and the United Kingdom are major markets for wine exported from the United States. Thus, it is useful to determine the income elasticity of demand for wine for each of these two nations, since as their household income grows, their demand for wine will grow, including the demand for wine produced in America.

For Canada, we report on six market-relevent estimates of income elasticity of demand. Four of these fall in the range from .97 to 1.35. That is, a 10 percent increase in household income in Canada results in a 9.7 to 13.5 percent increase in the demand for wine. Canada currently imports more of its wine from the European Union (EU) than it does from the United States. However, this condition can clearly change to the advantage of the United States over time.

For the United Kingdom, the estimates of income elasticity of demand for wine are somewhat higher than for Canada and the United States. Of the 13 estimates reported, nine lie in the range of .91 to 1.70, with six of those estimated at 1.23 to 1.70. Thus, a 10 percent increase in household income in the United Kingdom may result in an increase in the demand for wine from 12.3 percent to as much at 17.0 percent. This phenomenon suggests definite growth possibilities for the export of American wine to the U.K., though at this time, England imports most of its wine from the European Union and Australia.

### *Price Elasticity of Demand*

Jon P. Nelson estimates that the price elasticity of demand for wine in the United States is approximately .53. This implies that a 10 percent increase in the price of wine, holding quality constant, and accounting for the demand for beer and spirits at the same time, results in an estimated 5.3 percent decline in the quantity demanded of wine. Thus the price elasticity of demand for wine is what is termed inelastic – relatively unresponsive to price changes.[27] Likewise, as the price of wine decreases by, say 10 percent, the quantity demanded of wine only increases by about 5.3 percent. Since Washington wineries are specializing in premium wines above $7.00 in price per bottle, this suggests that vintners have some flexibility in the pricing of their wines, other things equal. *Price increases will generally lead to higher total revenues.*

### *Canada and the United Kingdom*

Consistent with the estimates of price elasticity of demand for wine in the United States, we find that the estimates for Canada range from -.22 to -.70. Of the ten estimates we report here, six

of them lie in the range of -.58 to -.35. That is, a 10 percent increase (decrease) in the price of wine is estimated to lead to a 5.8 percent to 3.5 percent decrease (increase) in the quantity demanded of wine. Thus, again, United States' producers have the advantage of an inelastic demand for wine in Canada, which affords them some flexibility in pricing their products to maximize revenue.

The estimates of price elasticity of demand for the United Kingdom display a much wider range. There are 22 estimates available with a range from -.11 to -1.85. However, 15 of the estimates fall in the range of -.35 to -.99. Nine of the estimates fall in the range of -.35 to -.57. It is reasonable to conclude from this evidence that the price elasticity of demand for wine in the U.K. is also inelastic, based on the preponderance of the evidence. Again, this affords American wine exporters some flexibility in the pricing of their wines offered for sale in the U.K. and implies that relatively small price increases can result in increases in total revenue for the wine sold.[28]

## Conclusions: Prospects for the Industry[29]

### *The Market for Wine*[30]

Future prospects for the production and sale of premium wines from Washington are ultimately determined by conditions affecting the growth of demand for wine in domestic and international markets and the growth in Washington state wine supply.

### *Growth in Demand*

As noted in the beginning of this chapter, the United States' market has grown by 13.7 percent in quantity of wine sold and by 15 percent total revenues between 2002 and 2006. Thus, overall demand has been increasing. The following factors appear to be affecting this growth in demand:

- *Consumer Tastes and Preferences*

    - A major consumer trend, that is, a consumer taste factor that affects the demand for wine, is that wine tends to be consumed in moderation as part of a meal, where socializing is a major component of the wine and food consumption. This aspect of consumer demand is a very complex phenomenon. It involves the consumption of the wine itself; it involves the process of eating as a recreational activity; it involves eating and drinking as a socializing activity.

    - There has been a shift in demand toward premium wines priced $7.00 and above. Indeed, the fastest growth has been in the segment for wines priced over $30.00 a bottle.

    - These premium wines are the market sectors in which Washington wine production has been expanding. In this regard, the price elasticity of demand becomes very important. The price elasticity of demand for wine is inelastic. This means that as price increases by, say 10 percent, quantity demanded only drops off by about 5 percent. Total sales revenues will tend to increase as wine quality increases and is reflected in higher prices per bottle.

- *Income and the Income Elasticity of Demand*

    - Household income is a major determinant of demand for any product. Household income is rising. Currently, about one-fourth of the United States' households have incomes over $75,000. Families in this income bracket consume wine as an "affordable luxury." As household incomes continue to grow into this bracket in constant dollar terms, the wine market will expand.

    - Note again that current estimates are that as disposable income grows by 10 percent, on average the demand for wine will increase in the neighborhood of 9 percent. Finally, note that the United States is among the few markets in which the demand for wine is growing as some combination of a change in tastes and preferenes and a change in income.

- There is plenty of room to grow since it is estimated that less than 40 percent of the United States' wine consumers drink wine even occasionally, and the United States ranks 38th in per capita consumption of wine worldwide.

- *Demographic Factors*

  - Baby Boomers have led the growth in demand for wine. Their children, the so-called "millennial generation," are following this trend and are shifting their demand even more from beer and spirits to wine.

  - Women purchase a majority of the wine sold and their behavior has led to an increase in wine consumption among men.[31]

- *Foreign Competition*

  California has lost market share to imported wines priced at less than $7.00 a bottle. One can assume the same has occurred for Washington wines. However, demand in this segment of the wine market has been either declining or flat for the most recent decade. Demand and market share in premium wines has been increasing.

- *Reduction in International Restraints in Trade*

  - Restraints in trade, other than tariffs, such as quotas, phytosanitary standards, marketing restrictions, and constraints on the acceptance of wine making standards, have been major impediments to the ability of the United States to increase wine exports, especially to Canada and the European Union.

  - Major bilateral agreements to remove or reduce such trade practices have been achieved with Canada and the European Union, as well as a joint agreement with Canada, Australia, Chile, and New Zealand. Over time, such agreements will result in an expansion of the United States' export market.

  - NAFTA has further improved the export position of Washington wines with respect to Mexico and Canada.

  - Note, for example, that the removal of non-tariff barriers to the importation and sale of United States wine in Canada as of January 1, 1989, resulted in an annual increase in sales to Canada of 17 percent over the period 1989 to 1994.[32]

- *Extent of the Foreign Export Market*

  - United States wine exports by volume have grown from 179.7 million liters in 1996 to 404.5 million liters in 2006, an increase of 225.1 percent in 11 years.

  - Total revenue of United States wine exports have grown from $326 million in 1996 to $876 million in 2006, an increase of 268.7 percent in 11 years.[33]

- *Changes in Domestic Marketing Practices*[34]

  Several recent changes in Washington state wine marketing laws, as well as a recent United States Supreme Court decision,[35] will have the effect of making the retail market for wine more competitive in Washington and nationwide. There will be both positive and negative effects on overall demand for Washington state wines. The national market will become more accessible to Washington wines, while Washington wines will now experience more competition within the state from wine imported from other states.

  - *Substitute House Bill 3150 – Brochures/Private Labels.* This law allows wineries:

    - to use touring brochures that jointly display winery locations, along with local restaurant and hotel facilities; and,

    - to partner with restaurants to create private labels which feature the name of the winery and the restaurant.

This law should, at the margin, have the effect of increasing wine sales of small local wineries in particular and an increase in wine tourism.

- *Substitute Senate Bill 6537 – Direct to Consumers*
  - This law will allow small, upscale wineries in particular to gain access to consumer markets in approximately one-half of the states that prohibited the direct sale of wines from a specific winery to consumers at the time of the decision – 2004.
  - The economic effects of this law on small, upscale Washington wineries is likely to be significant since in the past they were essentially shut out of such markets due to the economic infeasibility of selling their wines to such states through a wholesaler (the "three-tier" system).
  - Major markets are potentially opened, including Florida, the second largest market, New York, the third largest market, New Jersey, the fifth largest market, Massachusetts, the sixth largest market, Michigan, the 11th largest market, and Ohio, the 12th largest market.
  - In summary, this legal change should result in a shift in demand – an increase – for small, upscale wine producers in the state in particular.
- *Substitute Senate Bill 6823 – Direct to Retailer*
  - Induced by a legal challenge brought by Costco and sanctioned by the United States Supreme Court case discussed previously, this law opens up the direct sale of out-of-state wine to Washington retailers provided they comply with Washington's current laws and regulations.
  - Other things equal, this will increase competition against Washington state wineries of all sizes and wine production styles, and the demand for Washington state wines within the state will fall somewhat, other things equal.

### *Growth in Supply*

- *Global Warming*

  Gregory Jones, an expert on viticulture and climate and climate change, observes:

  "In general, the overall wine style that a region produces is a result of the baseline climate, while climate variability determines vintage yield and quality differences. Climatic changes therefore have the potential to bring about changes in wine styles."[36]

  Professor Jones has tracked climate changes in North America. He documents "tremendous changes in growing season climates, especially in the western USA."
  - These climate changes will likely have more adverse effects in the most southern, warmer wine grape growing regions of California. At the minimum, certain regions will likely have to change the varieties of vines planted.
  - The effects on Washington state viticulture will likely be mostly positive, relative to California. Thus, the competitive position of Washington viticulture vis-a-vis California's will likely improve as a result of known and foreseeable climate change.

## Final Judgment

In light of all discussion, the viticulture and wine making industry in Washington state will continue to grow and improve for the foreseeable future, with simultaneous increases in the agriculture sector and related sectors.

## Endnotes

[1] Of course, this is *gross* and not *net* revenue per harvested acre. The costs of production in viticulture are considerably higher per acre than are the costs of production of winter wheat. See United States Department of Agriculture, National Agricultural Statistics Service, Washington Field Office, *2006 Annual Agriculture Bulletin*, p. 6.

[2] In 2005, 185 million acres of winter wheat were planted and 180 million were harvested in the state. Over the planting and harvesting season, approximately 1,992 worker/months of seasonal agricultural labor were employed in wheat and grain production of all types for 2005. As of 2005, there were an estimated 54,000 acres of vineyards for grapes of all types of which 28,000 were dedicated to wine grapes. However, 12,564 worker/months of seasonal labor were employed in grape production of all types for that year. See U.S. Department of Agriculture, National Agricultural Statistics Service, *2006 Annual Agriculture Bulletin,* pp. 31 and 89. See also the *2005 Agricultural Workforce in Washington State*, Appendix Table 7.

[3] As of November 2006, there were at least 70 wineries operating in the Walla Walla American Viticultural Area. See **http://www.winesnw.com/walla.html**.

[4] MFK Research LLC, *The Impact of Wine, Grapes, and Grape Products on the American Economy 2007: Family Business Building Value*, St. Helena, CA and Table 2 - U.S. Gross Domestic Product and Related Data. **http://www.ers.usda.gov/publications/agoutlook/aotables/2007/03Mar/aotab02.xls**

[5] MFK Research LLC, 2007, Op.cit., p. 18.

[6] United States Department of Agriculture, National Agricultural Statistics Service, *AGRI-FACTS*, September Review, posted online October 16, 2006.

[7] The state's wine industry has been shifting toward the production of more red varieties which generally command a higher price in the premium wine market. As of the end of 1992, 36.0 percent of the 11,100 total acres planted in vines were red varieties. By the end of 2005, 56.0 percent of the 31,000 total acres planted were in red varieties. In 2005, the average price per ton of red varieties was $1,137, while it was only $741 for white varieties. Thus, red varieties were fetching 53.4 percent more per harvested ton (see *Appendix Exhibit 5.7*).

[8] MFK Research LLC, *The Impact of Wine, Grapes, and Grape Products on the American Economy 2007: Family Business Building Value*, St. Helena, CA, 2007, p. 24.

[9] Wines Northwest, *Washington Wineries, Wines and Wine Country*. **http://www.winesnw.com/wahome.html**

[10] Strictly speaking, nothing can exceed 100 percent of itself, but it is conventional to convert factorial changes into percentages.

[11] United States Department of Agriculture, National Agricultural Statistics Service, *AGRI-FACTS*, *Wine Grapes, Washington,* September Review, posted online October 16, 2006.

[12] The current dollar average price per ton over the period 1976 to 1978 was $376. Converting this to the average price index for the 2004 to 2006 period inflates this price to an estimated $1,168 per ton. Thus, over the 30-year period, the tonnage price of wine grapes has fallen by about 41 percent in constant price terms.

[13] See *2005 Agricultural Workforce in Washington State*, Chapter 1, for a discussion of input-output model estimates for the Washington state agriculture sector.

[14] See the glossary for the definition of the concepts of direct, indirect, and induced economic effects.

[15] The suggestion that leakages could account for at least some of the difference in the two total revenue multipliers comes from Dr. Karl Storchmann, Department of Economics, Whitman College, Walla Walla, Washington.

[16] Note that these estimates are based on statistics that refer specifically to the time period of data for which they are estimated. Comparison with earlier or later time periods, therefore, risks making errors of interpretation.

[17] MFK Research LLC reports the wage bill for *workers in wine grape vineyards only*. If one pro-rates the annual covered total before-tax wage in 2000 of $30,039,970 by the ratio of wine grape vineyard workers (950 in 1999) to the total grape vineyard workers (2099 in 2000), one gets: [(950/2099 = 0.4525) x $30,039,970 = $13,595,982]. As shown in *Exhibit 5.15*, the estimate is about $13,224,000 in current dollars for the year 2000. Considering measurement error, this sum is very close to the estimate of 12,718,000 current dollars in 1999.

[18] For a discussion of the QCEW data, see United States Department of Labor, Bureau of Labor Statistics, News, "County Employment and Wages Technical Note." **http://www.bls.gov/news.release/cewqtr.tn.htm**

[19] See Washington Wine Commission, *Washington Wine Facts*. **http://www.washingtonwine.org/facts.cfm**

[20] The CPI-U Inflation Calculator was used to convert current dollars to constant or real dollars. This index is somewhat higher than the CPI-W.

[21] For any given grower, the wage bill – the grower's labor cost – is the product of the wage rate times hours worked, summed over all workers hired by that grower. From the worker's standpoint, this statistic is simply total earnings.

[22] See page 5 of the referenced document.

[23] *Terrior* in viticulture and wine making is a French concept wherein climate, geography, and cultural factors interact to define the wine styles and quality that come from any site or region.

[24] Nelson, Jon P. , "Economic and Demographic Factors in U.S. Alcohol Demand: A Growth-Accounting Analysis," Empirical Economics, 1997, Vol. 22, p. 95.

[25] The income elasticity measure stated here is a *conditional* elasticity. That is, the elasticity is estimated in a statistical context where the income elasticities of close substitutes, wine, beer and spirits, are simultaneously compared. See Jon P. Nelson, Op. cit., 1997, p. 95. This reported compensated income elasticity of .93 is on the low end of estimates for the U.S. Of the seven studies for the U.S., four report compensated income elasticities of demand between 1.06 and 1.82 – very high.

[26] The elasticity estimates in this section are from Fogarty, James, *The Demand for Beer, Wine, and Spirits: A Survey of the Literature*, Economics Programme, University of Western Australia, Crawley, Western Australia, 60009, Australia, 2006.

[27] Nelson, Jon P., Op. cit., 1997, p. 95.

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[29] It is risky to make predictions. Writing in 1985, Professor Raymond J. Folwell assessed the future of wine production and sales for Washington state. The general tone of the study is conservative and even negative with respect to the growth prospects for Washington wine. Events, thus far, have turned out otherwise. However, industries that experience sharp increases in growth, as has the Washington wine industry, tend to experience corrections and consolidations that contract the industry for a time. See Folwell, Raymond J., *Implications of International and National Trends on the Washington Wine Industry*, Information Series No. 4, IMPACT Center, Washington State University, Pullman, WA, November 1985.

[30] This discussion is taken from MFK Research LLC, Report on the *Economic Impact of California Wine* 2006, St. Helena, CA., updated January 2007, pp. 12-15.

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2000, Vol. 82. This study excels in describing the ingenuity of a nation, in this case Canada and selected provinces of Canada, to throw up non-tariff trade barriers.

[33] Wine Institute, "U.S. Wine Exports," 95 Percent from California, Jump 30 Percent to $876 Million in 2006, March 14, 2007. **http://www.wineinstitute.org/industry/exports/2007/us_wine_exports.php**

[34] These legislative efforts are briefly summarized in: Washington Wine Institute, *2007 Washington Wine Institute Update*. **http://www.washingtonwineinstitute.org/WWI_update.html**

[35] United States Supreme Court, Granholm, et al. and Michigan Beer and Wine Wholesalers Association versus Eleanor Heald, et al. Cases Nos. 03-1116 and 03-1120, 2005. This legal brief provides a detailed review of the negative impact of constraints imposed by states on the sale of wines produced outside of state boundaries and a legal and economic justification for declaring the unconstitutionality of such laws that are in restraint of trade across state borders.

[36] Jones, Gregory V., "Climate Change in the Western United States Grape Growing Regions," *Acta Horticulturae* (ISHS) 689, 2005, p. 41. See also his less technical article: Jones, Gregory V., "Climate Change and Wine: Observations, Impacts and Future Implications," *Wine Industry Journal*, July/August 2006, Vol. 21. No. 4.

# Chapter 6

## Summary and Outlook

### Introduction

The following events and phenomena stand out in the 2006 agricultural production year.

- Dire predictions of the impact of the 2005 drought on production and revenue were incorrect.

- Assertions of a generalized shortage of labor during 2006 were apparently incorrect.

- Export trade issues continue to be important for Washington inasmuch as 31.7 percent of Washington's 2005 production was exported to international markets.[1] Trade issues continue to contribute to problems facing Washington's producers in the area of beef production and apple exports, for example.

### Drought Predictions

The dire predictions during the winter, spring, and early summer of 2005 concerning the impact of drought on the quantity of agricultural output in the state and its market value did not materialize. Instead of a drop in the total value of agricultural production in 2005 compared to 2004, the value of agricultural production actually rose by 8.9 percent in current dollars and 4.2 percent in constant dollars.[2]

This outcome emphasizes the uncertainty that agricultural producers and their employees face on a yearly basis.

### Labor Shortage

There has also been continuing concern over a shortage of seasonal and migrant labor. This is a perennial concern of agricultural producers that is heightened by the continuing debate over illegal immigration and the uncertainty generated by the current legislative process in the U.S. House of Representatives and the Senate.

Yet, as the summary below indicates, there may have been spot shortages during 2006, but there was no general shortage of seasonal and migrant labor for Washington state. According to the Pew Hispanic Center, a research organization in Washington, D.C., reports that the flow of undocumented workers into America apparently continued until the middle of 2006, and this may have played a role in alleviating any potential shortage.[3]

Since the major surge in seasonal and migrant labor demand begins about June of each year, this flow may have been sufficient to meet labor supply needs in 2006. Of course, an additional critical factor was an increase in constant dollar hourly wage rates that drew state residents into the labor force and kept people already working in agriculture more firmly attached to agricultural work. Thus, we must look to 2007 employment statistics to ascertain if an overall drop in supply of seasonal and migrant labor has occurred due to enhanced border security and increased enforcement of immigration laws.

### Summary of the Evidence on Labor Shortage, 2006

#### *Definition of a Shortage*

- A shortage occurs when, at the wage rate agricultural producers are offering, there is insufficient labor supplied to meet the demand at that wage rate. That is, there is excess demand at the offered wage rate. However, in general, raising the wage rate will tend to eliminate the shortage.

- There can be spot shortages in local labor markets or regions of the state due to the failure of information to be quickly and efficiently disseminated concerning jobs and the wages they pay on the one hand and the number and location of workers who are willing to accept the jobs at the wage rates offered, on the other. This type of shortage is due to frictional adjustment issues. Improved information flows can help alleviate this type of shortage.

- There can be a shortage due to a long-run decline in the supply of labor due, for instance, to tightening the border with Mexico. This is a type of structural shortage – a shortage induced by some fundamental change in the labor market for the type of labor in question.

- In either event, in the practical world a shortage can be inferred if you observe agricultural producers offering higher constant hourly wage rates.

- However, when one observes an increase in the constant dollar wage rate, it is possible to infer a labor shortage. You cannot determine if the shortage is due to an increase in demand for labor due to say, an increase in the timing and amount of the cherry crop, a decrease in supply of labor due to shutting down the border, or some combination of the two.

### *National and State Evidence of an Increase in Demand for Labor Overall*

- The national and state nonagriculture sectors largely influence the demand and supply of labor in the agriculture sector – determining hourly average wage rates and labor supply. If these economies are booming, as they are now, then they will exert pressure on the agriculture sector to raise hourly average wage rates in order to maintain or increase the required agriculture labor supply.

- Both the national and the state labor force grew by 1.4 percent during 2006.

- For the nation, civilian employment grew by 1.9 percent. For the state, it grew by 2.0 percent. For the next few years, state civilian employment is projected to continue to grow by more than one percent a year.

- The national unemployment rate in 2006 fell to 4.6 percent compared to 5.1 percent in 2005. The state unemployment rate fell from 5.5 percent in 2005 to 5.0 percent in 2006. It has continued to fall through the first half of 2007 to 4.5 percent.

- Continued claimants in unemployment insurance have been dropping sharply both for the nonagriculture sector and the agriculture sector over the period 2003 to 2006. Month by month, continued claimants in 2006 are roughly half of what they were in 2003.

- Job vacancies in the primary agriculture production sector have been increasing since 2004, though the total amount of vacancies is small relative to the overall demand for agricultural labor through the seasons.

- In short, there has been an overall increase in demand for workers in the nation and the state during 2006 compared to 2005.

### *Evidence of an Increase in Demand for Seasonal and Migrant Labor in Washington State During 2006*

- *The key statistic is this: total seasonal and migrant agricultural employment remained at about 93,000 workers in 2006 compared to 2005. The overall supply of agricultural labor did not decrease.*

- Hourly average wage rates rose sharply in the Pacific Northwest and in the agriculture sector in Washington during 2006.

- Large changes in the size and timing of the cherry harvest drove this increase in hourly average wage rates in Washington, leading to compensating wage increases in apples and pears. These three tree fruits drive the seasonal demand for agricultural labor in the state.

- Unemployment rates in key agricultural counties during the peak employment season in general were falling during 2006.

- The increase in hourly average wage rates in cherries was due to an increase in demand, not a decrease in supply.

- We find that agricultural producers in the state identified 52,000 workers coming from combined inter-state, intra-state, foreign, and unknown geographic location sources in 2006. This number, estimated by identical sampling methods in 2005 and 2006, was 40,000 in 2005.

- *We conclude that while there were some spot shortages of seasonal and migrant agricultural labor in the state during 2006, there was no overall shortage of such labor in 2006 compared to 2005.*

## International Trade

International trade is very important to the economic well being of Washington state agriculture. As noted above, in 2005, an estimated 31.7 percent of total agricultural production in the state was sent overseas – $2,035.5 million in exports from a production of $6,412.7 million in current dollars. In terms of value by commodity group, Washington ranks second behind California in the export of vegetables and preparations and fruit and preparations. It ranks 5th in wheat and products; 10th in dairy products; 8th in seeds; and 6th in "other" exports.[4] Thus, diplomatic agreements with respect to various restraints of trade[5] and phytosanitary rules continue to be very important for the overall state economy as well as the agriculture sector in the state.

### *Beef Exports and Mad Cow Disease*

At the point at which Japan shut down beef imports from America in 2003 due to the discovery of Mad Cow Disease (BSE) in America, Japan was importing $1.4 billion of the total United States exports of $3.9 billion – approximately 36 percent of total United States exports. On December 12, 2005, Japan agreed to allow the resumption of imports of beef from animals aged 20 months or less. Various body parts thought to harbor the prion that leads to BSE and a similar disease in humans were excluded, including any bone, bone marrow, brains, etc. By January 20, 2006, the ban was re-imposed when Japanese inspectors discovered U.S. imported veal with bone and offal products in a U.S. shipment. Inspectors in the United States had failed to discover and stop the shipment.[6]

While nationwide exports of live animals and meat products increased between 2004 and 2005, they are still down by a net amount of $1,353.7 million in 2005 compared to 2003. One estimate is that about $300 million of this drop on net is due to the issue of BSE. Applying the agricultural trade multiplier discussed in *Chapter 1*, the net additional drop in value of output due to the BSE problem is estimated at $813 million. Using the employment multiplier, the loss of employment is estimated at 10 to 11 thousand workers nationwide.

Though Washington is not among the top ten exporters of live animals and meat, the potentially large nationwide impacts of the BSE problem will affect Washington cattle ranchers and farmers to some degree. In Washington, this sub-sector employs 5.9 percent of the agricultural labor force in the state covered by unemployment insurance (*see Exhibit 2.2*). It provides 8.0 percent of the total annual earnings for agricultural workers in the state, as measured by the QCEW database.

It is estimated that "since the closure, Washington state cattle producers have lost $190 million each year and that the U.S. meat industry has lost 10,000 jobs overall."[7] Since Washington has a comparative advantage in transportation costs to the Pacific Rim, its interest in resolving this BSE ban with Japan is economically important.

As of June 2006, Japan lifted the ban, subject to audits of the 35 beef processing plants in America authorized to export beef to Japan. Nationwide, beef and veal exports to Japan have risen from 730,000 pounds in June 2006 to 9,458,000 pounds in April 2007. By way of contrast, U.S. pork exports to Japan were 84,202,000 pounds in June 2006 and 83,876,000 pounds in April 2007.[8]

### *Apples – Mexico*[9]

The report on the *2005 Agricultural Workforce in Washington State* discusses the history of Mexico's charge of dumping against U.S. apple importers. As of the date of that report, the tariff imposed by Mexico on U.S. apples – red and Golden Delicious – stood at 46.58 percent for exporters of

red and Golden Delicious apples who are not members of the Northwest Fruit Exporters. (Apples that are not red or Golden Delicious are not subject to any duty.) On the event of President Vincente Fox's visit to the United States, Governor Gregoire asked for relief with respect to this dumping and tariff issue. While apple exports to Mexico have increased by about one percent in the past year, on the legal front, little has changed. At this point, Washington growers have filed for a NAFTA Panel to review the issue. Appeal by the U.S. apple growers to the World Trade Organization also remains an option.

### *Apples – Japan*

As of August 2005, Japan agreed to abide by the decision of the World Trade Organization with respect to lifting its phytosanitary ban on the import of U.S. apples with respect to fire blight. Since that time, there has been no change in the market situation with respect to apple exports to Japan. Demand conditions for U.S. apple imports to Japan are such that American exporters are unable to accept the large risks and financial outlays involved in shipping apples to Japan. Thus, little or nothing has been exported to Japan since 2002.

### *Apples – India*

India, though it levies a 50 percent tariff on apple imports, is a bright spot for Washington state apple exports. India is not an efficient producer of apples in terms of terrain and climate, transportation infrastructure, and marketing infrastructure. As a result, apple consumption of high-priced domestic apples is one of the lowest per capita in the world, standing at about 3.5 kilograms per year among the top 40 percent of the population in terms of income. In contrast, per capita apple consumption over the 2001 to 2003 period for America was about seven kilograms. In China, it is about 12 kilograms; and in Turkey, it is about 34 kilograms.[10]

Demand conditions and the superior year-round supply of American imports have resulted in exports from Washington growers of about 1.3 million boxes of apples in 2006. In one year, exports increased about 20 percent. India is now the fourth largest market for Washington apple exports.

### *Asparagus*

Seasonal and migrant labor employment in asparagus production in Washington state continued to decline in 2006 in response to some degree to the *Andean Trade Promotion and Drug Eradication Act*.

### *Wine*

In international trade, Washington agriculture has had both winners and losers. Washington vineyards and wine production happen to be winners. Trade diplomacy has resulted in the achievement of bi-lateral and multi-lateral agreements with such countries as Canada, Australia, New Zealand, and the European Union, provided for the mutual acceptance of existing oenological (wine making) practices, simplification of certification of wine imports, agreements over the use of semi-generic names, agreement over names of wine origin, and the labeling of wines. These agreements will increase the ability of U.S. and Washington wines to compete in world markets. For example, the bi-lateral agreement with Canada lowered tariffs and removed non-tariff barriers. The lowering of the non-tariff barriers, which the above agreements address, is largely responsible for a 17 percent annual increase in U.S. wine sales to Canada over the period 1989 to 1994.[11] Most of the increase in sales has been in the high-end wines in which Washington state wineries are specializing.

### *Exchange Rates – China*[12]

China is a massive potential market for American goods and services and, indeed, has the foreign exchange trade surplus in American dollars to exercise this demand.

The United States has been putting steady pressure on China to devalue the yuan in terms of the U.S. dollar (see the report, *2005 Agricultural Workforce in Washington State*, pp. 12-13). Apparently, this pressure is slowly paying off. In current dollars/yuan, it cost the Chinese consumer/importer 8.177 yuan on average to buy one U.S. dollar in 2005. This number dropped to 7.954 yuan on average for 2006 – a drop of 2.8 percent between the two years. As of June 21, 2007, a U.S. dollar cost 7.618 yuan. Over the two and a half year period in

question, American goods and services have become 7.3 percent cheaper for the Chinese consumer/importer. Other things equal, exports of American goods and services to China should increase.

## Illegal Immigration

As the report *2005 Agricultural Workforce in Washington State* (p. 25) describes, somewhat more than 50 percent of agricultural workers in the United States are undocumented workers. For the Pacific Region – Oregon and Washington – the estimate is 64 percent. These estimates have not been updated since 2002. The estimates are that about 93,000 migrant and seasonal workers were employed in the state in 2006. Sixty-four percent of this number is just shy of 60,000 workers. Clearly, Washington state agricultural producers are dependent on this undocumented labor force to carry out their annual production of agricultural products, especially fresh fruits and vegetables.

### *H-2A*

The H-2A Program, as currently constituted, provides minimal relief to the problem of seasonal and migrant labor supply in Washington state. About 777 workers were certified to work in the state during 2006. There have been technical problems in certifying H-2A workers for 2007.

One problem with the program is that it simply is not nimble enough to meet the needs of agricultural producers. The paperwork is costly and time consuming. Certification of the labor force request must be made by the U.S. Department of Labor.

Although the Senate's *Comprehensive Immigration Reform Act (CIRA) of 2007* (S1348) was recently withdrawn, should something like the CIRA be agreed upon, then there will be a major change in the H-2A Program. One of the most important proposed revisions in CIRA is to establish a "Guest Worker" Program that will allow employers to *attest* to a needed labor supply rather than wait upon the U.S. Department of Labor to *officially certify* the need. (In any case, the H-2A numbers are small – 60,000 or so workers nationwide. Historically, the Department of Labor has certified almost all requests.)

A problem with the proposed legislation is that at this time only 200,000 guest workers are proposed to be admitted into the country under this revision in the law. As we note above, perhaps 60,000 of the seasonal and migrant workers employed in the state during 2006 were undocumented workers. California's peak seasonal demand for labor alone tends to peak near 200,000 workers. Thus, part of the problem of an adequate seasonal labor supply remains.

### *The Adverse Effect Wage Rate*

While the state minimum wage appears to be set too low to be a major labor cost issue for agricultural producers in the state, the Adverse Effect Wage Rate (AEWR) is another story altogether. Should some compromise version of the Senate's *Comprehensive Immigration Reform Act of 2007* (S1348) be enacted, all but about 10,000 workers in Washington agriculture will be affected under the 2006 AEWR – that is, their hourly average wage rates currently lie below the existing AEWR plus a proposed additional $2.00 per hour for housing and travel reimbursement. Most significantly, the core of the seasonal and migrant labor demand is for fruit pickers in apples and pears. These workers are paid more than $3.00 below the $13.00 per hour cut-off we estimate for the total cost of the 2006 AEWR.

Speculation at this point is, perhaps, idle. Simple economic analysis would predict that this agricultural minimum wage, now called the AEWR, will cause a significant contraction in employment and production. It will be necessary to see what actually transpires, both in Congress, and in the nation's and state's agriculture sector.

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[7] See Press Release of Senator Cantwell – "Cantwell Applauds Agreement to Resume U.S. Beef Exports to Japan, Calls for Continued Pressure for Swift Implementation," June 21, 2006. Note the close correspondence of the estimated job loss in the Cantwell press release with the estimated job loss using the international trade multiplier above. Note that in 2001, Washington exports of live animals and meat, except poultry, stood at $101.2 million. In 2005, the figure is $31.9 million. Hides and skins dropped somewhat over this time period from $50.4 million to $43.4 million. Poultry and products over this time period went from $4.0 million to $4.9 million, *U.S. Agricultural Exports: Estimated Value, by Commodity Group and State*, FY 2001 to 2005, U.S. Department of Agriculture, Economic Research Service, **http://www.ers.usda.gov/data/StateExports/sx5yr.xls.**

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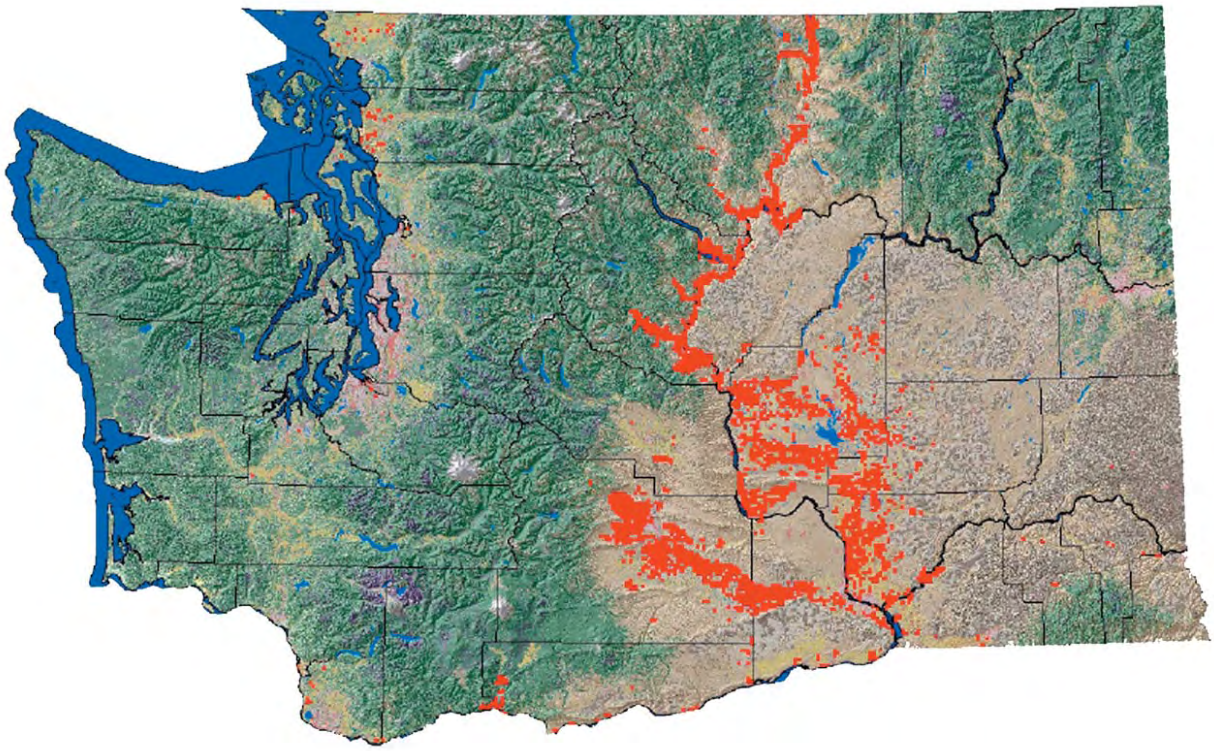
## Appendix Exhibit 1.1

### Geographic Density of Planted Tree Fruit, 2006



**NOTE:** One red dot = 1 section of land containing fruit. 1 section = 640 acreas = 1 square mile.

Source: Washington Fruit Survey, 2006, posted online December 4, 2006.

## Appendix Exhibit 1.2

### Value of Agriculture Production and Government Payments, Washington State, 1996 to 2005, in $1,000s, Current Dollars

| YEAR | FIELD CROPS | FRUITS AND NUTS | COMMERCIAL VEGETABLES | BERRY CROPS | TOTAL CROPS | SPECIALTY PRODUCTS[1] | LIVESTOCK AND PRODUCTS | TOTAL VALUE OF PRODUCTION | GOVERNMENT PAYMENTS | TOTAL VALUE[2] |
|---|---|---|---|---|---|---|---|---|---|---|
| 1996 | 2,083,200 | 1,232,736 | 307,635 | 54,431 | 3,678,002 | 619,731 | 1,457,443 | 5,755,176 | 155,364 | 5,910,540 |
| 1997 | 1,869,686 | 1,235,820 | 357,558 | 50,183 | 3,513,247 | 577,012 | 1,450,033 | 5,540,292 | 147,263 | 5,687,555 |
| 1998 | 1,648,070 | 1,070,299 | 357,016 | 40,405 | 3,115,790 | 584,544 | 1,542,459 | 5,242,793 | 260,524 | 5,503,317 |
| 1999 | 1,617,658 | 1,233,033 | 299,306 | 66,252 | 3,216,249 | 592,518 | 1,553,370 | 5,362,137 | 270,594 | 5,632,731 |
| 2000 | 1,697,526 | 1,164,734 | 325,760 | 46,739 | 3,234,759 | 587,994 | 1,519,056 | 5,341,809 | 352,793 | 5,694,602 |
| 2001 | 1,750,181 | 1,315,186 | 306,775 | 61,534 | 3,433,676 | 535,386 | 1,604,115 | 5,573,177 | 299,021 | 5,872,198 |
| 2002 | 1,798,986 | 1,450,719 | 361,775 | 62,378 | 3,673,858 | 515,334 | 1,396,461 | 5,585,653 | 215,912 | 5,801,565 |
| 2003 | 1,736,997 | 1,647,682 | 354,976 | 66,161 | 3,805,816 | 503,751 | 1,449,168 | 5,758,735 | 265,396 | 6,024,131 |
| 2004 | 1,798,487 | 1,499,894 | 294,995 | 77,614 | 3,670,990 | 539,951 | 1,678,139 | 5,889,080 | 197,009 | 6,086,089 |
| 2005 | 1,766,052 | 1,885,761 | 391,132 | 75,716 | 4,118,661 | 543,970 | 1,750,085 | 6,412,716 | 239,854 | 6,652,570 |

**NOTES:** [1] Includes forest products, Christmas trees, floriculture, nursery and other horticultural products, and agaricus and other (shitake, oyster, etc.) mushrooms.
[2] Includes government payments.

Source: 2006 Washington Annual Agriculture Bulletin, Page 25.
**http://www.nass.usda.gov/Statistics_by_State/Washington/Publications/Annual_Statistical_Bulletin/2006/abcover.pdf**

## Appendix Exhibit 1.3

## Employment of Covered Seasonal Workers by Crop in Washington State, Statewide, and by Agricultural Reporting Areas, 2006

**WASHINGTON STATE**

| | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP | OCT | NOV | DEC | AVG |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **STATE TOTALS** | **12,771** | **15,756** | **19,027** | **22,454** | **24,516** | **51,906** | **67,482** | **42,014** | **49,629** | **49,119** | **16,533** | **12,970** | **32,015** |
| APPLES, TOTAL | 7,201 | 7,617 | 8,892 | 10,062 | 8,843 | 20,619 | 18,520 | 15,412 | 31,651 | 38,101 | 11,042 | 7,771 | 15,478 |
| CHERRIES, TOTAL | 664 | 959 | 726 | 456 | 1,396 | 16,475 | 32,302 | 7,494 | 116 | 4 | 177 | 329 | 5,092 |
| PEARS, TOTAL | 471 | 409 | 399 | 122 | 157 | 299 | 167 | 3,390 | 4,863 | 2,037 | 391 | 385 | 1,091 |
| OTHER TREE FRUIT WORKERS | 229 | 445 | 805 | 929 | 553 | 507 | 896 | 2,525 | 727 | 106 | 391 | 279 | 699 |
| GRAPE WORKERS | 997 | 2,122 | 1,783 | 1,209 | 1,485 | 1,415 | 1,480 | 915 | 1,137 | 809 | 543 | 295 | 1,183 |
| BLUEBERRY WORKERS | 383 | 223 | 93 | 134 | 43 | 59 | 689 | 2,336 | 119 | 6 | 6 | 32 | 344 |
| RASPBERRY WORKERS | 398 | 565 | 532 | 373 | 490 | 327 | 4,578 | 1,087 | 888 | 1,030 | 841 | 1,111 | 1,018 |
| STRAWBERRY WORKERS | - | - | 75 | 95 | 175 | 2,051 | 305 | 77 | 16 | 7 | - | - | 233 |
| BULB WORKERS | 152 | 847 | 994 | 545 | 327 | 69 | 89 | 195 | 120 | 84 | 122 | 115 | 305 |
| HOP WORKERS | 14 | 384 | 1,038 | 691 | 932 | 229 | 102 | 197 | 1,688 | 28 | 65 | 4 | 448 |
| NURSERY WORKERS | 714 | 713 | 1,205 | 1,774 | 2,041 | 2,117 | 1,829 | 1,515 | 1,274 | 939 | 637 | 961 | 1,310 |
| WHEAT/GRAIN WORKERS | 34 | 56 | 79 | 67 | 62 | 195 | 300 | 784 | 195 | 103 | 88 | 74 | 170 |
| ASPARAGUS WORKERS | - | - | - | 2,562 | 5,087 | 4,314 | 310 | 32 | - | 43 | - | - | 1,029 |
| CUCUMBER WORKERS | - | - | - | - | 11 | 20 | 155 | 146 | 302 | 43 | - | - | 56 |
| ONION WORKERS | 436 | 460 | 789 | 352 | 340 | 453 | 1,358 | 771 | 621 | 222 | 268 | 77 | 512 |
| POTATO WORKERS | 514 | 530 | 715 | 958 | 611 | 654 | 893 | 1,913 | 1,861 | 3,649 | 1,104 | 831 | 1,186 |
| MISC VEGETABLE WORKERS | 109 | 105 | 234 | 790 | 777 | 879 | 1,205 | 1,544 | 1,991 | 1,241 | 343 | 251 | 789 |
| OTHER SEASONAL WORKERS | 455 | 321 | 668 | 1,335 | 1,186 | 1,224 | 2,304 | 1,681 | 2,060 | 667 | 515 | 455 | 1,073 |

**WESTERN AREA 1**

| | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP | OCT | NOV | DEC | AVG |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **TOTAL** | **2,125** | **2,665** | **3,197** | **3,430** | **3,559** | **5,153** | **8,105** | **6,665** | **4,860** | **3,842** | **2,352** | **2,901** | **4,071** |
| BLUEBERRY WORKERS | 383 | 223 | 93 | 134 | 43 | 59 | 689 | 2,336 | 119 | 6 | 6 | 32 | 344 |
| RASPBERRY WORKERS | 398 | 565 | 532 | 373 | 490 | 327 | 4,578 | 1,087 | 888 | 1,030 | 841 | 1,111 | 1,018 |
| STRAWBERRY WORKERS | - | - | 75 | 92 | 148 | 1,977 | 15 | 12 | - | 6 | - | - | 194 |
| BULB WORKERS | 152 | 847 | 994 | 545 | 327 | 69 | 89 | 195 | 120 | 84 | 122 | 115 | 305 |
| CUCUMBER WORKERS | - | - | - | - | 11 | 20 | 155 | 146 | 302 | 43 | - | - | 56 |
| POTATO WORKERS | 291 | 297 | 268 | 197 | 212 | 280 | 144 | 226 | 564 | 997 | 556 | 499 | 378 |
| MISC. VEGETABLE WORKERS | 57 | 60 | 173 | 484 | 396 | 520 | 745 | 1,034 | 1,380 | 840 | 202 | 198 | 507 |
| NURSERY WORKERS | 684 | 642 | 1,011 | 1,458 | 1,738 | 1,696 | 1,410 | 1,142 | 939 | 668 | 473 | 736 | 1,050 |
| RHUBARB WORKERS | - | - | 13 | 85 | 89 | 10 | 22 | 5 | - | - | - | - | 19 |
| OTHER SEASONAL WORKERS | 160 | 31 | 38 | 62 | 105 | 195 | 258 | 482 | 548 | 168 | 152 | 210 | 201 |

**SOUTH CENTRAL AREA 2**

| | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP | OCT | NOV | DEC | AVG |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **TOTAL** | **3,681** | **4,789** | **5,656** | **6,350** | **7,548** | **17,043** | **20,300** | **10,631** | **14,766** | **12,884** | **4,342** | **3,781** | **9,314** |
| APPLES, TOTAL | 2,370 | 2,068 | 2,764 | 3,313 | 2,687 | 7,701 | 5,542 | 5,309 | 9,567 | 11,146 | 3,695 | 3,272 | 4,953 |
| CHERRIES, TOTAL | 125 | 293 | 303 | 98 | 1,156 | 6,095 | 12,664 | 1,216 | 105 | - | 18 | 23 | 1,841 |
| PEARS, TOTAL | 335 | 364 | 282 | 110 | 10 | 157 | 93 | 1,458 | 2,277 | 952 | 231 | 126 | 533 |
| OTHER TREE FRUIT, TOTAL | - | 280 | 551 | 513 | 53 | 179 | 165 | 1,264 | 131 | 7 | - | - | 262 |
| GRAPES, TOTAL | 750 | 1,486 | 1,065 | 768 | 817 | 679 | 690 | 397 | 526 | 351 | 246 | 280 | 671 |
| ASPARAGUS WORKERS | - | - | - | 374 | 1,854 | 1,500 | 308 | 32 | - | 38 | - | - | 342 |
| HOPS, TOTAL | 10 | 256 | 483 | 478 | 506 | 152 | 90 | 151 | 1,483 | 28 | 65 | - | 309 |
| ONION WORKERS | - | 13 | 40 | 30 | - | 80 | 70 | 320 | 114 | 6 | - | - | 56 |
| POTATO WORKERS | - | - | - | - | - | - | 98 | 211 | 43 | - | - | - | 29 |
| MISC. VEGETABLE WORKERS | 26 | - | 3 | 158 | 108 | 119 | 320 | 25 | 366 | 238 | 41 | 28 | 119 |
| OTHER SEASONAL WORKERS | 65 | 29 | 165 | 508 | 357 | 381 | 260 | 248 | 154 | 118 | 46 | 52 | 199 |

## Appendix Exhibit 1.3 (*Continued*)

## Employment of Covered Seasonal Workers by Crop in Washington State, Statewide, and by Agricultural Reporting Areas, 2006

### NORTH CENTRAL AREA 3

| | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP | OCT | NOV | DEC | AVG |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **TOTAL** | **3,026** | **3,451** | **4,011** | **4,899** | **3,658** | **12,261** | **22,211** | **11,793** | **14,074** | **15,363** | **3,786** | **3,585** | **8,510** |
| APPLES, TOTAL | 2,642 | 3,123 | 3,660 | 4,570 | 3,207 | 5,319 | 5,270 | 3,084 | 11,348 | 14,189 | 3,448 | 3,111 | 5,248 |
| CHERRIES, TOTAL | 206 | 167 | 130 | 155 | 118 | 6,622 | 16,468 | 5,997 | 5 | 4 | 37 | 30 | 2,495 |
| PEARS, TOTAL | 55 | 28 | 69 | 12 | 147 | 113 | 35 | 1,903 | 2,235 | 1,085 | 160 | 237 | 507 |
| OTHER TREE FRUIT WORKERS | 117 | 52 | 140 | 130 | 152 | 62 | 325 | 742 | 44 | 46 | 30 | 91 | 161 |
| OTHER SEASONAL WORKERS | 6 | 81 | 12 | 32 | 34 | 145 | 113 | 67 | 442 | 39 | 111 | 116 | 100 |

### COLUMBIA BASIN AREA 4

| | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP | OCT | NOV | DEC | AVG |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **TOTAL** | **2,000** | **2,269** | **2,562** | **2,810** | **3,181** | **6,774** | **6,966** | **6,425** | **8,319** | **9,436** | **2,885** | **1,647** | **4,606** |
| APPLES, TOTAL | 1,228 | 1,348 | 1,461 | 1,320 | 1,325 | 2,978 | 4,039 | 4,092 | 6,195 | 6,938 | 1,661 | 875 | 2,788 |
| CHERRIES, TOTAL | 19 | 170 | 179 | 139 | 73 | 2,164 | 1,330 | 274 | 6 | - | 73 | 119 | 379 |
| PEAR WORKERS | 81 | 17 | 48 | - | - | 29 | 39 | 29 | 351 | - | - | 22 | 51 |
| MINT WORKERS | 35 | 20 | 38 | 33 | 127 | 29 | 221 | 183 | 65 | - | - | - | 63 |
| OTHER TREE FRUIT WORKERS | 109 | 57 | 86 | 238 | 276 | 239 | 109 | 194 | 29 | 1 | 342 | 84 | 147 |
| ASPARAGUS WORKERS | - | - | - | 66 | 582 | 346 | - | - | - | 5 | - | - | 83 |
| ONION WORKERS | 325 | 392 | 227 | 127 | 172 | 197 | 294 | 388 | 371 | 115 | 246 | 66 | 243 |
| POTATOES, TOTAL | 174 | 206 | 314 | 588 | 354 | 352 | 408 | 702 | 927 | 2,141 | 429 | 310 | 575 |
| MISC. VEGETABLE WORKERS | 2 | 2 | 9 | 18 | 61 | 63 | 44 | 65 | 36 | 2 | 7 | - | 26 |
| WHEAT/GRAIN WORKERS | 2 | 3 | 5 | - | - | 5 | 28 | 36 | - | - | 14 | - | 8 |
| NURSERY WORKERS | 19 | 29 | 5 | 30 | 25 | 264 | 269 | 202 | 172 | 105 | 67 | 166 | 113 |
| OTHER SEASONAL WORKERS | 6 | 25 | 190 | 251 | 186 | 108 | 185 | 260 | 167 | 129 | 46 | 5 | 130 |

### SOUTH EASTERN AREA 5

| | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP | OCT | NOV | DEC | Avg |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **TOTAL** | **1,861** | **2,449** | **3,285** | **4,508** | **6,080** | **10,165** | **9,296** | **5,500** | **7,184** | **7,191** | **2,973** | **926** | **5,118** |
| APPLES, TOTAL | 961 | 1,078 | 1,007 | 859 | 1,624 | 4,621 | 3,669 | 2,927 | 4,541 | 5,828 | 2,238 | 513 | 2,489 |
| CHERRIES, TOTAL | 314 | 329 | 114 | 64 | 49 | 1,594 | 1,840 | 7 | - | - | 49 | 157 | 376 |
| OTHER TREE FRUIT WORKERS | 3 | 56 | 28 | 48 | 72 | 27 | 297 | 325 | 523 | 52 | 19 | 104 | 130 |
| GRAPE WORKERS | 247 | 636 | 718 | 441 | 668 | 736 | 790 | 518 | 611 | 458 | 297 | 15 | 511 |
| ASPARAGUS WORKERS | - | - | - | 2,122 | 2,651 | 2,468 | 2 | - | - | - | - | - | 604 |
| HOP WORKERS | 4 | 128 | 555 | 213 | 426 | 77 | 12 | 46 | 205 | - | - | 4 | 139 |
| ONION WORKERS | 111 | 55 | 522 | 195 | 168 | 176 | 994 | 63 | 136 | 101 | 22 | 11 | 213 |
| POTATOES, TOTAL | 49 | 27 | 133 | 173 | 45 | 22 | 243 | 774 | 327 | 511 | 119 | 22 | 204 |
| MISC. VEGETABLE WORKERS | 24 | 43 | 36 | 45 | 123 | 167 | 74 | 415 | 209 | 161 | 93 | 25 | 118 |
| WHEAT/GRAIN WORKERS | 12 | 6 | 13 | 15 | 15 | 11 | 50 | 117 | 30 | 13 | 3 | 15 | 25 |
| NURSERY WORKERS | - | - | 1 | 2 | 13 | 15 | 1 | 2 | 2 | 1 | - | - | 3 |
| STRAWBERRY WORKERS | - | - | - | 3 | 27 | 74 | 290 | 65 | 16 | 1 | - | - | 40 |
| OTHER SEASONAL WORKERS | 136 | 91 | 158 | 328 | 199 | 177 | 1,034 | 241 | 584 | 65 | 133 | 60 | 267 |

### EASTERN AREA 6

| | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP | OCT | NOV | DEC | AVG |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **TOTAL** | **78** | **133** | **316** | **457** | **490** | **510** | **604** | **1,000** | **426** | **403** | **195** | **130** | **395** |
| WHEAT/GRAIN, TOTAL | 20 | 47 | 61 | 52 | 47 | 179 | 222 | 631 | 165 | 90 | 71 | 59 | 137 |
| NURSERY WORKERS | 11 | 42 | 188 | 284 | 265 | 142 | 149 | 169 | 161 | 165 | 97 | 59 | 144 |
| OTHER SEASONAL WORKERS | 47 | 44 | 67 | 121 | 178 | 189 | 233 | 200 | 100 | 148 | 27 | 12 | 114 |

Source: ESD/LMEA, Agricultural Labor Employment and Wage Trends Survey

## Appendix Exhibit 1.4

## Employment of Covered Seasonal Workers by Activity/Crop in Washington State, Statewide, and by Agricultural Reporting Areas, 2006

**WASHINGTON**

| ACTIVITY | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP | OCT | NOV | DEC | AVG |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **STATE TOTALS** | **12,771** | **15,756** | **19,027** | **22,454** | **24,516** | **51,906** | **67,482** | **42,014** | **49,629** | **49,119** | **16,533** | **12,970** | **32,015** |
| APPLES, TOTAL | 7,201 | 7,617 | 8,892 | 10,062 | 8,843 | 20,619 | 18,520 | 15,412 | 31,651 | 38,101 | 11,042 | 7,771 | 15,478 |
| APPLE PRUNING | 6,639 | 6,844 | 7,405 | 2,209 | 459 | 1,694 | 1,344 | 1,181 | 802 | 124 | 2,977 | 7,078 | 3,230 |
| APPLE THINNING | - | - | 9 | 3,187 | 3,712 | 17,379 | 15,769 | 8,316 | 328 | - | - | - | 4,058 |
| APPLE HARVESTER | - | - | - | - | - | - | 18 | 3,500 | 28,885 | 35,314 | 6,124 | - | 6,153 |
| APPLE SORT, GRADE, PACK | 402 | 385 | 279 | 316 | 235 | 233 | 221 | 467 | 213 | 660 | 406 | 493 | 359 |
| OTHER APPLE ACTIVITIES | 160 | 388 | 1,199 | 4,350 | 4,437 | 1,313 | 1,168 | 1,948 | 1,423 | 2,003 | 1,535 | 200 | 1,677 |
| CHERRIES, TOTAL | 664 | 959 | 726 | 456 | 1,396 | 16,475 | 32,302 | 7,494 | 116 | 4 | 177 | 329 | 5,092 |
| CHERRY PRUNING | 657 | 845 | 551 | 75 | 65 | 74 | 12 | 141 | 107 | - | 87 | 309 | 244 |
| CHERRY HARVESTER | - | - | - | - | - | 10,242 | 25,598 | 5,568 | - | - | - | - | 3,451 |
| OTHER CHERRY ACTIVITIES | 7 | 114 | 175 | 381 | 1,331 | 6,159 | 6,692 | 1,785 | 9 | 4 | 90 | 20 | 1,397 |
| PEARS, TOTAL | 471 | 409 | 399 | 122 | 157 | 299 | 167 | 3,390 | 4,863 | 2,037 | 391 | 385 | 1,091 |
| PEAR PRUNING | 390 | 392 | 282 | 72 | 50 | - | 13 | - | - | - | 213 | 195 | 134 |
| PEAR THINNING | - | - | - | - | - | 243 | 86 | 73 | - | - | - | - | 34 |
| PEAR HARVESTER | - | - | - | - | - | - | - | 3,255 | 4,309 | 1,836 | - | - | 783 |
| OTHER PEAR ACTIVITIES | 81 | 17 | 117 | 50 | 107 | 56 | 68 | 62 | 554 | 201 | 178 | 190 | 140 |
| OTHER TREE FRUIT WORKERS | 229 | 445 | 805 | 929 | 553 | 507 | 896 | 2,525 | 727 | 106 | 391 | 279 | 699 |
| GRAPE WORKERS | 997 | 2,122 | 1,783 | 1,209 | 1,485 | 1,415 | 1,480 | 915 | 1,137 | 809 | 543 | 295 | 1,183 |
| BLUEBERRY WORKERS | 383 | 223 | 93 | 134 | 43 | 59 | 689 | 2,336 | 119 | 6 | 6 | 32 | 344 |
| RASPBERRY WORKERS | 398 | 565 | 532 | 373 | 490 | 327 | 4,578 | 1,087 | 888 | 1,030 | 841 | 1,111 | 1,018 |
| STRAWBERRY WORKERS | - | - | 75 | 95 | 175 | 2,051 | 305 | 77 | 16 | 7 | - | - | 233 |
| BULB WORKERS | 152 | 847 | 994 | 545 | 327 | 69 | 89 | 195 | 120 | 84 | 122 | 115 | 305 |
| HOP WORKERS | 14 | 384 | 1,038 | 691 | 932 | 229 | 102 | 197 | 1,688 | 28 | 65 | 4 | 448 |
| NURSERY WORKERS | 714 | 713 | 1,205 | 1,774 | 2,041 | 2,117 | 1,829 | 1,515 | 1,274 | 939 | 637 | 961 | 1,310 |
| WHEAT/GRAIN WORKERS | 34 | 56 | 79 | 67 | 62 | 195 | 300 | 784 | 195 | 103 | 88 | 74 | 170 |
| ASPARAGUS WORKERS | - | - | - | 2,562 | 5,087 | 4,314 | 310 | 32 | - | 43 | - | - | 1,029 |
| CUCUMBER WORKERS | - | - | - | - | 11 | 20 | 155 | 146 | 302 | 43 | - | - | 56 |
| ONION WORKERS | 436 | 460 | 789 | 352 | 340 | 453 | 1,358 | 771 | 621 | 222 | 268 | 77 | 512 |
| POTATO WORKERS | 514 | 530 | 715 | 958 | 611 | 654 | 893 | 1,913 | 1,861 | 3,649 | 1,104 | 831 | 1,186 |
| MISC. VEGETABLE WORKERS | 109 | 105 | 234 | 790 | 777 | 879 | 1,205 | 1,544 | 1,991 | 1,241 | 343 | 251 | 789 |
| OTHER SEASONAL WORKERS | 455 | 321 | 668 | 1,335 | 1,186 | 1,224 | 2,304 | 1,681 | 2,060 | 667 | 515 | 455 | 1,073 |

**WESTERN AREA 1**

| ACTIVITY | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP | OCT | NOV | DEC | AVG |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **TOTAL** | **2,125** | **2,665** | **3,197** | **3,430** | **3,559** | **5,153** | **8,105** | **6,665** | **4,860** | **3,842** | **2,352** | **2,901** | **4,071** |
| BLUEBERRY WORKERS | 383 | 223 | 93 | 134 | 43 | 59 | 689 | 2,336 | 119 | 6 | 6 | 32 | 344 |
| RASPBERRY WORKERS | 398 | 565 | 532 | 373 | 490 | 327 | 4,578 | 1,087 | 888 | 1,030 | 841 | 1,111 | 1,018 |
| STRAWBERRY WORKERS | - | - | 75 | 92 | 148 | 1,977 | 15 | 12 | - | 6 | - | - | 194 |
| BULB WORKERS | 152 | 847 | 994 | 545 | 327 | 69 | 89 | 195 | 120 | 84 | 122 | 115 | 305 |
| CUCUMBER WORKERS | - | - | - | - | 11 | 20 | 155 | 146 | 302 | 43 | - | - | 56 |
| POTATO WORKERS | 291 | 297 | 268 | 197 | 212 | 280 | 144 | 226 | 564 | 997 | 556 | 499 | 378 |
| MISC. VEGETABLE WORKERS | 57 | 60 | 173 | 484 | 396 | 520 | 745 | 1,034 | 1,380 | 840 | 202 | 198 | 507 |
| NURSERY WORKERS | 684 | 642 | 1,011 | 1,458 | 1,738 | 1,696 | 1,410 | 1,142 | 939 | 668 | 473 | 736 | 1,050 |
| RHUBARB WORKERS | - | - | 13 | 85 | 89 | 10 | 22 | 5 | - | - | - | - | 19 |
| OTHER SEASONAL WORKERS | 160 | 31 | 38 | 62 | 105 | 195 | 258 | 482 | 548 | 168 | 152 | 210 | 201 |

## Appendix Exhibit 1.4 (*Continued*)

## Employment of Covered Seasonal Workers by Activity/Crop in Washington State, Statewide, and by Agricultural Reporting Areas, 2006

**SOUTH CENTRAL AREA 2**

| ACTIVITY | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP | OCT | NOV | DEC | AVG |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **TOTAL** | **3,681** | **4,789** | **5,656** | **6,350** | **7,548** | **17,043** | **20,300** | **10,631** | **14,766** | **12,884** | **4,342** | **3,781** | **9,314** |
| APPLES, TOTAL | 2,370 | 2,068 | 2,764 | 3,313 | 2,687 | 7,701 | 5,542 | 5,309 | 9,567 | 11,146 | 3,695 | 3,272 | 4,953 |
| APPLE PRUNING | 2,215 | 1,836 | 2,304 | 1,566 | 130 | 1,550 | 1,017 | 313 | 179 | 75 | 302 | 3,110 | 1,216 |
| APPLE THINNING | - | - | - | 951 | 676 | 5,263 | 3,908 | 1,458 | - | - | - | - | 1,021 |
| APPLE HARVESTER | - | - | - | - | - | - | - | 2,273 | 8,756 | 9,616 | 2,523 | - | 1,931 |
| APPLE SORT, GRADE, PACK | 134 | 123 | 39 | 177 | 40 | 185 | 171 | 393 | - | 357 | 176 | 151 | 162 |
| OTHER APPLE ACTIVITIES | 21 | 109 | 421 | 619 | 1,841 | 703 | 446 | 872 | 632 | 1,098 | 694 | 11 | 622 |
| CHERRIES, TOTAL | 125 | 293 | 303 | 98 | 1,156 | 6,095 | 12,664 | 1,216 | 105 | - | 18 | 23 | 1,841 |
| CHERRY PRUNING | 125 | 293 | 247 | 47 | - | 20 | 12 | 138 | 105 | - | 18 | 23 | 86 |
| CHERRY HARVESTER | - | - | - | - | - | 2,806 | 7,904 | - | - | - | - | - | 893 |
| OTHER CHERRY ACTIVITY | - | - | 56 | 51 | 1,156 | 3,269 | 4,748 | 1,078 | - | - | - | - | 863 |
| PEARS, TOTAL | 335 | 364 | 282 | 110 | 10 | 157 | 93 | 1,458 | 2,277 | 952 | 231 | 126 | 533 |
| PEAR PRUNING | 335 | 364 | 282 | 72 | 10 | - | 7 | - | - | - | 213 | 126 | 117 |
| PEAR THINNING | - | - | - | - | - | 150 | 86 | 73 | - | - | - | - | 26 |
| PEAR HARVESTER | - | - | - | - | - | - | - | 1,385 | 2,277 | 952 | - | - | 385 |
| OTHER PEAR ACTIVITIES | - | - | - | 38 | - | 7 | - | - | - | - | 18 | - | 5 |
| OTHER TREE FRUIT, TOTAL | - | 280 | 551 | 513 | 53 | 179 | 165 | 1,264 | 131 | 7 | - | - | 262 |
| OTHER TREE FRUIT PRUNER | - | 280 | 521 | 140 | - | 16 | - | - | 12 | - | - | - | 81 |
| OTHER TREE FRUIT HARVESTER | - | - | - | - | - | - | 165 | 1,166 | 119 | - | - | - | 121 |
| OTHER TREE FRUIT ACTIVITIES | - | - | 30 | 373 | 53 | 163 | - | 98 | - | 7 | - | - | 60 |
| GRAPES, TOTAL | 750 | 1,486 | 1,065 | 768 | 817 | 679 | 690 | 397 | 526 | 351 | 246 | 280 | 671 |
| GRAPE PRUNING | 676 | 1,292 | 918 | 136 | 401 | - | 16 | - | - | - | - | 257 | 308 |
| GRAPE HARVESTER | - | - | - | - | - | - | - | - | 182 | 300 | 44 | - | 44 |
| OTHER GRAPE ACTIVITY | 74 | 194 | 147 | 632 | 416 | 679 | 674 | 397 | 344 | 51 | 202 | 23 | 319 |
| ASPARAGUS WORKERS | - | - | - | 374 | 1,854 | 1,500 | 308 | 32 | - | 38 | - | - | 342 |
| HOPS, TOTAL | 10 | 256 | 483 | 478 | 506 | 152 | 90 | 151 | 1,483 | 28 | 65 | - | 309 |
| HOP TWINING AND TRAINING | - | - | - | 250 | 328 | 29 | - | - | - | - | 16 | - | 52 |
| HOP HARVESTER | - | | - | - | - | - | - | 21 | 1,165 | - | - | - | 108 |
| OTHER HOP ACTIVITY | 10 | 256 | 483 | 228 | 178 | 123 | 90 | 130 | 318 | 28 | 49 | - | 158 |
| ONION WORKERS | - | 13 | 40 | 30 | - | 80 | 70 | 320 | 114 | 6 | - | - | 56 |
| POTATO WORKERS | - | - | - | - | - | - | 98 | 211 | 43 | - | - | - | 29 |
| MISC. VEGETABLE WORKERS | 26 | - | 3 | 158 | 108 | 119 | 320 | 25 | 366 | 238 | 41 | 28 | 119 |
| OTHER SEASONAL WORKERS | 65 | 29 | 165 | 508 | 357 | 381 | 260 | 248 | 154 | 118 | 46 | 52 | 199 |

**NORTH CENTRAL AREA 3**

| ACTIVITY | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP | OCT | NOV | DEC | AVG |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **TOTAL** | **3,026** | **3,451** | **4,011** | **4,899** | **3,658** | **12,261** | **22,211** | **11,793** | **14,074** | **15,363** | **3,786** | **3,585** | **8,510** |
| APPLES, TOTAL | 2,642 | 3,123 | 3,660 | 4,570 | 3,207 | 5,319 | 5,270 | 3,084 | 11,348 | 14,189 | 3,448 | 3,111 | 5,248 |
| APPLE PRUNING | 2,340 | 2,776 | 3,214 | 76 | 126 | 19 | 11 | 205 | 92 | - | 2,494 | 2,639 | 1,166 |
| APPLE THINNING | - | - | - | 2,155 | 1,526 | 5,045 | 4,905 | 2,361 | - | - | - | - | 1,333 |
| APPLE HARVESTER | - | - | - | - | - | - | 17 | 186 | 10,787 | 13,658 | 518 | - | 2,097 |
| APPLE SORT, GRADE, PACK | 268 | 262 | 240 | 139 | 195 | 48 | 50 | 74 | 213 | 303 | 230 | 342 | 197 |
| OTHER APPLE ACTIVITIES | 34 | 85 | 206 | 2,200 | 1,360 | 207 | 287 | 258 | 256 | 228 | 206 | 130 | 455 |

## Appendix Exhibit 1.4 (*Continued*)

## Employment of Covered Seasonal Workers by Activity/Crop in Washington State, Statewide, and by Agricultural Reporting Areas, 2006

**NORTH CENTRAL AREA 3 (Continued)**

| ACTIVITY | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP | OCT | NOV | DEC | AVG |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CHERRIES, TOTAL | 206 | 167 | 130 | 155 | 118 | 6,622 | 16,468 | 5,997 | 5 | 4 | 37 | 30 | 2,495 |
| CHERRY PRUNING | 206 | 167 | 103 | 18 | 60 | 54 | - | - | - | - | 30 | 27 | 55 |
| CHERRY HARVESTER | - | - | - | - | - | 4,016 | 14,723 | 5,509 | - | - | - | - | 2,021 |
| OTHER CHERRY ACTIVITIES | - | - | 27 | 137 | 58 | 2,552 | 1,745 | 488 | 5 | 4 | 7 | 3 | 419 |
| PEARS, TOTAL | 55 | 28 | 69 | 12 | 147 | 113 | 35 | 1,903 | 2,235 | 1,085 | 160 | 237 | 507 |
| PEAR PRUNING | 55 | 28 | - | - | 40 | - | 6 | - | - | - | - | 69 | 17 |
| PEAR THINNING | - | - | - | - | - | 93 | - | - | - | - | - | - | 8 |
| PEAR HARVESTER | - | - | - | - | - | - | - | 1,870 | 2,032 | 884 | - | - | 399 |
| OTHER PEAR ACTIVITIES | - | - | 69 | 12 | 107 | 20 | 29 | 33 | 203 | 201 | 160 | 168 | 84 |
| OTHER TREE FRUIT WORKERS | 117 | 52 | 140 | 130 | 152 | 62 | 325 | 742 | 44 | 46 | 30 | 91 | 161 |
| OTHER SEASONAL WORKERS | 6 | 81 | 12 | 32 | 34 | 145 | 113 | 67 | 442 | 39 | 111 | 116 | 100 |

**COLUMBIA BASIN AREA 4**

| ACTIVITY | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP | OCT | NOV | DEC | AVG |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **TOTAL** | **2,000** | **2,269** | **2,562** | **2,810** | **3,181** | **6,774** | **6,966** | **6,425** | **8,319** | **9,436** | **2,885** | **1,647** | **4,606** |
| APPLES, TOTAL | 1,228 | 1,348 | 1,461 | 1,320 | 1,325 | 2,978 | 4,039 | 4,092 | 6,195 | 6,938 | 1,661 | 875 | 2,788 |
| APPLE PRUNING | 1,199 | 1,275 | 1,182 | 316 | 82 | 107 | 276 | 575 | 111 | - | 40 | 847 | 501 |
| APPLE THINNING | - | - | 9 | 72 | 341 | 2,622 | 3,456 | 2,318 | 210 | - | - | - | 752 |
| APPLE HARVESTER | - | - | - | - | - | - | - | 721 | 5,473 | 6,515 | 1,231 | - | 1,162 |
| OTHER APPLE ACTIVITIES | 29 | 73 | 270 | 932 | 902 | 249 | 307 | 478 | 401 | 423 | 390 | 28 | 374 |
| CHERRIES, TOTAL | 19 | 170 | 179 | 139 | 73 | 2,164 | 1,330 | 274 | 6 | - | 73 | 119 | 379 |
| CHERRY PRUNING | 19 | 70 | 91 | 8 | - | - | - | - | 2 | - | 4 | 110 | 25 |
| CHERRY HARVESTER | - | - | - | - | - | 2,110 | 1,190 | 59 | - | - | - | - | 280 |
| OTHER CHERRY ACTIVITIES | - | 100 | 88 | 131 | 73 | 54 | 140 | 215 | 4 | - | 69 | 9 | 74 |
| PEAR WORKERS | 81 | 17 | 48 | - | - | 29 | 39 | 29 | 351 | - | - | 22 | 51 |
| MINT WORKERS | 35 | 20 | 38 | 33 | 127 | 29 | 221 | 183 | 65 | - | - | - | 63 |
| OTHER TREE FRUIT WORKERS | 109 | 57 | 86 | 238 | 276 | 239 | 109 | 194 | 29 | 1 | 342 | 84 | 147 |
| ASPARAGUS WORKERS | - | - | - | 66 | 582 | 346 | - | - | - | 5 | - | - | 83 |
| ONION WORKERS | 325 | 392 | 227 | 127 | 172 | 197 | 294 | 388 | 371 | 115 | 246 | 66 | 243 |
| POTATOES, TOTAL | 174 | 206 | 314 | 588 | 354 | 352 | 408 | 702 | 927 | 2,141 | 429 | 310 | 575 |
| POTATO HARVESTER | - | - | - | 5 | - | - | - | 45 | 126 | 392 | - | - | 47 |
| POTATO SORT, GRADE, PACK | 124 | 114 | 187 | 266 | 106 | - | 250 | 503 | 375 | 763 | 223 | 214 | 260 |
| OTHER POTATO ACTIVITIES | 50 | 92 | 127 | 317 | 248 | 352 | 158 | 154 | 426 | 986 | 206 | 96 | 268 |
| MISC. VEGETABLE WORKERS | 2 | 2 | 9 | 18 | 61 | 63 | 44 | 65 | 36 | 2 | 7 | - | 26 |
| WHEAT/GRAIN WORKERS | 2 | 3 | 5 | - | - | 5 | 28 | 36 | - | - | 14 | - | 8 |
| NURSERY WORKERS | 19 | 29 | 5 | 30 | 25 | 264 | 269 | 202 | 172 | 105 | 67 | 166 | 113 |
| OTHER SEASONAL WORKERS | 6 | 25 | 190 | 251 | 186 | 108 | 185 | 260 | 167 | 129 | 46 | 5 | 130 |

## Appendix Exhibit 1.4 (*Continued*)

## Employment of Covered Seasonal Workers by Activity/Crop in Washington State, Statewide, and by Agricultural Reporting Areas, 2006

**SOUTH EASTERN AREA 5**

| ACTIVITY | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP | OCT | NOV | DEC | AVG |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **TOTAL** | **1,861** | **2,449** | **3,285** | **4,508** | **6,080** | **10,165** | **9,296** | **5,500** | **7,184** | **7,191** | **2,973** | **926** | **5,118** |
| APPLES, TOTAL | 961 | 1,078 | 1,007 | 859 | 1,624 | 4,621 | 3,669 | 2,927 | 4,541 | 5,828 | 2,238 | 513 | 2,489 |
| APPLE PRUNING | 885 | 957 | 705 | 251 | 121 | 18 | 40 | 88 | 420 | 49 | 141 | 482 | 346 |
| APPLE THINNING | - | - | - | 9 | 1,169 | 4,449 | 3,500 | 2,179 | 118 | - | - | - | 952 |
| APPLE HARVESTER | - | - | - | - | - | - | 1 | 320 | 3,869 | 5,525 | 1,852 | - | 964 |
| OTHER APPLE ACTIVITIES | 76 | 121 | 302 | 599 | 334 | 154 | 128 | 340 | 134 | 254 | 245 | 31 | 227 |
| CHERRIES, TOTAL | 314 | 329 | 114 | 64 | 49 | 1,594 | 1,840 | 7 | - | - | 49 | 157 | 376 |
| CHERRY PRUNING | 307 | 315 | 110 | 2 | 5 | - | - | 3 | - | - | 35 | 149 | 77 |
| CHERRY HARVESTER | - | - | - | - | - | 1,310 | 1,781 | - | - | - | - | - | 258 |
| OTHER CHERRY ACTIVITIES | 7 | 14 | 4 | 62 | 44 | 284 | 59 | 4 | - | - | 14 | 8 | 42 |
| OTHER TREE FRUIT WORKERS | 3 | 56 | 28 | 48 | 72 | 27 | 297 | 325 | 523 | 52 | 19 | 104 | 130 |
| GRAPE WORKERS | 247 | 636 | 718 | 441 | 668 | 736 | 790 | 518 | 611 | 458 | 297 | 15 | 511 |
| ASPARAGUS WORKERS | - | - | - | 2,122 | 2,651 | 2,468 | 2 | - | - | - | - | - | 604 |
| HOP WORKERS | 4 | 128 | 555 | 213 | 426 | 77 | 12 | 46 | 205 | - | - | 4 | 139 |
| ONION WORKERS | 111 | 55 | 522 | 195 | 168 | 176 | 994 | 63 | 136 | 101 | 22 | 11 | 213 |
| POTATOES, TOTAL | 49 | 27 | 133 | 173 | 45 | 22 | 243 | 774 | 327 | 511 | 119 | 22 | 204 |
| POTATO HARVESTER | - | - | - | - | - | 24 | 32 | 96 | 71 | 238 | 34 | - | 41 |
| POTATO SORT, GRADE, PACK | 31 | - | 21 | 30 | - | - | 110 | 602 | 158 | 128 | 8 | - | 91 |
| OTHER POTATO ACTIVITIES | 18 | 27 | 112 | 143 | 45 | 22 | 101 | 76 | 98 | 145 | 77 | 22 | 74 |
| MISC. VEGETABLE WORKERS | 24 | 43 | 36 | 45 | 123 | 167 | 74 | 415 | 209 | 161 | 93 | 25 | 118 |
| WHEAT/GRAIN WORKERS | 12 | 6 | 13 | 15 | 15 | 11 | 50 | 117 | 30 | 13 | 3 | 15 | 25 |
| NURSERY WORKERS | - | - | 1 | 2 | 13 | 15 | 1 | 2 | 2 | 1 | - | - | 3 |
| STRAWBERRY WORKERS | - | - | - | 3 | 27 | 74 | 290 | 65 | 16 | 1 | - | - | 40 |
| OTHER SEASONAL WORKERS | 136 | 91 | 158 | 328 | 199 | 177 | 1,034 | 241 | 584 | 65 | 133 | 60 | 267 |

**EASTERN AREA 6**

| ACTIVITY | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP | OCT | NOV | DEC | AVG |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **TOTAL** | **78** | **133** | **316** | **457** | **490** | **510** | **604** | **1,000** | **426** | **403** | **195** | **130** | **395** |
| WHEAT/GRAIN, TOTAL | 20 | 47 | 61 | 52 | 47 | 179 | 222 | 631 | 165 | 90 | 71 | 59 | 137 |
| WHEAT/GRAIN HARVESTER | - | - | - | - | - | - | - | - | 12 | - | - | - | 1 |
| WHEAT/GRAIN EQPMT OPERATOR | - | - | 17 | 12 | 24 | 51 | 124 | 597 | 71 | 39 | 44 | 15 | 83 |
| OTHER WHEAT/GRAIN ACTIVITY | 20 | 47 | 44 | 40 | 23 | 128 | 98 | 34 | 82 | 51 | 27 | 44 | 53 |
| NURSERY WORKERS | 11 | 42 | 188 | 284 | 265 | 142 | 149 | 169 | 161 | 165 | 97 | 59 | 144 |
| OTHER SEASONAL WORKERS | 47 | 44 | 67 | 121 | 178 | 189 | 233 | 200 | 100 | 148 | 27 | 12 | 114 |

Source: ESD/LMEA, Agricultural Labor Employment and Wage Trends Survey

## Appendix Exhibit 1.5

### Total Agricultural Employment in Washington State, Statewide, by MSA/MD, and by County 2006 (Benchmark: March 2006)

| | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP | OCT | NOV | DEC | AVG |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **WASHINGTON** | **63,940** | **72,000** | **77,860** | **81,910** | **86,580** | **123,820** | **139,160** | **112,150** | **118,550** | **112,630** | **70,850** | **63,530** | **93,580** |
| BELLINGHAM MSA | 2,600 | 2,830 | 2,910 | 2,980 | 3,150 | 3,910 | 5,340 | 4,100 | 3,060 | 2,880 | 2,690 | 2,710 | 3,260 |
| BREMERTON MSA | 320 | 350 | 380 | 400 | 420 | 450 | 440 | 410 | 380 | 380 | 380 | 350 | 390 |
| OLYMPIA MSA | 1,290 | 1,350 | 1,400 | 1,500 | 1,660 | 1,700 | 1,750 | 1,650 | 1,590 | 1,500 | 1,370 | 1,440 | 1,520 |
| RICHLAND-KENNEWICK-PASCO MSA | 6,280 | 7,540 | 8,340 | 10,170 | 12,330 | 18,140 | 14,330 | 11,420 | 14,030 | 12,260 | 7,280 | 5,970 | 10,680 |
| SEATTLE-BELLEVUE-EVERETT MD | 2,950 | 3,250 | 3,550 | 3,780 | 3,980 | 4,380 | 4,440 | 4,250 | 3,760 | 3,980 | 3,000 | 3,040 | 3,700 |
| SPOKANE MSA | 1,120 | 1,300 | 1,480 | 1,630 | 1,770 | 1,770 | 1,810 | 1,760 | 1,560 | 1,430 | 1,240 | 1,140 | 1,500 |
| TACOMA MD | 1,250 | 1,580 | 1,760 | 1,650 | 1,720 | 1,750 | 2,040 | 1,760 | 1,640 | 1,590 | 1,390 | 1,370 | 1,620 |
| CHELAN-DOUGLAS | 8,500 | 9,340 | 10,210 | 9,700 | 9,590 | 17,830 | 25,670 | 15,560 | 16,790 | 16,090 | 9,490 | 8,710 | 13,120 |
| YAKIMA MSA | 15,760 | 17,620 | 18,630 | 19,090 | 20,110 | 32,110 | 34,520 | 28,290 | 32,450 | 29,760 | 16,120 | 14,630 | 23,260 |
| ADAMS | 1,330 | 1,460 | 1,680 | 1,790 | 1,910 | 2,340 | 2,670 | 2,470 | 2,730 | 2,840 | 1,550 | 1,360 | 2,010 |
| ASOTIN | 130 | 140 | 170 | 180 | 200 | 190 | 230 | 190 | 180 | 150 | 140 | 140 | 170 |
| CLARK | 920 | 1,080 | 1,110 | 1,140 | 1,240 | 1,630 | 1,520 | 1,320 | 1,200 | 1,070 | 950 | 1,000 | 1,180 |
| CLALLAM | 280 | 300 | 320 | 340 | 380 | 400 | 440 | 420 | 380 | 310 | 290 | 280 | 340 |
| COLUMBIA | 230 | 250 | 260 | 250 | 270 | 320 | 350 | 350 | 330 | 260 | 240 | 240 | 280 |
| COWLITZ | 380 | 410 | 430 | 590 | 550 | 840 | 950 | 850 | 530 | 410 | 420 | 420 | 570 |
| FERRY | 100 | 110 | 120 | 130 | 140 | 150 | 150 | 140 | 130 | 110 | 100 | 100 | 120 |
| GARFIELD | 140 | 150 | 160 | 150 | 170 | 180 | 200 | 200 | 170 | 160 | 140 | 130 | 160 |
| GRANT | 5,660 | 6,490 | 6,880 | 7,160 | 7,830 | 11,270 | 11,510 | 10,600 | 11,950 | 12,230 | 5,590 | 6,420 | 8,630 |
| GRAYS HARBOR | 440 | 570 | 620 | 570 | 630 | 640 | 650 | 580 | 560 | 540 | 460 | 410 | 550 |
| ISLAND | 270 | 300 | 330 | 330 | 340 | 390 | 360 | 360 | 340 | 300 | 260 | 280 | 320 |
| JEFFERSON | 110 | 120 | 140 | 140 | 160 | 170 | 180 | 150 | 140 | 120 | 120 | 110 | 140 |
| KITTITAS | 750 | 850 | 960 | 1,480 | 1,060 | 1,140 | 1,350 | 1,240 | 1,250 | 1,370 | 780 | 610 | 1,070 |
| KLICKITAT | 1,040 | 1,240 | 1,380 | 1,240 | 1,350 | 2,330 | 2,160 | 1,890 | 1,970 | 1,680 | 1,110 | 1,040 | 1,540 |
| LEWIS | 970 | 1,060 | 1,140 | 1,210 | 1,260 | 1,340 | 1,500 | 1,350 | 1,200 | 1,080 | 1,100 | 1,020 | 1,180 |
| LINCOLN | 530 | 590 | 630 | 610 | 670 | 700 | 740 | 860 | 660 | 660 | 560 | 560 | 650 |
| MASON | 410 | 440 | 460 | 480 | 510 | 540 | 540 | 500 | 500 | 550 | 530 | 460 | 490 |
| OKANOGAN | 3,480 | 3,920 | 4,180 | 4,590 | 4,600 | 6,550 | 11,320 | 7,610 | 8,440 | 8,590 | 3,970 | 3,470 | 5,890 |
| PACIFIC | 310 | 340 | 350 | 380 | 410 | 420 | 430 | 400 | 370 | 320 | 280 | 280 | 360 |
| PEND OREILLE | 90 | 110 | 120 | 130 | 140 | 150 | 150 | 140 | 140 | 110 | 100 | 100 | 120 |
| SAN JUAN | 120 | 120 | 130 | 140 | 150 | 160 | 170 | 170 | 170 | 130 | 120 | 120 | 140 |
| SKAGIT | 2,370 | 2,660 | 2,980 | 2,960 | 2,910 | 3,360 | 4,040 | 4,410 | 4,210 | 3,560 | 2,570 | 2,550 | 3,220 |
| SKAMANIA | 60 | 80 | 90 | 100 | 100 | 100 | 100 | 90 | 120 | 90 | 70 | 50 | 90 |
| STEVENS | 560 | 630 | 730 | 810 | 860 | 890 | 940 | 870 | 810 | 680 | 610 | 560 | 750 |
| WAHKIAKUM | 50 | 50 | 60 | 60 | 70 | 70 | 70 | 70 | 60 | 50 | 50 | 50 | 60 |
| WALLA WALLA | 2,340 | 2,510 | 2,830 | 3,070 | 2,920 | 4,370 | 4,890 | 4,320 | 3,720 | 4,350 | 3,490 | 2,240 | 3,420 |
| WHITMAN | 820 | 870 | 970 | 970 | 1,050 | 1,120 | 1,200 | 1,390 | 1,060 | 1,000 | 900 | 850 | 1,020 |

**NOTE:** MSA = Metropolitan Statistical Area; MD = Metropolitan Division

Source: ESD/LMEA

## Appendix Exhibit 1.6

## Reasons for Changes in Hourly Average Wage Rates and Total Employment of Hired Agricultural Workers, United States, California, and the Pacific Region, Selected Weeks, 2006

| Survey Week in 2006 | National | Pacific – Washington and Oregon | California |
|---|---|---|---|
| | | **Average Wage Rate in Dollars per Hour** | |
| January 8-14 | Wage rates increased 3 percent from the same date in 2005. | Nothing unusual noted for the Pacific Region. Largest increases occurred in the Corn Belt I and Corn Belt II Regions due to favorable weather, increasing the demand for highly-paid truck drivers and machine operators; the Southeast Region due to increased demand for highly-skilled machine operators and truck drivers in livestock and poultry operations; and the Northeast II Region due to a higher percentage of nursery and greenhouse workers. | Nothing unusual noted for California. |
| April 9-15 | Wage rates increased 5 percent from the same date in 2005. | Nothing unusual noted for the Pacific Region. | Nothing unusual noted for California. Largest increases occurred in the Northeast I and Northeast II Regions due to a strong demand for nursery and greenhouse workers. The Corn Belt I Region wage rate increases were due to a lower proportion of part-time workers in the labor force, strong demand for nursery and greenhouse workers, and increasing need for highly-skilled machine operators on farms. The Mountain I Region increases were due to an increased demand for nursery and greenhouse workers and to more salaried workers putting in fewer hours. |
| July 9-15 | Wage rates increased 4 percent from the same date in 2005. | Largest increases occurred in the Pacific Region due to a significantly lower percentage of part-time workers in the labor force. The same reason applies to the Corn Belt II Region. Other largest wage rate increase regions are the Appalachian I, due to an increase in nursery and greenhouse workers; Appalachian II due to a higher proportion of highly-paid equine workers; and Delta, due to increased demand for workers in aquaculture and on dairy farms. | Nothing unusual noted for California. |
| October 8-14 | Wage rates increased 4 percent from the same date in 2005. | Largest increases occurred in the Pacific Region due to a larger percentage of salaried workers putting in fewer hours. This reason applies to the Mountain II Region as well. Other largest wage rate increase regions are Southern Plains (wet weather), Mountain I (lower proportion of part-time workers), and Delta (greater percentage of nursery and greenhouse workers in the labor force). | Nothing unusual noted for California. |

## Appendix Exhibit 1.6 (*Continued*)

## Reasons for Changes in Hourly Average Wage Rates and Total Employment of Hired Agricultural Workers, United States, California, and the Pacific Region, Selected Weeks, 2006

| Survey Week in 2006 | National | Pacific – Washington and Oregon | California |
|---|---|---|---|
| | | **Total Employment** | |
| January 8-14 | Hired workers increased 3 percent from the same date in 2005. | Largest increases occurred in the Pacific Region due to expansion in greenhouse and nursery industries. Largest increases occurred also in the Corn Belt I, Delta, and Northeast II Regions due largely to weather patterns and conditions. | Largest decreases occurred in California due to heavy rains and flooding as well as tight security at the Mexico border and strong competition from the higher-paying construction industry. Largest decreases also occurred in the Southern Plains, Northern Plains, and Appalachian II Regions. |
| April 9-15 | Hired workers decreased 4 percent from the same date in 2005. | Nothing unusual noted for the Pacific Region. Largest increases were in the Delta, Appalachian I, Corn Belt I, and Florida Regions largely due to weather patterns and conditions. Florida also experienced large increases in demand for nursery and greenhouse workers. | Largest decreases occurred in California due to 8 consecutive weeks of heavy rains and unseasonably cool weather, plus the continuing controversy over immigration. Other regions of largest decreases are the Southeast (extremely dry weather) and, Appalachian II Regions (wet weather). |
| July 9-15 | Hired workers decreased 11 percent from the same date in 2005. | Largest decreases occurred in the California and Pacific Regions. In the Pacific Region, the wheat harvest was behind normal due to the cool season, plus worker shortages were reported due to heightened border security. Cool, wet weather was the major factor along with heightened border security in California. Weather conditions contributed to largest decreases in the Northeast I (too much rain), Southern Plains (drought conditions) and Corn Belt II (wet conditions) Regions. | See the discussion for Pacific – Washington and Oregon. |
| October 8-14 | Hired workers decreased 5 percent from the same date in 2005. | Largest increases occurred in the Pacific Region due to favorable weather, especially in seeding of winter wheat and harvest of fall crops. Other largest increases occurred in the Northeast II (favorable weather conditions), Appalachian II (favorable conditions for corn and soybean harvest), and Florida (favorable weather conditions ) Regions. | Nothing unusual noted for California. |

**NOTES:** The Farm Labor Regions are defined as follows:

Northeast I = CT, ME, MA, NH, NY, RI, and VT
Northeast II = DE, MD, NJ, and PA
Southeast = Al, GA, and SC
Lake = MI, MN, and WI
Delta = AR, LA, and MS
Mountain I = ID, MT, WY, and SD
Mountain II - CO, NV, and UT
Mountain III = AZ and NM
Florida = FL
Appalachian I = NC and VA
Appalachian II = KY, TN, and WV
Corn Belt I = IL, IN, and OH
Corn Belt II = IA and MO
Northern Plains = KS, NE, ND, and SD
Southern Plains = OK and TX
Pacific = OR and WA
California = CA

Source: U.S. Department of Agriculture, Agricultural Statistics Board, National Agricultural Statistics Service (NASS), Farm Labor, Issues released on the following dates: Feb 17, 2006; May 19, 2006; August 18, 2006; and November 17, 2006.

## Appendix Exhibit 1.7

### Value Added to the U.S. Economy by the Agriculture Sector via the Production of Goods and Services, Washington State, Current Dollars, 1999 to 2005[1]

| ITEM | 1999 1,000s DOLLARS | 2000 1,000s DOLLARS | 2001 1,000s DOLLARS | 2002 1,000s DOLLARS | 2003 1,000s DOLLARS | 2004 1,000s DOLLARS | 2005 1,000s DOLLARS |
|---|---|---|---|---|---|---|---|
| **CASH RECEIPTS:** | | | | | | | |
| **CROPS** (FINAL CROP OUTPUT) | 3,227,177 | 3,372,844 | 3,461,654 | 3,695,061 | 3,979,695 | 4,087,659 | 3,986,925 |
| **LIVESTOCK** (FINAL ANIMAL OUTPUT) | 1,644,239 | 1,712,827 | 1,755,285 | 1,552,649 | 1,527,014 | 1,735,656 | 1,822,675 |
| MACHINE HIRE AND CUSTOM WORK | 70,702 | 85,196 | 59,205 | 57,605 | 88,552 | 47,279 | 30,360 |
| FOREST PRODUCTS SOLD | 235,000 | 225,000 | 171,000 | 140,000 | 120,000 | 140,000 | 150,000 |
| OTHER FARM INCOME | 203,205 | 128,270 | 210,224 | 131,077 | 148,873 | 176,904 | 178,880 |
| GROSS IMPUTED RENTAL VALUE OF FARM DWELLINGS | 212,394 | 246,746 | 246,652 | 251,936 | 294,922 | 316,674 | 330,713 |
| **FINAL AGRICULTURAL SECTOR OUTPUT** | **5,592,717** | **5,770,883** | **5,904,020** | **5,828,328** | **6,159,056** | **6,504,172** | **6,499,553** |
| **LESS:** INTERMEDIATE CONSUMPTION OUTLAYS: | | | | | | | |
| FARM ORIGIN | 799,518 | 894,498 | 814,580 | 834,937 | 771,218 | 698,054 | 841,520 |
| MANUFACTURED INPUTS | 694,193 | 699,831 | 759,829 | 685,737 | 637,318 | 802,902 | 883,613 |
| **OTHER INTERMEDIATE EXPENSES:** | | | | | | | |
| REPAIR AND MAINTENANCE OF CAPITAL ITEMS | 313,481 | 314,645 | 271,389 | 264,895 | 206,273 | 270,579 | 283,411 |
| MACHINE HIRE AND CUSTOM WORK | 141,732 | 106,706 | 102,441 | 177,527 | 93,840 | 97,045 | 82,603 |
| MARKETING, STORAGE, AND TRANSPORTATION EXPENSE | 318,793 | 383,071 | 423,538 | 372,686 | 395,536 | 460,382 | 524,736 |
| CONTRACT LABOR | 39,429 | 38,603 | 54,892 | 47,585 | 37,448 | 32,781 | 22,745 |
| MISCELLANEOUS EXPENSES | 498,712 | 463,476 | 549,968 | 549,776 | 494,009 | 542,978 | 690,388 |
| **TOTAL INTERMEDIATE CONSUMPTION OUTLAYS** | **2,805,858** | **2,900,830** | **2,976,637** | **2,933,143** | **2,635,642** | **2,904,721** | **3,329,016** |
| **GOVERNMENT TRANSACTIONS:** | | | | | | | |
| + DIRECT GOVERNMENT PAYMENTS | 270,594 | 352,793 | 299,021 | 215,912 | 265,396 | 197,009 | 239,854 |
| - MOTOR VEHICLE REGISTRATION AND LICENSE FEES | 19,955 | 17,438 | 19,416 | 13,105 | 10,315 | 11,661 | 6,882 |
| - PROPERTY TAXES | 165,091 | 164,220 | 165,226 | 142,699 | 160,000 | 170,000 | 200,000 |
| **GROSS VALUE ADDED** | **2,872,407** | **3,041,188** | **3,041,762** | **2,955,293** | **3,618,495** | **3,614,799** | **3,203,509** |
| **LESS:** CAPITAL CONSUMPTION | 401,698 | 397,149 | 402,146 | 406,211 | 414,564 | 445,440 | 460,029 |
| **NET VALUE ADDED** | **2,470,709** | **2,644,039** | **2,639,616** | **2,549,082** | **3,203,931** | **3,169,359** | **2,743,480** |
| **LESS:** FACTOR PAYMENTS: | | | | | | | |
| EMPLOYEE COMPENSATION (TOTAL HIRED LABOR) | 1,126,503 | 1,141,855 | 1,134,115 | 1,073,301 | 1,122,552 | 1,097,219 | 1,217,255 |
| NET RENT RECEIVED BY NONOPERATING LANDLORDS | 348,288 | 362,975 | 306,850 | 301,608 | 222,739 | 272,114 | 279,895 |
| REAL ESTATE AND NON-REAL ESTATE INTEREST | 278,201 | 294,294 | 271,202 | 253,960 | 243,520 | 249,462 | 288,857 |
| **NET FARM INCOME** | **717,717** | **844,915** | **927,449** | **920,213** | **1,615,120** | **1,550,564** | **957,473** |

**NOTE:** [1]Value of agricultural sector production is the gross value of the commodities and services produced within a year. Net value added is the sector's contribution to the national economy and is the sum of the income from production earned by all factors of production, regardless of ownership. Net farm income is the farm operator's share of income from the sector's production activities. The concept presented is consistent with that employed by the Organization for Economic Cooperation and Development.

Source: USDA - Economic Research Service Revised - August 31, 2006. 2006 Washington Annual Agriculture Bulletin, Page 25.
**http://www.nass.usda.gov/Statistics_by_State/Washington/Publications/Annual_Statistical_Bulletin/2006/abcover.pdf**

## Appendix Exhibit 1.8

### Annual Earnings per Job, in Current and Constant Dollars, Year 2000 = 100, CPI-W Washington State and the United States, 2000 to 2005

| CALENDAR YEAR | WASHINGTON CURRENT | WASHINGTON CONSTANT | UNITED STATES CURRENT | UNITED STATES CONSTANT | WASHINGTON PERCENT DIFFERENCE IN CONSTANT DOLLARS | NATIONAL RANK |
|---|---|---|---|---|---|---|
| 2000 | 41,399 | 41,399 | 39,007 | 39,007 | 6.13 | 7 |
| 2001 | 42,175 | 41,051 | 40,164 | 39,094 | 5.01 | 10 |
| 2002 | 43,386 | 41,664 | 41,116 | 39,526 | 5.41 | 10 |
| 2003 | 44,323 | 41,632 | 42,433 | 39,857 | 4.45 | 10 |
| 2004 | 45,902 | 42,023 | 44,360 | 40,611 | 3.48 | 10 |
| 2005 | 47,097 | 41,651 | 45,847 | 40,546 | 2.73 | 11 |

Source: Washington State Office of Economic and Revenue Forecast Council, Washington State Economic Climate Study, Volume XI, October 2006, p. 17.
http://www.erfc.wa.gov/pubs/clim1006.pdf

## Appendix Exhibit 1.9

### Farm Labor Workers Employed in 1000's, Weekly Average Hours Worked, and Wage Rates Pacific Region, California, and the United States, 2004 to 2006[1, 2]

| | NUMBER OF WORKERS | | | HOURS WORKED PER WEEK[3] | | |
|---|---|---|---|---|---|---|
| MONTH/YEAR | PACIFIC | CALIFORNIA | UNITED STATES | PACIFIC | CALIFORNIA | UNITED STATES |
| **2004** | | | | | | |
| JANUARY | 41 | 190 | 662 | 38.2 | 41.8 | 38.1 |
| APRIL | 64 | 234 | 827 | 36.8 | 45.9 | 40.6 |
| JULY | 112 | 218 | 961 | 37.3 | 44.6 | 39.2 |
| OCTOBER | 68 | 200 | 851 | 39.3 | 45.0 | 40.5 |
| **2005** | | | | | | |
| JANUARY | 38 | 143 | 589 | 35.9 | 40.1 | 37.0 |
| APRIL | 64 | 182 | 753 | 40.2 | 45.0 | 39.9 |
| JULY | 109 | 206 | 936 | 39.3 | 45.3 | 40.6 |
| OCTOBER | 76 | 183 | 842 | 43.1 | 44.4 | 42.0 |
| **2006** | | | | | | |
| JANUARY | 52 | 125 | 614 | 35.8 | 41.6 | 38.2 |
| APRIL | 65 | 137 | 720 | 37.5 | 43.0 | 40.8 |
| JULY | 92 | 190 | 875 | 41.3 | 45.7 | 40.9 |

## Appendix Exhibit 1.9 *(Continued)*

### Farm Labor Workers Employed in 1000's, Weekly Average Hours Worked, and Wage Rates Pacific Region, California, and the United States, 2004 to 2006[1, 2]

| | HOURLY AVERAGE WAGE RATES[3] | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | FIELD | | | LIVESTOCK | | | FIELD AND LIVESTOCK | | | ALL | | |
| MONTH/YEAR | PACIFIC | CALIF. | U.S. | PACIFIC | CALIF. | U.S. | PACIFIC | CALIF. | U.S. | PACIFIC | CALIF. | U.S. |
| **2004** | | | | | | | | | | | | |
| JANUARY | 8.58 | 8.41 | 8.39 | 9.31 | 9.25 | 8.83 | 8.78 | 8.54 | 8.55 | 9.82 | 9.47 | 9.41 |
| APRIL | 9.02 | 8.42 | 8.47 | 10.16 | 9.83 | 8.95 | 9.16 | 8.56 | 8.59 | 9.91 | 9.30 | 9.23 |
| JULY | 8.88 | 8.41 | 8.34 | 8.90 | 9.91 | 8.74 | 8.88 | 8.60 | 8.43 | 9.25 | 9.26 | 9.04 |
| OCTOBER | 9.32 | 8.43 | 8.62 | 9.23 | 9.57 | 8.91 | 9.31 | 8.63 | 8.69 | 9.81 | 9.33 | 9.32 |
| **2005** | | | | | | | | | | | | |
| JANUARY | 9.32 | 8.56 | 8.71 | 9.90 | 9.93 | 9.20 | 9.39 | 8.86 | 8.90 | 10.33 | 9.82 | 9.78 |
| APRIL | 8.87 | 8.62 | 8.56 | 10.78 | 9.60 | 9.14 | 9.23 | 8.76 | 8.72 | 9.95 | 9.48 | 9.35 |
| JULY | 8.60 | 8.76 | 8.61 | 10.67 | 10.66 | 9.26 | 8.80 | 9.00 | 8.78 | 9.21 | 9.68 | 9.38 |
| OCTOBER | 8.96 | 9.21 | 8.90 | 9.58 | 10.45 | 9.15 | 9.00 | 9.37 | 8.96 | 9.62 | 10.13 | 9.61 |
| **2006** | | | | | | | | | | | | |
| JANUARY | 9.36 | 8.99 | 9.11 | 10.47 | 10.50 | 9.26 | 9.48 | 9.20 | 9.17 | 10.25 | 10.30 | 9.78 |
| APRIL | 9.24 | 8.93 | 8.95 | 10.13 | 10.80 | 9.31 | 9.45 | 9.21 | 9.06 | 10.10 | 10.18 | 9.78 |
| JULY | 9.50 | 8.98 | 8.95 | 11.06 | 10.90 | 9.56 | 9.59 | 9.20 | 9.10 | 10.15 | 9.96 | 9.74 |

**NOTES:** [1] Pacific Region includes Washington and Oregon. All regions exclude agricultural service workers.
[2] United States excludes Alaska.
[3] All hired farm workers and wage rates include supervisors/managers and other workers which are not published separately.

Source: 2006 Washington Annual Agriculture Bulletin, Page 11.
**http://www.nass.usda.gov**

## Appendix Exhibit 2.1

### Current and Constant Dollar, Year 2000 = 100 CPI-W, Percentage Wage Rate Changes – Pears, Cherries, and Apples Washington State, 1991 to 2006

| YEAR | PEARS PERCENT CHANGE CURRENT | PEARS PERCENT CHANGE CONSTANT | CHERRIES PERCENT CHANGE CURRENT | CHERRIES PERCENT CHANGE CONSTANT | APPLES PERCENT CHANGE CURRENT | APPLES PERCENT CHANGE CONSTANT |
|---|---|---|---|---|---|---|
| 1991 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| 1992 | 5.83 | 1.54 | 2.81 | -0.83 | 0.83 | -4.83 |
| 1993 | 3.29 | 0.04 | -0.63 | -4.83 | 2.33 | -2.98 |
| 1994 | 8.38 | 1.74 | 5.12 | -1.43 | 2.96 | -3.75 |
| 1995 | 9.03 | 1.57 | 3.63 | -3.75 | 3.25 | -5.76 |
| 1996 | 6.40 | 0.13 | 3.69 | -4.89 | 3.92 | -6.76 |
| 1997 | 8.61 | 0.64 | 9.19 | -1.88 | 5.25 | -5.20 |
| 1998 | 9.79 | 0.84 | 8.81 | -2.83 | 6.42 | -3.50 |
| 1999 | 8.23 | -0.03 | 8.87 | -3.67 | 6.29 | -6.08 |
| 2000 | 11.86 | 0.78 | 16.69 | 0.14 | 9.75 | -0.07 |
| 2001 | 13.79 | 1.03 | 19.38 | -5.63 | 9.37 | -4.10 |
| 2002 | 14.26 | 0.96 | 15.63 | -2.45 | 10.17 | -3.66 |
| 2003 | 16.70 | 1.29 | 20.50 | -0.76 | 9.83 | -7.80 |
| 2004 | 15.95 | 0.69 | 18.94 | -2.80 | 11.13 | -7.12 |
| 2005 | 19.06 | 1.20 | 21.13 | -2.79 | 12.17 | -7.72 |
| 2006 | 21.55 | 2.50 | 37.61 | 8.64 | 16.78 | 7.33 |

Source: ESD/LMEA, UI Wage File

## Appendix Exhibit 2.2

### Comparison of Selected Tree Fruit Hourly Average Wage Rates with the State Minimum Wage Adjusted to Year 2000 Dollars, CPI-W, Washington State, 1991 to 2006

| YEAR | WASHINGTON STATE MINIMUM WAGE | HARVEST 3RD QTR PEAR WAGES | HARVEST 3RD QTR CHERRY WAGES | HARVEST 4TH QTR APPLE WAGES |
|---|---|---|---|---|
| 1991 | 5.37 | 7.88 | 10.70 | 9.65 |
| 1992 | 5.21 | 9.42 | 10.74 | 9.31 |
| 1993 | 5.07 | 8.51 | 9.77 | 9.48 |
| 1994 | 5.69 | 9.55 | 10.59 | 9.41 |
| 1995 | 5.54 | 9.45 | 10.03 | 9.23 |
| 1996 | 5.38 | 8.56 | 9.76 | 9.14 |
| 1997 | 5.53 | 8.87 | 10.48 | 9.28 |
| 1998 | 5.44 | 9.00 | 10.25 | 9.43 |
| 1999 | 5.89 | 8.47 | 10.05 | 9.20 |
| 2000 | 6.50 | 8.96 | 10.97 | 9.73 |
| 2001 | 6.54 | 9.11 | 9.58 | 9.38 |
| 2002 | 6.61 | 9.07 | 10.34 | 9.42 |
| 2003 | 6.51 | 9.28 | 10.75 | 9.05 |
| 2004 | 6.49 | 8.90 | 10.26 | 9.11 |
| 2005 | 6.46 | 9.22 | 10.26 | 9.06 |
| 2006 | 6.54 | 9.44 | 12.27 | 9.79 |

Source: ESD/LMEA, UI Wage File

## Appendix Exhibit 2.3

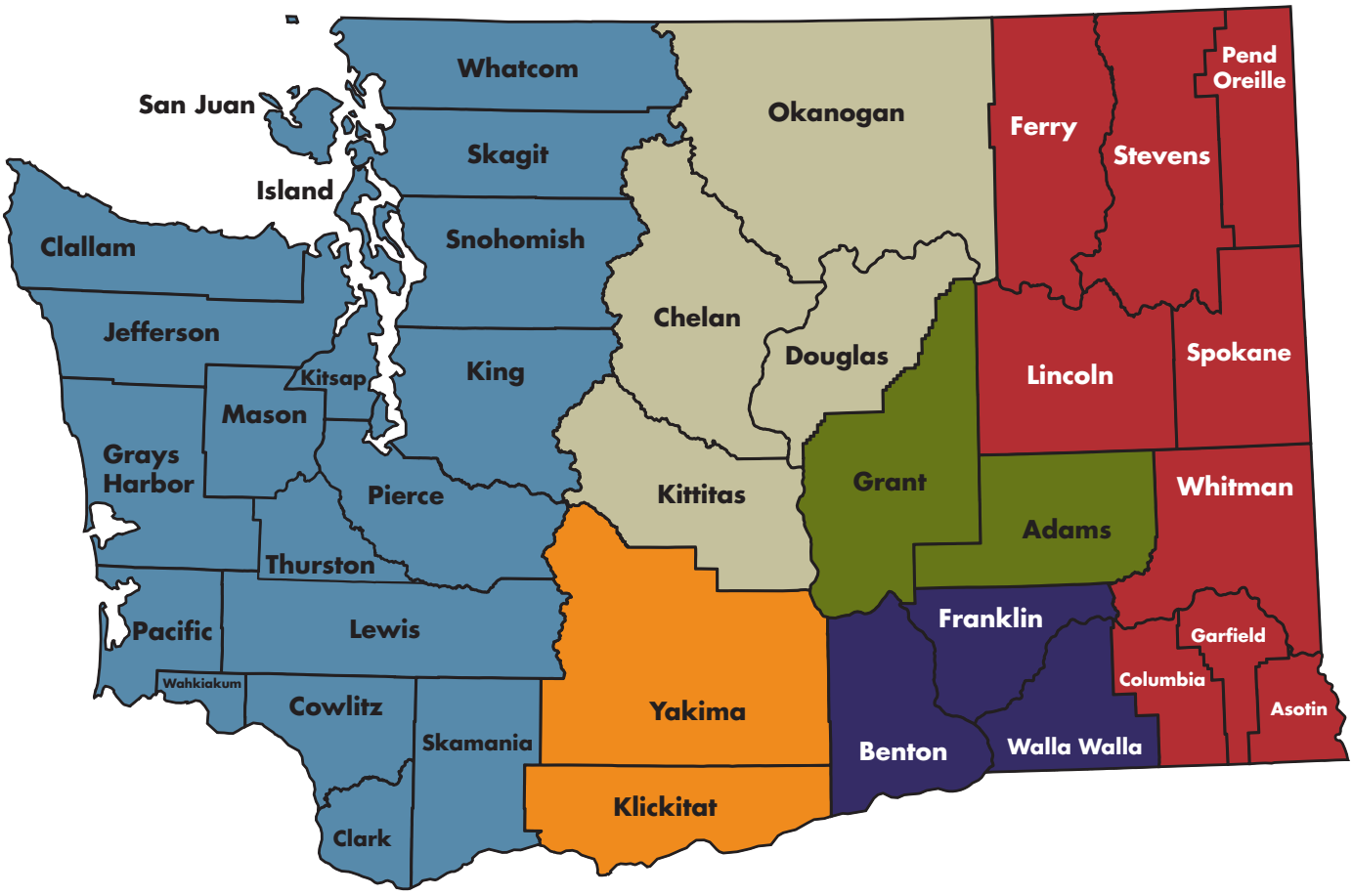
### Hourly Wage Rates, Pears, Cherries, and Apples, in Current and Constant Dollars, Year 2000 = 100, CPI-W, Washington State, 1990 to 2006

| | PEARS CURRENT DOLLARS | PEARS CONSTANT DOLLARS | CHERRIES CURRENT DOLLARS | CHERRIES CONSTANT DOLLARS | APPLES CURRENT DOLLARS | APPLES CONSTANT DOLLARS |
|---|---|---|---|---|---|---|
| 1990 | 6.44 | 8.48 | 8.30 | 10.94 | 7.39 | 9.74 |
| 1991 | 6.23 | 7.88 | 8.46 | 10.70 | 7.63 | 9.65 |
| 1992 | 7.68 | 9.42 | 8.75 | 10.74 | 7.59 | 9.31 |
| 1993 | 7.14 | 8.51 | 8.20 | 9.77 | 7.95 | 9.48 |
| 1994 | 8.22 | 9.55 | 9.12 | 10.59 | 8.10 | 9.41 |
| 1995 | 8.36 | 9.45 | 8.88 | 10.03 | 8.17 | 9.23 |
| 1996 | 7.80 | 8.56 | 8.89 | 9.76 | 8.33 | 9.14 |
| 1997 | 8.27 | 8.87 | 9.77 | 10.48 | 8.65 | 9.28 |
| 1998 | 8.52 | 9.00 | 9.71 | 10.25 | 8.93 | 9.43 |
| 1999 | 8.19 | 8.47 | 9.72 | 10.05 | 8.90 | 9.20 |
| 2000 | 8.96 | 8.96 | 10.97 | 10.97 | 9.73 | 9.73 |
| 2001 | 9.37 | 9.11 | 9.85 | 9.58 | 9.64 | 9.38 |
| 2002 | 9.47 | 9.07 | 10.80 | 10.34 | 9.83 | 9.42 |
| 2003 | 9.99 | 9.28 | 11.58 | 10.75 | 9.75 | 9.05 |
| 2004 | 9.83 | 8.90 | 11.33 | 10.26 | 10.06 | 9.11 |
| 2005 | 10.49 | 9.22 | 11.68 | 10.26 | 10.31 | 9.06 |
| 2006 | 11.02 | 9.44 | 14.32 | 12.27 | 11.42 | 9.79 |

Source: ESD/LMEA, UI Wage File

## Appendix Exhibit 3.1

### Agricultural Reporting Areas in Washington State




**AREA 1** = Clallam, Clark, Cowlitz, Grays Harbor, Island, Jefferson, King, Kitsap, Lewis, Mason, Pacific, Pierce, San Juan, Skagit, Skamania, Snohomish, Thurston, Wahkiakum, and Whatcom

**AREA 2** = Klickitat and Yakima

**AREA 3** = Chelan, Douglas, Kittitas, and Okanogan

**AREA 4** = Adams and Grant

**AREA 5** = Benton, Franklin, and Walla Walla

**AREA 6** = Asotin, Columbia, Ferry, Garfield, Lincoln, Pend Oreille, Spokane, Stevens, and Whitman

Source: ESD/LMEA

## Appendix Exhibit 3.2

### Employment of Seasonal Hired Agricultural Workers in Washington State, Statewide, and by Agricultural Reporting Areas and Source of Worker, 2006

| REPORTING AREA | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP | OCT | NOV | DEC |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **STATE** | | | | | | | | | | | | |
| **TOTAL** | **11,163** | **14,514** | **18,347** | **21,076** | **22,774** | **56,168** | **60,028** | **43,341** | **48,795** | **45,786** | **14,673** | **11,855** |
| LOCAL | 8,386 | 11,358 | 13,682 | 14,599 | 16,674 | 31,865 | 41,732 | 31,369 | 33,471 | 24,674 | 10,600 | 10,228 |
| INTRA-STATE | 135 | 139 | 222 | 290 | 392 | 859 | 498 | 1,074 | 1,049 | 1,542 | 78 | 78 |
| INTER-STATE | 143 | 70 | 298 | 504 | 364 | 2,226 | 3,354 | 1,749 | 1,707 | 2,256 | 321 | 60 |
| FOREIGN | 1,492 | 2,353 | 2,456 | 2,034 | 3,305 | 5,013 | 3,659 | 1,999 | 6,409 | 5,735 | 710 | 897 |
| UNKNOWN | 1,006 | 594 | 1,689 | 3,649 | 2,039 | 16,205 | 10,785 | 7,149 | 6,160 | 11,585 | 2,964 | 593 |
| **WESTERN** | | | | | | | | | | | | |
| **TOTAL** | **1,807** | **2,415** | **3,190** | **3,122** | **3,136** | **5,720** | **8,029** | **6,439** | **4,913** | **3,627** | **2,372** | **2,790** |
| LOCAL | 1,412 | 2,234 | 1,824 | 1,746 | 2,392 | 3,438 | 5,137 | 3,987 | 4,169 | 2,752 | 1,488 | 2,556 |
| INTRA-STATE | 20 | 3 | 36 | 46 | 0 | 250 | 14 | 13 | 11 | 229 | 0 | 0 |
| INTER-STATE | 55 | 0 | 147 | 194 | 31 | 851 | 623 | 846 | 196 | 96 | 70 | 35 |
| FOREIGN | 254 | 80 | 3 | 34 | 9 | 11 | 160 | 271 | 84 | 53 | 0 | 0 |
| UNKNOWN | 66 | 98 | 1,180 | 1,102 | 704 | 1,170 | 2,095 | 1,322 | 453 | 497 | 814 | 199 |
| **SOUTH CENTRAL** | | | | | | | | | | | | |
| **TOTAL** | **3,415** | **4,442** | **5,837** | **6,203** | **6,217** | **18,679** | **17,091** | **12,224** | **13,915** | **11,752** | **3,222** | **3,066** |
| LOCAL | 1,944 | 2,693 | 4,135 | 4,050 | 4,682 | 9,774 | 14,207 | 8,324 | 9,446 | 3,658 | 2,953 | 2,433 |
| INTRA-STATE | 108 | 130 | 157 | 187 | 81 | 264 | 237 | 589 | 874 | 1,074 | 75 | 75 |
| INTER-STATE | 81 | 70 | 134 | 120 | 20 | 245 | 606 | 359 | 574 | 569 | 52 | 0 |
| FOREIGN | 1,013 | 1,391 | 1,375 | 1,654 | 1,357 | 3,104 | 1,858 | 846 | 2,990 | 3,172 | 142 | 558 |
| UNKNOWN | 269 | 158 | 36 | 192 | 77 | 5,293 | 182 | 2,106 | 31 | 3,279 | 0 | 0 |
| **NORTH CENTRAL** | | | | | | | | | | | | |
| **TOTAL** | **2,747** | **3,229** | **3,773** | **3,843** | **3,872** | **13,264** | **19,622** | **11,612** | **13,336** | **15,024** | **3,674** | **3,470** |
| LOCAL | 2,597 | 3,049 | 3,489 | 3,738 | 3,665 | 7,038 | 12,049 | 10,538 | 9,261 | 10,235 | 3,136 | 3,177 |
| INTRA-STATE | 5 | 6 | 23 | 5 | 22 | 84 | 232 | 437 | 30 | 40 | 3 | 3 |
| INTER-STATE | 3 | 0 | 4 | 0 | 4 | 302 | 1,098 | 355 | 158 | 1,209 | 198 | 3 |
| FOREIGN | 137 | 171 | 226 | 95 | 181 | 839 | 1,076 | 255 | 1,990 | 1,486 | 99 | 93 |
| UNKNOWN | 5 | 3 | 31 | 5 | 0 | 5,001 | 5,167 | 27 | 1,897 | 2,054 | 238 | 194 |
| **COLUMBIA BASIN** | | | | | | | | | | | | |
| **TOTAL** | **1,744** | **1,927** | **2,225** | **3,006** | **3,429** | **5,941** | **6,598** | **6,352** | **8,618** | **8,841** | **2,793** | **1,584** |
| LOCAL | 1,290 | 1,612 | 1,830 | 2,413 | 2,468 | 3,769 | 5,012 | 4,338 | 5,990 | 4,940 | 2,270 | 1,423 |
| INTRA-STATE | 0 | 0 | 0 | 0 | 252 | 169 | 13 | 4 | 134 | 199 | 0 | 0 |
| INTER-STATE | 3 | 0 | 7 | 7 | 10 | 81 | 180 | 85 | 675 | 295 | 0 | 8 |
| FOREIGN | 77 | 60 | 47 | 47 | 222 | 519 | 301 | 173 | 675 | 397 | 0 | 45 |
| UNKNOWN | | | | | | | | | | | | |
| **SOUTH EASTERN** | | | | | | | | | | | | |
| **TOTAL** | **1,428** | **2,440** | **3,141** | **4,465** | **5,596** | **11,984** | **8,038** | **5,759** | **7,591** | **6,176** | **2,433** | **826** |
| LOCAL | 1,121 | 1,715 | 2,246 | 2,225 | 2,950 | 7,366 | 4,683 | 3,256 | 4,189 | 2,722 | 575 | 519 |
| INTRA-STATE | 3 | 0 | 0 | 53 | 37 | 64 | 2 | 5 | 0 | 0 | 0 | 0 |
| INTER-STATE | 3 | 0 | 0 | 183 | 299 | 748 | 847 | 104 | 104 | 88 | 0 | 14 |
| FOREIGN | 10 | 651 | 803 | 204 | 1,536 | 535 | 262 | 453 | 669 | 627 | 469 | 201 |
| UNKNOWN | | | | | | | | | | | | |
| **EASTERN** | | | | | | | | | | | | |
| **TOTAL** | **22** | **61** | **181** | **437** | **524** | **580** | **650** | **955** | **422** | **366** | **179** | **119** |
| LOCAL | 22 | 55 | 158 | 425 | 517 | 480 | 644 | 929 | 416 | 366 | 179 | 119 |
| INTRA-STATE | 0 | 0 | 6 | 0 | 0 | 28 | 0 | 26 | 0 | 0 | 0 | 0 |
| INTER-STATE | 0 | 0 | 6 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| FOREIGN | 0 | 0 | 2 | 0 | 0 | 6 | 0 | 0 | 0 | 0 | 0 | 0 |
| UNKNOWN | 0 | 6 | 9 | 12 | 7 | 67 | 6 | 0 | 6 | 0 | 0 | 0 |

Source: ESD/LMEA, Agricultural Labor Employment and Wage Trends Survey

## Appendix Exhibit 3.3

### Number and Percent of Growers Reporting a Labor Shortage by Month and Agricultural Reporting Area, 2006

| MONTH | TOTAL SAMPLE RESPONDING | PERCENT BY AREA | PERCENT OF GROWERS BY STATE | PERCENT SHARE OF GROWERS BY REGION |
|---|---|---|---|---|
| **JULY** | | | | |
| **STATE** | **389** | **12.6** | **12.6** | **100.0** |
| AREA 1 | 58 | 8.6 | 1.9 | 14.9 |
| AREA 2 | 67 | 20.9 | 2.2 | 17.2 |
| AREA 3 | 39 | 23.1 | 1.3 | 10.0 |
| AREA 4 | 95 | 10.5 | 3.1 | 24.4 |
| AREA 5 | 98 | 10.2 | 3.2 | 25.2 |
| AREA 6 | 32 | 3.1 | 1.0 | 8.2 |
| **AUGUST** | | | | |
| **STATE** | **371** | **9.2** | **9.2** | **100.0** |
| AREA 1 | 53 | 11.3 | 1.3 | 14.3 |
| AREA 2 | 63 | 12.7 | 1.6 | 17.0 |
| AREA 3 | 38 | 13.2 | 0.9 | 10.2 |
| AREA 4 | 85 | 4.7 | 2.1 | 22.9 |
| AREA 5 | 101 | 9.9 | 2.5 | 27.2 |
| AREA 6 | 31 | 3.2 | 0.8 | 8.4 |
| **SEPTEMBER** | | | | |
| **STATE** | **336** | **10.7** | **10.7** | **100.0** |
| AREA 1 | 46 | 2.2 | 1.5 | 13.7 |
| AREA 2 | 60 | 15.0 | 1.9 | 17.9 |
| AREA 3 | 34 | 11.8 | 1.1 | 10.1 |
| AREA 4 | 79 | 11.4 | 2.5 | 23.5 |
| AREA 5 | 94 | 13.8 | 3.0 | 28.0 |
| AREA 6 | 23 | 0.0 | 0.7 | 6.8 |
| **OCTOBER** | | | | |
| **STATE** | **334** | **12.3** | **12.3** | **100.0** |
| AREA 1 | 48 | 4.2 | 1.8 | 14.4 |
| AREA 2 | 59 | 15.3 | 2.2 | 17.7 |
| AREA 3 | 32 | 12.5 | 1.2 | 9.6 |
| AREA 4 | 84 | 13.1 | 3.1 | 25.1 |
| AREA 5 | 87 | 16.1 | 3.2 | 26.0 |
| AREA 6 | 24 | 4.2 | 0.9 | 7.2 |
| **NOVEMBER** | | | | |
| **STATE** | **321** | **3.7** | **3.7** | **100.0** |
| AREA 1 | 47 | 6.4 | 0.5 | 14.6 |
| AREA 2 | 54 | 1.9 | 0.6 | 16.8 |
| AREA 3 | 32 | 3.1 | 0.4 | 10.0 |
| AREA 4 | 80 | 2.5 | 0.9 | 24.9 |
| AREA 5 | 82 | 4.9 | 1.0 | 25.5 |
| AREA 6 | 26 | 3.8 | 0.3 | 8.1 |
| **DECEMBER** | | | | |
| **STATE** | **305** | **2.0** | **2.0** | **100.0** |
| AREA 1 | 46 | 2.2 | 0.3 | 15.1 |
| AREA 2 | 48 | 2.1 | 0.3 | 15.7 |
| AREA 3 | 35 | 5.7 | 0.2 | 11.5 |
| AREA 4 | 72 | 1.4 | 0.5 | 23.6 |
| AREA 5 | 80 | 1.3 | 0.5 | 26.2 |
| AREA 6 | 24 | 0.0 | 0.2 | 7.9 |

Source: ESD/LMEA, Agricultural Labor Employment and Wage Trends Survey

## Appendix Exhibit 4.1

### Unduplicated Continued Claimants for Unemployment Compensation, Agriculture and All Nonagriculture Industries Washington State, 2003 to 2006

| | 2003 | | | 2004 | | | 2005 | | | 2006 | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| MONTH | AGRI | PERCENT ALL NONAG INDUSTRY | RATIO AG/ALL NONAG INDUSTRY | AGRI | PERCENT ALL NONAG INDUSTRY | RATIO AG/ALL NONAG INDUSTRY | AGRI | PERCENT ALL NONAG INDUSTRY | RATIO AG/ALL NONAG INDUSTRY | AGRI | PERCENT ALL NONAG INDUSTRY | RATIO AG/ALL NONAG INDUSTRY |
| JANUARY | 11,033 | 163,542 | 6.75 | 11,055 | 150,001 | 7.37 | 8,750 | 116,057 | 7.54 | 7,619 | 94,025 | 8.10 |
| FEBRUARY | 8,701 | 149,086 | 5.84 | 8,270 | 130,389 | 6.34 | 5,847 | 93,845 | 6.23 | 5,285 | 78,733 | 6.71 |
| MARCH | 7,619 | 148,637 | 5.13 | 6,346 | 118,411 | 5.36 | 4,689 | 86,016 | 5.45 | 4,339 | 74,404 | 5.83 |
| APRIL | 6,781 | 139,158 | 4.87 | 5,384 | 106,538 | 5.05 | 4,565 | 82,488 | 5.53 | 4,253 | 70,872 | 6.00 |
| MAY | 5,410 | 127,791 | 4.23 | 4,707 | 95,399 | 4.93 | 4,103 | 77,284 | 5.31 | 3,292 | 62,918 | 5.23 |
| JUNE | 5,066 | 126,562 | 4.00 | 3,204 | 87,733 | 3.65 | 2,623 | 69,583 | 3.77 | 2,697 | 58,138 | 4.64 |
| JULY | 4,182 | 116,573 | 3.59 | 3,188 | 85,534 | 3.82 | 2,942 | 69,106 | 4.26 | 2,086 | 58,432 | 3.57 |
| AUGUST | 6,085 | 113,776 | 5.35 | 4,733 | 85,532 | 5.53 | 3,980 | 67,318 | 5.91 | 3,421 | 56,284 | 6.08 |
| SEPTEMBER | 3,436 | 107,704 | 3.19 | 2,137 | 75,433 | 2.83 | 1,879 | 60,878 | 3.09 | 1,651 | 52,967 | 3.12 |
| OCTOBER | 4,177 | 107,125 | 3.90 | 2,725 | 78,500 | 3.47 | 2,396 | 66,074 | 3.63 | 1,757 | 56,354 | 3.12 |
| NOVEMBER | 9,058 | 122,721 | 7.38 | 6,605 | 88,701 | 7.45 | 5,593 | 74,396 | 7.52 | 5,098 | 67,681 | 7.53 |
| DECEMBER | 10,635 | 137,002 | 7.76 | 7,504 | 97,272 | 7.71 | 7,227 | 82,953 | 8.71 | 6,982 | 82,192 | 8.49 |
| **AVERAGE** | **6,849** | **129,973** | **5.27** | **5,488** | **99,787** | **5.50** | **4,550** | **78,833** | **5.77** | **4,040** | **67,750** | **5.96** |

Source: ESD/LMEA

## Appendix Exhibit 4.2

### Demographic Characteristics of Continued Claims in Agriculture Washington State, 2005 and 2006

| | 2005 | | 2006 | |
|---|---|---|---|---|
| TOTAL CONTINUED CLAIMS | 17,444 | 100% | 15,927 | 100% |
| FEMALE | 6,123 | 35.1% | 5,878 | 36.9% |
| MALE | 11,321 | 64.9% | 10,049 | 63.1% |
| WHITE | 5,268 | 30.2% | 4,847 | 30.4% |
| BLACK | 123 | 0.7% | 122 | 0.8% |
| HISPANIC | 11,541 | 66.2% | 10,525 | 66.1% |
| NATIVE AMERICAN | 156 | 0.9% | 147 | 0.9% |
| ASIAN | 150 | 0.9% | 123 | 0.8% |
| OTHER | 206 | 1.2% | 168 | 1.1% |
| UNDER AGE 25 | 1,205 | 19.7% | 1,379 | 8.7% |
| AGE 25-34 | 3,588 | 58.6% | 3,170 | 19.9% |
| AGE 35-44 | 5,346 | 87.3% | 4,879 | 30.6% |
| AGE 45-54 | 4,541 | 74.2% | 4,138 | 26.0% |
| AGE 55+ | 2,005 | 32.7% | 2,366 | 14.9% |
| LESS THAN GRADE 12 EDUCATION | 10,990 | 63.0% | 9,941 | 62.4% |
| HIGH SCHOOL GRADUATE OR GED | 4,297 | 24.6% | 4,070 | 25.6% |
| MORE THAN HIGH SCHOOL | 2,157 | 12.4% | 1,921 | 12.1% |

**NOTE:** These data represent continued claims, not unduplicated continued claimants. Thus, a person submitting two claims in a year would be counted twice.

Source: ESD/LMEA, Data Warehouse

## Appendix Exhibit 4.3

### Detailed Agricultural Industries: Most Continued Claimants (Unduplicated Workers) Washington State, 2005 and 2006

| NAICS | 2005 | 2006 | PERCENT CHANGE 2005-2006 |
|---|---|---|---|
| DECIDUOUS TREE FRUITS | 5,935 | 5,208 | -12.2 |
| CROP PREPARATION | 2,748 | 2,867 | 4.3 |
| FIELD CROPS | 1,146 | 1,053 | -8.1 |
| GENERAL FARMS | 645 | 476 | -26.2 |
| ORNAMENTAL FLORICULTURE | 683 | 589 | -13.8 |
| GRAPES | 681 | 588 | -13.7 |
| VEGETABLES AND MELON | 491 | 486 | -1.0 |
| IRISH POTATOES | 555 | 483 | -13.0 |
| WHEAT | 259 | 236 | -8.9 |
| BERRY FARMS | 226 | 184 | -18.6 |
| DAIRY FARMS | 146 | 130 | -11.0 |
| FARM LABOR | 112 | 86 | -23.2 |

Source: ESD/LMEA, Data Warehouse

## Appendix Exhibit 5.1

### Washington State's Bearing Acreage, Yield Per Acre in Tons, Production, Average Price Per Ton, Value of Utilized Production, and Wine Grape Utilization, Current and Constant Dollars, 1995 to 2006

| | | | VALUE PER BEARING ACRE | | VALUE OF UTILIZED PRODUCTION IN $1,000s | | UTILIZATION – WINE | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | PRICE IN $ PER TON | |
| YEAR | BEARING ACREAGE | YIELD PER ACRE IN TONS | CURRENT DOLLARS | CONSTANT DOLLARS 2006 = 100[2] | CURRENT DOLLARS | CONSTANT DOLLARS 2006 = 100[2] | QUANTITY IN TONS[1] | CURRENT DOLLARS | CONSTANT DOLLARS 2006 = 100[2] |
| 1995 | — | — | — | — | $39,240 | $25,318 | 60,000 | $654 | $422 |
| 1996 | — | — | — | — | $33,180 | $25,260 | 35,000 | $948 | $722 |
| 1997 | 13,000 | 4.77 | $4,636 | $3,230 | $60,264 | $41,992 | 62,000 | $972 | $677 |
| 1998 | 15,000 | 4.67 | $4,303 | $3,109 | $64,540 | $46,637 | 70,000 | $922 | $666 |
| 1999 | 19,000 | 3.68 | $3,353 | $2,488 | $63,700 | $47,259 | 70,000 | $910 | $675 |
| 2000 | 24,000 | 3.75 | $3,371 | $2,131 | $80,910 | $51,159 | 90,000 | $899 | $568 |
| 2001 | 27,000 | 3.70 | $3,322 | $2,336 | $89,700 | $63,077 | 100,000 | $897 | $631 |
| 2002 | 27,000 | 4.26 | $3,740 | $2,533 | $100,970 | $68,397 | 115,000 | $878 | $595 |
| 2003 | 27,000 | 4.15 | $3,816 | $2,634 | $103,040 | $71,129 | 112,000 | $920 | $635 |
| 2004 | 27,000 | 3.96 | $3,666 | $3,004 | $98,975 | $81,100 | 107,000 | $925 | $758 |
| 2005 | 28,000 | 3.93 | $3,654 | $3,065 | $102,300 | $85,799 | 110,000 | $930 | $780 |
| 2006 | 31,000 | 3.87 | $3,646 | $3,646 | $113,040 | $113,040 | 120,000 | $942 | $942 |

**NOTES:** [1] Total production and production utilized are the same.
[2] See Appendix Exhibit 5.2 for the data on index numbers of prices received by farmers. Prices indices for California grapes aggregated wine grapes with all other grapes. We therefore use the price index for all "Fruits and Nuts" as the best approximation of price change for wine groups in Washington state.

Source: For Years up to 2006 – United States Department of Agriculture, National Agricultural Statistics Service, AGRI-FACTS, September Review, posted online October 16, 2006. For 2006 – United States Department of Agriculture, National Agricultural Statistics Service, Grape Release, "2006 Washington Wine Grape Production Up 9 Percent, White Riesling Up 27 Percent," posted online January 25, 2007. United States Department of Agriculture, National Agricultural Statistics Service, Press Release, Washington's 2006 Apple Production Lower and 2006 Grape Production Lower, posted online October 12, 2006. United States Department of Agriculture, National Agricultural Statistics Service, Washington Vineyard Acreage Report 2006, posted online February 9, 2007.

## Appendix Exhibit 5.2

### Index Numbers of Prices Received by Farmers, All Crops and Fruits and Nuts, All, United States, 1990 to 2006

| | ALL CROPS | | FRUITS AND NUTS | |
|---|---|---|---|---|
| YEAR | 1990-1992 = 100 | 2006 = 100 | 1990-1992 = 100 | 2006 = 100[2] |
| 1990 | 103 | 85.83 | 97 | 62.58 |
| 1991 | 101 | 84.16 | 112 | 72.26 |
| 1992 | 101 | 84.16 | 99 | 63.87 |
| 1993 | 102 | 85.00 | 93 | 60.00 |
| 1994 | 105 | 87.50 | 90 | 58.06 |
| 1995 | 112 | 93.33 | 100 | 64.52 |
| 1996 | 126 | 105.00 | 118 | 76.13 |
| 1997 | 115 | 95.83 | 108 | 69.68 |
| 1998 | 107 | 89.17 | 112 | 72.26 |
| 1999 | 97 | 80.83 | 115 | 74.19 |
| 2000 | 96 | 80.00 | 98 | 63.23 |
| 2001 | 99 | 82.50 | 109 | 70.32 |
| 2002 | 105 | 87.50 | 105 | 67.74 |
| 2003 | 111 | 92.50 | 107 | 69.03 |
| 2004 | 117 | 97.50 | 127 | 81.94 |
| 2005 | 112 | 93.33 | 130 | 83.87 |
| 2006 | 120 | 100.00 | 155 | 100.00 |

Source: USDA, NASS, Agricultural Statistics Board, Various issues of the Agricultural Prices Summary by year. Main web address for entry into these reports is: http://usda.mannlib.cornell.edu/MannUsda/homepage.do

## Appendix Exhibit 5.3

### Grape Vineyard and Winery Establishments, Covered Annual Average Employment, Annual Wage Bill, and Annual Average Before-Tax Earnings, in Current and Constant Dollars, Washington State, Selected Years 1990 to 2006

| GRAPE VINEYARDS | | | | | | |
|---|---|---|---|---|---|---|
| Year | Annual Average Covered Establishments | Annual Average Employment | Total Annual Before-Tax Wage Bill | | Annual Average Before-Tax Earnings | |
| | | | Current Dollars | Constant Dollars | Current Dollars | Constant Dollars |
| 1990 | 314 | 1,373 | 10,686,430 | 6,687,678 | 7,783 | 4,871 |
| 1995 | 299 | 1,449 | 15,357,675 | 9,908,772 | 10,599 | 6,813 |
| 2000 | 306 | 2,099 | 30,039,970 | 18,994,273 | 14,312 | 9,049 |
| 2005 | 306 | 2,453 | 38,834,737 | 32,570,693 | 15,832 | 13,278 |
| 2006 | 297 | 2,493 | 41,089,212 | 41,089,212 | 16,482 | 16,482 |
| **WINERIES** | | | | | | |
| 1990 | 43 | 541 | 7,521,423 | 4,706,907 | 13,903 | 8,700 |
| 1995 | 48 | 556 | 10,976,175 | 7,081,828 | 19,741 | 12,737 |
| 2000 | 74 | 871 | 24,011,380 | 15,182,395 | 27,568 | 17,431 |
| 2001 | 87 | 949 | 25,609,842 | 18,008,840 | 26,986 | 18,977 |
| 2002 | 95 | 1,003 | 25,826,449 | 17,494,836 | 25,749 | 17,442 |
| 2003 | 107 | 1,129 | 27,902,394 | 19,261,022 | 24,714 | 17,060 |
| 2004 | 120 | 1,240 | 31,241,035 | 25,598,904 | 25,194 | 20,644 |
| 2005 | 132 | 1,327 | 35,535,454 | 29,803,585 | 26,779 | 22,460 |
| 2006 | 157 | 1,555 | 41,709,609 | 41,709,609 | 26,823 | 26,823 |

**NOTES:** These data are based on quarterly tax reports submitted under the Unemployment Insurance program (UI). Thus, the data relate only to establishments that are covered by UI. The SIC of 0172, Grape Vineyards, is a perfect one-to-one match with NAICS 111332. The SIC of 2084, Wines, Brandy, and Brandy Spirits is not a perfect one-to-one match, since a part of SIC 2085 also falls into NAICS 312130. However, there was no significant employment in SIC 2085 during the years reported here. Thus, for the State of Washington, for this time series/cross-section, SIC 2084 is a good match to NAICS 312130. Employment follows U.S. Department of Labor, Bureau of Labor Statistics' conventions and is measured on the 12th of each month. There was a change in coverage of the UI laws between 1985 and 1990, resulting in an addition of smaller establishments to the measurement universe.

Source: Washington State Department of Employment Security, Labor Market and Economic Analysis Branch, Quarterly Census of Employment and Wages

## Appendix Exhibit 5.4

### Number of Bonded Wineries in the United States
### Selected States With More Than 100 Wineries in 2005

| STATE | 1999 | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 | PERCENT CHANGE 1999 TO 2005 |
|---|---|---|---|---|---|---|---|---|
| CALIFORNIA | 1,364 | 1,450 | 1,562 | 1,704 | 1,869 | 2,059 | 2,275 | 66.7 |
| MICHIGAN | 56 | 65 | 82 | 80 | 91 | 101 | 109 | 94.6 |
| NEW YORK | 172 | 186 | 185 | 197 | 211 | 227 | 245 | 42.4 |
| OHIO | 75 | 77 | 90 | 91 | 108 | 109 | 114 | 52.0 |
| OREGON | 126 | 145 | 164 | 192 | 214 | 250 | 291 | 130.0 |
| PENNSYLVANIA | 71 | 76 | 84 | 94 | 97 | 108 | 115 | 61.9 |
| TEXAS | 64 | 67 | 68 | 77 | 86 | 110 | 141 | 120.3 |
| VIRGINIA | 70 | 73 | 86 | 89 | 98 | 105 | 127 | 81.4 |
| WASHINGTON | 163 | 182 | 231 | 268 | 325 | 376 | 454 | 178.5 |
| **UNITED STATES TOTAL** | **2,688** | **2,904** | **3,187** | **3,469** | **3,873** | **4,356** | **4,929** | **83.3** |

Source: MFK Research LLC, "The Impact of Wine, Grapes, and Grape Products on the American Economy 2007: Family Business Building Value," St. Helena, CA, 2007, Appendix I.

## Appendix Exhibit 5.5

### Wine Production and Total Cases Sold in Washington State for the Top 50 Wineries in Terms of Total Cases Produced in 2006

| PRODUCTION RANK: WINERIES PRODUCING | TOTAL CASES PRODUCED | | TOTAL CASES SOLD | |
|---|---|---|---|---|
| | AMOUNT | PERCENT[1] | AMOUNT | PERCENT[1] |
| TOP 5 – 500,001 TO OVER 1,000,000 CASES | 4,772,861 | 72.59 | 3,540,000[2] | 80.38 |
| NEXT 9 – 50,001 TO 500,000 CASES | 1,152,829 | 17.53 | 359,854[3] | 8.17 |
| NEXT 10 – 20,001 TO 50,000 CASES | 303,571 | 4.62 | 270,300[4] | 6.14 |
| NEXT 10 – 15,001 TO 20,000 CASES | 173,786 | 2.64 | 89,500[5] | 2.03 |
| NEXT 10 – 10,001 TO 15,000 CASES | 119,645 | 1.82 | 137,134[6] | 3.11 |
| LAST 6 – AT LEAST 7,500 TO 10,000 CASES | 52,656 | 0.08 | 7,300[7] | 0.17 |
| **TOTAL** | **6,575,348** | **100.0** | **4,404,088** | **100.0** |

**NOTES:** [1] Totals may not add to 100.0 due to rounding
[2] One winery not reporting
[3] Three wineries not reporting
[5] Four wineries not reporting
[6] One winery not reporting
[7] Three wineries not reporting

Source: Adapted from: Puget Sound Business Journal, "Washington Wine," Supplement, Wineries, Part 1, March 30 - April 5, 2007, pp. 16 and 18.

## Appendix Exhibit 5.6

### Washington Wine Grapes, Acres Planted by Variety
### 1993, 1999, 2002, and 2006 as of January 1, in Acres

| VARIETY BY COLOR | JANUARY 1, 1993 | JANUARY 1, 1999 | JANUARY 1, 2002 | JANUARY 1, 2006 |
|---|---|---|---|---|
| **WHITE VARIETIES** | | | | |
| CHARDONNAY | 2,600 | 6,100 | 6,640 | 5,992 |
| SAUVIGNON BLANC | 800 | 700 | 710 | 993 |
| WHITE RIESLING | 2,000 | 1,900 | 2,200 | 4,404 |
| OTHER WHITE[1] | 1,700 | 1,800 | 2,450 | 2,260 |
| **TOTAL WHITE** | **7,100** | **10,500** | **12,000** | **13,649** |
| **RED VARIETIES** | | | | |
| CABERNET FRANC | 150 | 700 | 750 | 1,157 |
| CABERNET SAUVIGNON | 1,400 | 5,000 | 6,050 | 5,959 |
| MERLOT | 1,800 | 5,600 | 5,980 | 5,853 |
| SYRAH | — | 1,500 | 2,100 | 2,831 |
| OTHER RED[2] | 650 | 700 | 1,120 | 1,551 |
| **TOTAL RED** | **4,000** | **13,500** | **16,000** | **17,351** |
| **TOTAL WASHINGTON** | **11,100** | **24,000** | **28,000** | **31,000** |

**NOTES:** [1] Other White includes Chenin Blanc, Gewurztraminer, Muscat Canelli, Pinot Gris, Semillon, Viognier, and Other.
[2] Other Red includes Grenache, Lemberger, Malbec, Mouverdre, Petit Verdot, Pinot Noir, Sangiovese, Zinfandel, and Other.

Source: Adapted from: Puget Sound Business Journal, "Washington Wine," Supplement, Wineries, Part 1, March 30 - April 5, 2007, pp. 16 and 18.

## Appendix Exhibit 5.7

### Wine Grapes: Quantity and Price by Variety
### Washington State, 2000 to 2005

| | QUANTITY UTILIZED IN TONS | | | | | | AVERAGE PRICE IN DOLLARS PER TON, CURRENT DOLLARS | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 |
| **WHITE VARIETIES** | | | | | | | | | | | | |
| CHARDONNAY | 27,800 | 29,200 | 35,800 | 31,300 | 28,400 | 26,000 | 818 | 788 | 763 | 775 | 825 | 755 |
| WHITE RIESLING | 10,100 | 10,600 | 13,100 | 15,300 | 16,500 | 18,800 | 590 | 603 | 654 | 688 | 713 | 715 |
| CHENIN BLANC | 1,500 | 1,400 | 1,200 | 1,000 | 700 | 1,000 | 494 | 439 | 441 | 466 | 535 | 603 |
| SAUVIGNON BLANC | 3,400 | 3,300 | 4,000 | 3,900 | 2,800 | 3,900 | 728 | 719 | 734 | 746 | 769 | 751 |
| SEMILLON | 2,700 | 2,100 | 1,900 | 1,100 | 1,100 | 1,100 | 571 | 576 | 574 | 603 | 574 | 622 |
| GEWURZTRAMINER | 1,600 | 2,200 | 3,300 | 3,700 | 3,000 | 3,700 | 684 | 662 | 679 | 674 | 689 | 703 |
| PINOT GRIS | (1) | (1) | (1) | 1,900 | 1,700 | 1,600 | (1) | (1) | (1) | 818 | 825 | 846 |
| VIOGNIER | (1) | (1) | (1) | (1) | 1,200 | 1,000 | (1) | (1) | (1) | (1) | 946 | 975 |
| OTHERS[2] | 900 | 1,200 | 3,200 | 2,400 | 600 | 800 | 866 | 834 | 867 | 889 | 843 | 736 |
| **TOTAL WHITE** | **48,000** | **50,000** | **62,500** | **60,600** | **56,000** | **57,900** | **736** | **721** | **727** | **738** | **776** | **741** |
| **RED VARIETIES** | | | | | | | | | | | | |
| MERLOT | 21,400 | 23,400 | 21,600 | 20,900 | 20,400 | 20,500 | 1,060 | 1,034 | 975 | 1,047 | 1,011 | 1,027 |
| CABERNET SAUVIGNON | 13,000 | 16,700 | 18,400 | 18,700 | 18,900 | 17,800 | 1,144 | 1,122 | 1,136 | 1,218 | 1,168 | 1,217 |
| PINOT NOIR | 1,000 | 900 | 1,200 | 800 | 1,200 | 900 | 642 | 689 | 571 | 604 | 589 | 980 |
| LEMBERGER | 500 | 500 | 600 | 400 | 450 | 200 | 790 | 748 | 723 | 768 | 766 | 622 |
| CABERNET FRANC | 3,300 | 3,300 | 2,900 | 2,800 | 2,800 | 2,300 | 994 | 1,012 | 1,047 | 1,074 | 1,081 | 1,240 |
| SYRAH | 2,200 | 4,400 | 6,500 | 6,300 | 5,900 | 7,900 | 1,343 | 1,221 | 1,189 | 1,261 | 1.154 | 1,157 |
| SANGIOVESE | (1) | (1) | (1) | (1) | 500 | 600 | (1) | (1) | (1) | (1) | 1,434 | 1,341 |
| OTHERS[3] | 600 | 800 | 1,300 | 1,500 | 850 | 1,900 | 1,232 | 1,286 | 1,290 | 1,289 | 1,468 | 1,490 |
| **TOTAL RED** | **42,000** | **50,000** | **52,500** | **51,400** | **51,000** | **52,100** | **1,085** | **1,073** | **1,058** | **1,135** | **1,089** | **1,137** |
| **STATE TOTAL** | **90,000** | **100,000** | **115,000** | **112,000** | **107,000** | **110,000** | **899** | **897** | **878** | **920** | **925** | **930** |

**NOTES:** [1] Included in "Other" prior to first year published.
[2] Includes Mueller-Thurgau, Madeline Angevine, Siegerrebe, Rousanne, Muscat Ottonel, Orange Muscat, etc.
[3] Includes Pink Varieties, Malbec, Grenache, Zinfandel, Barbera, Petit Verdot, Nebbiolo, Mouverdre, Petit Syrah, etc.

Source: United States Department of Agriculture, National Agricultural Statistics Service, Washington Field Office, 2006 Annual Agriculture Bulletin, p. 93;
United States Department of Agriculture, National Agricultural Statistics Service, Washington Field Office, 2005 Annual Statistical Bulletin, p. 87.

***Absolute Advantage –*** The economic situation in which a person or firm requires fewer resources, e.g. labor hours, to produce a given amount of goods or services compared to some other producer. American agricultural workers, on the whole, have an absolute advantage in agriculture compared to China because the American farm worker produces over $70,000 worth of output per year while the farm worker in China produces about $3,000 worth of output per year.

***Adverse Effect Wage Rate (AEWR) –*** Under the H-2A Program defined below, the hourly wage rate that must be paid for foreign contract laborers. For Washington state in 2006, it was $10.37 per hour for "All Hired" labor; $9.68 for "Field" labor, and $9.77 for "Field and Livestock" labor.

***Agricultural Employment –*** Any service or activity defined as agricultural employment in the *Fair Labor Standards Act* and in the *Internal Revenue Code* of 1954. The handling, planting, drying, packing, packaging, processing, freezing, and grading prior to delivery for storage of any agricultural or horticultural commodity in its un-manufactured state are also considered agricultural employment.

***Alien Employment Certification H-2A Program –*** This program allows agricultural employers to import foreign workers temporarily if and when there are not enough qualified U.S. citizen workers available.

***American Viticultural Area (AVA) –*** The American Viticultural Area designation indicates the geographic pedigree of a given wine. This is critical to the identity of a wine, since the terrior of a wine, especially climate and soil, is a major predictor of the average quality of a wine. However, since an AVA can be a very large region, the AVA itself is no necessary predictor of a wine's overall quality. To be AVA labeled, 85 percent of a given wine must come from the specific AVA.

***Comparative Advantage –*** The economic situation in which an economic actor – a person or firm or a trading nation – has a relatively lower opportunity cost in producing a good or service compared to the opportunity cost of the good or service produced by one's trading partner. Consider the following example that assumes labor is the only factor of production used to produce either of two goods:

| Trading Partner | Output in Pounds Achieved by One Hour of Labor | |
|---|---|---|
| | Apples | Avocados |
| Farmer A | 15 | 10 |
| Farmer B | 4 | 2 |

Farmer A has an absolute advantage in producing both apples and avocados, since Farmer A is absolutely more productive than Farmer B in producing both apples and avocados for a given hour of labor. However, it costs Farmer A 1.5 pounds of apples to produce a pound of Avocados (15 /10 = 1.5). This is the opportunity cost – the quantity of avocados one has to give up in order to increase the production of apples by one pound. Yet the cost to Farmer A of producing one pound of apples is only 2/3rds of a pound of avocados (10 / 15 = .667). In contrast, it costs Farmer B 2.0 pounds of apples to produce a pound of avocados (4 / 2 = 2.0). Yet it costs Farmer B only 0.5 (2 / 4 = .5) pound of avocados to produce a pound of apples. Farmer B produces avocados relatively cheaper in real terms than does Farmer A. Farmer A produces apples relatively cheaper than Farmer B. Farmer A will tend to specialize in apples and trade them for avocados produced by Farmer B. Farmer B will specialize in avocado production and trade avocados for apples. The result will be an overall increase in the total production of both apples and avocados.

***Constant Dollars or Prices –*** The dollar amount of any statistic such as total cash receipts, price per bushel of wheat, or wage rate per hour that has been deflated with a price index to some base period of reference in order to remove the effect of inflation relative to that base period. Also termed **real** dollars or **real** prices.

***Continued Claimants –*** Individuals who are eligible for unemployment insurance benefits and who are in a waiting period for unemployment insurance credit or who are requesting payment of unemployment insurance benefits for one or more weeks of unemployment.

***Contract Labor –*** The United States' Departments of Labor and of Agriculture distinguish in their data two different types of hired agricultural labor. Agricultural labor hired directly by the farmer or agricultural producer is direct hired labor. In this case, the farmer or agricultural producer assumes responsibility for the legal status of the agricultural worker. When the farmer or agricultural producer hires agricultural labor through the services of a farm labor contractor, who then assumes the responsibility for the legal status of the agricultural worker, this type of labor is referred to in the statistics as "contract labor."

***Current Dollars or Prices –*** The dollar amount of any variable that has not been adjusted for the effects of inflation with a price index relative to some base year of reference. Also termed **nominal** dollars or **nominal** prices.

***Demand for Labor –*** A schedule or curve that shows the quantity of labor employers are willing to hire at each wage rate set in the labor market.

***Derived Demand for Labor –*** This concept recognizes the fact that the demand for labor is a direct function of the demand for a particular product or service produced by that labor.

***Direct Effect –*** In input-output analysis, the value of initial production in a productive sector. For example, in the case of agriculture, one component of its direct effect is the dollar value of hops produced and sold to all other sectors in the economy.

***Dumping –*** In international trade, the practice of a foreign producer attempting to sell a product or service below its cost of production, where that cost is determined by competitive market conditions. Selling an imported product at a price that is below the domestic price for the same or a similar product is not necessarily dumping.

***Earnings –*** The product of the wage rate times the number of units of labor offered during a given time period, such as hours. Wage rate per hour times hours worked per day equals daily earnings.

***Equilibrium –*** This is the economic condition in which, at a given price, or wage rate in the case of agricultural labor, the quantity demanded of the good or service (e.g., agricultural labor) equals the quantity supplied. There is no shortage of labor and there is no surplus of labor at the wage rate being offered.

***Factor of Production –*** A factor of production is any physical input used in the production of a good or service. It can be land, labor, or capital. A given factor of production, like land, can have many dimensions and vary along a quality scale in terms of the ability of each given level of quality to combine with any other factor of production to produce a given good or service.

***Foreign Exchange Rate –*** The price of one international currency in terms of another. Also termed the **Exchange Rate**.

***Formal Labor Market –*** That component of the labor market characterized by established institutions designed to link employers offering job opportunities to workers seeking employment. Newspaper ads, job fairs, the various internet employment sites, and the WorkSource centers are examples of formal labor market institutions.

***Income Elasticity of Demand –*** An economic concept that shows the proportional responsiveness of a change in the demand for a good or service as income changes by a given proportion. The proportional responsiveness can be negative, zero – no change, or positive.

***Indirect Effect –*** In input-output analysis, the change in the dollar value of output of an industry that supplies inputs to a given industry, such as the sale of gasoline to an agricultural producer.

***Induced Effect –*** In input-output analysis, the change in household income and consumption as a result of the change in payrolls to labor engaged in direct and indirect production. These are earnings that can be either consumed or saved. When they are consumed, the expenditure on consumption generates further economic activity in the economy.

***Informal Labor Market –*** That component of the labor market characterized by word-of-mouth, or other unstructured means, to link employers offering jobs with workers seeking work. In addition to word-of-mouth, other examples are direct application at the employer's establishment, neighborhood hiring corners, and the exchange of job information via cell phone.

***Input-Output Model –*** An analytical technique that simultaneously relates all of the inputs bought by a given production sector from all other production sectors in the economy and all of the outputs of that sector sold to all other productive sectors in the economy. Also known as **Inter-Industry Analysis**.

***Labor Force –*** All individuals working at a job for pay for at least one hour a week and all individuals working in a family enterprise or farm, unpaid, for at least 15 hours a week plus all individuals not working but actively seeking work in a given week.

***Labor Market –*** Any locus, a newspaper ad section, a webpage location, a street corner, or a WorkSource office, in which information is supplied on job openings posted by employers and information on offers to work are posted by workers.

***Migrant Agricultural Worker –*** A person employed in agricultural work of a seasonal or other temporary nature who is required to be absent overnight from his or her permanent place of residence. Exceptions are immediate family members of an agricultural employer or a farm labor contractor, and temporary foreign workers. Temporary foreign workers are nonimmigrant aliens authorized to work in agricultural employment for a specified time period, normally less than a year.

***Migrant and Seasonal Agricultural Worker Protection Act (MSPA) –*** This act provides employment-related protections to migrant and seasonal agricultural workers and is administered and enforced by the Wage and Hour Division of the U.S. Department of Labor's Employment Standards Administration.

***Multiplier –*** With respect to input-output analysis, the process whereby the addition of one more unit of output or expenditure in the economy generates additional output, employment, or income.

***North American Industrial Classification System (NAICS) –*** An industry classification system that is based on the individual establishment, e.g., a farm or a restaurant, that allows the classification of economic units that have similar production processes into the same industry. The lines drawn between industries demarcate, to the extent possible, differences in production processes.

***Prion*** – A prion is an infectious agent "which (almost certainly) does not have a nucleic acid genome..." Prions are "...defined as small proteinaceous infectious particles which resist inactivation by procedures that modify nucleic acids...Prion diseases are often called spongiform encephalopathies because of the post mortem appearance of the brain with large vacuoles in the cortex and cerebellum."

***Quantity of Labor Demanded*** – The amount of labor actually hired by an employer at a specific wage rate. If a wage rate changes due to a shift in the supply of labor, the response of employers to that shift is known as a *change in quantity demanded of labor (not a change in demand)*.

***Quantity of Labor Supplied*** – The amount of labor actually supplied by a worker at a specific wage rate. If the wage rate changes due to a shift in the demand for labor, the response of workers to that shift is known as a *change in quantity supplied (not a change in supply)*.

***Seasonal Agricultural Worker –*** A person employed in work of a seasonal or other temporary nature who is not required to be absent overnight from his or her permanent place of residence. The same exceptions listed above for Migrant Agricultural Worker apply here.

***Seasonal Hired Worker –*** Any worker employed less than 150 calendar days during a calendar year.

***Shortage of Labor –*** This is the difference between the quantity of labor supplied and the quantity of labor demanded when the hourly wage rate (or its piece-rate equivalent) lies below the equilibrium wage rate – the wage rate that balances quantity supplied with quantity demanded of labor. The concept can also be thought of as excess demand at the price or wage currently being offered. For this kind of shortage to exist, the wage rate being offered is below what workers are willing to accept in a free and open labor market.

***Spot Shortage of Labor*** – A shortage of labor that is localized to a specific geographic location or labor market due to imperfections in the flow of information between those who seek to hire labor and those who are willing to work in such locations at the advertised wage rate.

***Social Cost Factor –*** The social cost factor recovers the benefits that are paid out of the UI system but not charged back to employers due to a number of reasons (e.g., the employer went out of business, allowable voluntary quits, the difference in paying benefits at the two top quarters of earnings but charging at the average of four quarters of earnings, etc.). It is a separate tax from the experience tax rate.

***Supply of Labor*** – A schedule or curve that shows the amount of hours workers are willing to supply at each wage rate offered by employers.

***Terroir*** – In viticulture and wine making, a French concept, where climate, geology, geography, and cultural factors interact to define the wine styles and quality that come from any site or region.

***Three-Tier System*** – A method of state-instituted restraint of trade whereby a vintner from out of state is required to sell his or her wine in the state in question only via the services of a wholesaler. Due to the added costs of such a process, most small upscale vintners, such as characterize the recent growth in wineries in Washington state, are excluded from those state markets. Indeed, as the U.S. Supreme Court brief points out, most small wineries cannot even get wholesale distributors to carry their wines (see *Chapter 5*).

***Total Factor Productivity –*** This is the ratio of an index of total output divided by an index of total input. Index numbers are employed in order to combine different final outputs such as cars and oranges and to combine different inputs such as gasoline and an hour of migrant labor picking cherries. This measure of productivity can be expressed as a rate of change per unit of time or a percentage change for a given unit of time.

***Value Added –*** In general, the difference between the price at which some quantity of output can be sold, such as a metric ton of apples, and the cost of all intermediate inputs used to produce that output. Gasoline and fertilizer would be intermediate inputs, but the labor of the agricultural producer and any labor hired by him or her, would be a contribution to value added.

***Wage Bill –*** The wage bill is the product of the hourly (or other time conditioned measure) wage rate paid to each worker times the number of hours worked by each worker, summed over the number of workers hired.

***Wage Rate –*** The product the additional unit of output produced by hiring an additional unit of labor times the price at which that unit of output can be sold in a competitive market. Any time unit can be involved—hour, day, week, month, year, etc.

***Worker/Month*** – One worker employed in an occupation or activity for one month during a calendar year. Summing these for a calendar month yields the total number of workers employed in an activity in a given month. Also termed **Average Monthly Workers**.

***Worker/Year –*** The sum of all worker/months over a calendar year divided by 365. Also termed **Average Worker Year**.