

# 2011 AGRICULTURAL WORKFORCE

Agriculture economy  
Employment and earnings  
Agriculture labor market  
Wineries, vineyards and hops  
Crop production and wage trends



**Washington State  
Employment Security Department**



Labor Market and Economic Analysis

December 2012



# 2011 Agricultural Workforce Report

Washington State Employment Security Department  
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Any remaining errors are the responsibility of the authors.

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# Executive summary

## Value of production

The value of total agricultural production for Washington state in 2010 was \$7.9 billion. The value of agricultural production is total physical output multiplied by market price, not including government payments. Agricultural-production value rose by 11.5 percent from 2009 to 2010, while gross state product rose by 3.9 percent over the same period. In inflation-adjusted dollars, the increase in agricultural-production value was 17.6 percent.

Agricultural-export prices and the total value of agricultural production have been rising over time, suggesting a continuing increase in the demand for Washington state agricultural products.

## Employment and earnings

Average annual agricultural employment increased over the period of the Great Recession.

A cool spring delayed the 2011 harvest season for apples, cherries and pears, upsetting the historical pattern of seasonal labor supply. Survey data suggest a labor shortage for the apple harvest season in particular.

On the whole, average hourly earnings in agriculture are higher for Washington and Oregon (Pacific region) than for California or the United States overall. Weekly hours worked have remained stable in the Pacific region, California and nationwide.

The federal H-2A guest-worker program is a small but increasing source of labor supply for Washington and the United States as a whole. In Washington, both the H-2A program's Adverse-Effect Wage Rate and the state minimum wage have the effect of raising the average wage rate in agriculture for the state.

## Agricultural labor markets

The agricultural component to the state's labor market has been a mitigating factor to unemployment in the state over the three-year period from 2009 through 2011.

Seasonal hiring is more of a factor for the six key agricultural counties in the state than for the state's eight Metropolitan Divisions and Metropolitan Statistical Areas.

Statewide unemployment and continued claims data reveal both seasonal patterns in the demand for agricultural labor and the effect of the business cycle.

## Wine, vineyard, and hop industries

Washington state is the second-largest premium wine producer in the United States, with sales of \$437.6 million in 2010. Wine is produced in 30 of the 39 counties in the state, with the majority coming from four counties in Eastern Washington. The state's five largest wine producers accounted for more than 70 percent of total state wine production.

The number of wineries covered by unemployment insurance increased by about 51 percent from 2006 to 2010, while vineyard firms decreased by about 9 percent over the same time frame.

Employment in both vineyards and wineries has been on an upward trend in recent years, as has total production and revenue.

Washington state is the top hop producer in the nation, accounting for almost 80 percent of total production in 2011. In recent years, the hop industry has been characterized by considerable volatility. Hop employment has tracked demand, with an increase in 2008 and 2009 after a perceived hop shortage, followed by a steep decline in 2010 as demand waned.

## Wheat, vegetables except potatoes, potatoes, nurseries and floriculture and hay industries

The current-dollar value of production for the top 40 agricultural products was \$7.6 billion in 2010. Wheat ranked third in production value (after apples and milk), yielding \$925 million. Vegetables production value (excluding potatoes) was \$483 million. Potatoes ranked fourth, yielding \$654 million. Nursery and floriculture ranked eighth, yielding \$300 million. All hay ranked sixth, yielding \$509 million.



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# Chapter 1: The state of the agricultural economy

This chapter describes the agricultural sector's role in the overall economy of Washington state. The estimates for physical production and for the current and inflation-adjusted dollar production values are for calendar year 2010. Employment and earnings data are for calendar year 2011.

Agricultural output in quantity terms varies from year to year, based on acres in production as well as other important factors, such as the weather. However, the dollar demand for specific products can vary widely from year to year. For instance, the average price paid to growers for blueberries in 2009 was \$0.78 per pound, rising to \$1.30 in 2010.

The demand for labor is a derived demand, dependent on the demand for agricultural goods and services. Within this context, the demand level for labor, at a given point in time, depends on specific growing and harvesting conditions in any given production year.<sup>1</sup>

An important example of this derived demand principle and its seasonal characteristics occurred in the 2011 fall apple harvest, as described in *Chapter 2*, when both apple bin rates<sup>2</sup> and employment increased during the months of October and November (*Figure 2-19*).

## The value of agricultural production

The value of total agricultural sector production for Washington state, that is total physical output multiplied by market price, in 2010 was \$7.9 billion in current dollars as shown in *Figure 1-1*. For context, the value of Washington's gross state product for 2010 was \$340.5 billion dollars. Agricultural production rose by 11.5 percent from 2009 through 2010 in current dollars, while gross

state product rose by 3.9 percent over the same period.<sup>3</sup> The volatility in the year-over-year value of agricultural production was greatest from 2007 through 2009, indicating a 12.9 percent difference.

As used in this report the total value of agricultural production does not include related government payments. *Figure 1-1* provides both total value of agricultural production and related government payments. These government payments fall into two categories: commodity-related payments and conservation payments. Commodity payments target specific commodities and are designed to establish price and income support, stabilize production and provide a safety net for farmers. Conservation payments fall into two categories, as follows. Land-retirement payments are made to remove environmentally sensitive land from production for long periods of time. Working land program payments are made to address environmental problems, such as pesticide runoff, on lands in active production.

*Figures 1-2* and *1-3* show key components of the agricultural production process both in current and inflation-adjusted dollars, using 2010 as the base year for comparison. As *Figure 1-2* shows, total value of agricultural production, net value added and net farm income generally move together (current dollars). Total hired and contract labor does not track the total value of agricultural production.

The labor costs generally move independently from the other components. The two different trends highlight the fact that labor is hired in a resource market for labor, while agricultural production is bought and sold in a product market. Different factors determine the function of these two different markets. The same is true for inflation-adjusted dollars, *Figure 1-3*. These components are discussed in more detail throughout this chapter.

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<sup>1</sup> Local geographic variations in this seasonal timing for the demand for labor can lead to spot shortages in any given locale and for any given grower, even when the overall supply of labor is adequate for the statewide growing and harvesting season.

<sup>2</sup> Bin rates shown in this report represent the midpoint of the pay range for all apple variety piece rates.

<sup>3</sup> The source of the gross state-product estimates is U.S. Department of Agriculture, National Agricultural Statistics Service, 2011 *Washington Annual Agriculture Bulletin*, page 3.

**Figure 1-1.** Total value of agricultural production and government payments in \$1,000s of current and inflation-adjusted dollars, base year 2010 = 100, price index for all farm products Washington state, 2006 through 2010

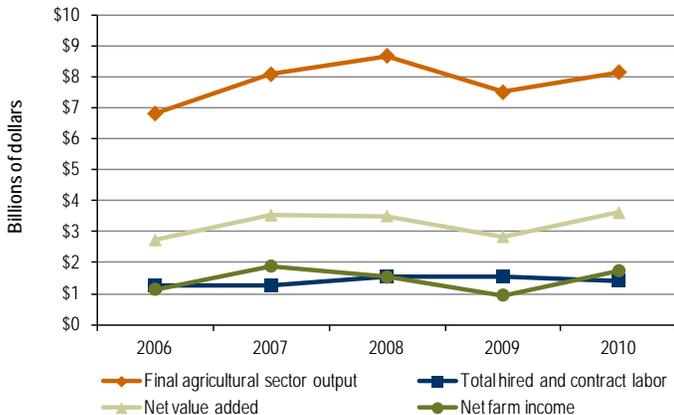
Source: U.S. Bureau of Labor Statistics, CPI for all farm products; U.S. Department of Agriculture, Economic Research Service

Year	Total value of production		Total value of production plus government payments	
	Current dollars	Inflation-adjusted dollars, index of all farm products	Current dollars	Inflation-adjusted dollars, index of all farm products
2006	\$6,606,512	\$5,849,377	\$6,802,978	\$6,023,327
2007	\$8,165,148	\$8,310,283	\$8,350,252	\$8,498,677
2008	\$7,736,891	\$8,288,453	\$7,937,819	\$8,503,705
2009	\$7,113,839	\$6,746,210	\$7,303,195	\$6,925,780
2010	\$7,934,483	\$7,934,483	\$8,249,168	\$8,249,168
Absolute difference: 2010 compared to 2009	\$820,644	\$1,188,273	\$945,973	\$1,323,388
Percent difference: 2010 compared to 2009	11.54%	17.61%	12.95%	19.11%

The total value of agricultural production continues to show volatility from year to year.

**Figure 1-2.** Total value of agricultural production, net value added, total hired and contract labor and net farm income, in \$1,000s of current dollars Washington state, 2006 through 2010

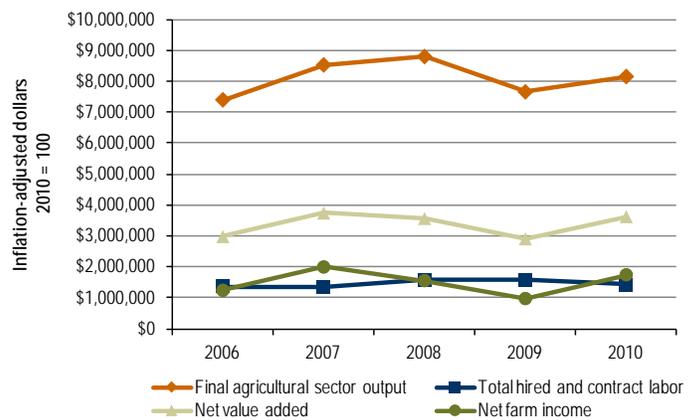
Source: U.S. Department of Agriculture, Economic Research Service



Trend lines support that the total value of agricultural sector production and total hired and contract labor are determined by different markets of supply and demand.

**Figure 1-3.** Total value of agricultural production, net value added, total hired and contract labor and net farm income, in \$1,000s of inflation-adjusted dollars, base year 2010 = 100, All Farm Products Price Index and CPI-W Washington state, 2006 through 2010

Source: U.S. Bureau of Labor Statistics, CPI for all farm products; U.S. Department of Agriculture; Economic Research Service



Trend lines support that the total value of agricultural sector production and total hired and contract labor are determined by different markets of supply and demand.

## Volatility in agricultural prices

As discussed in previous years' reports,<sup>4</sup> the value of agricultural production depends on demand for and supply of agricultural products in both the United States and world markets. This is particularly true for Washington state, since more than a third of state production is exported to overseas markets and most of the remaining two-thirds are exported to the other 49 states.

*Figure 1-4* shows recent changes in the price indices for a wide range of agricultural products. All products show gains over this six-year period, with some reversals between years. The overall price picture is one of year-to-year volatility along a rising price trend. Recently, this has been particularly true of food grains, feed grains and hay and dairy products.

Year-to-year changes to the total value of agricultural production further highlight the changing situation of supply and demand for agricultural products as shown in *Figure 1-5*. In 2009, 16 products fell in value by 15 percent or more. However in 2010, only

10 crops fell in value by 15 percent or more. Next, while only seven crops rose in value by 15 percent or more in 2009, nine crops rose in value by 15 percent or more for 2010.<sup>5</sup>

The crops and products that rose in value in 2010 were large value producers for agriculture, such as milk, wheat, cattle and calves and all cherry varieties. Milk value rose by 38.9 percent, wheat by 55.7 percent, cattle and calves by 20.2 percent and all cherries by 59 percent. The crops and products that fell in value in 2010 made up smaller shares of total value, such as onions, hops and all sweet corn varieties.

In general, crop-by-crop, the value decreases were smaller in percentage terms than were the value increases. The contribution to total agricultural value was smaller for these crops whose total value had declined.

**Figure 1-4.** Index of agricultural prices received by farmers, 1990 to 1992 = 100  
Washington state, 2006 through 2011

Source: U.S. Department of Agriculture, Agricultural Prices, ISSN: 1937-4216, released November 30, 2011

Year	All farm products	Food grains	Feed grains and hay	Fruits and nuts	Commercial vegetables	Potatoes and dry beans	Meat animals	Dairy products	Poultry and eggs
2006	115	134	109	154	136	125	116	99	111
2007	136	186	152	158	158	126	118	146	140
2008	149	259	206	149	151	157	117	140	151
2009	131	186	162	134	161	150	106	98	139
2010	141	177	165	148	162	140	123	125	152
2011	178	239	252	158	169	175	151	154	152

*The majority of agricultural products pricing increased from 2006 through 2011.*

<sup>4</sup> See: Chapter 5 of the 2008 Agricultural Workforce in Washington State, Employment Security Department, Labor Market and Economic Analysis, June 2009.

<sup>5</sup> See: Figure 1-5 in the 2010 Agricultural Workforce in Washington State, Employment Security Department, Labor Market and Economic Analysis, July 2011.

**Figure 1-5.** Agricultural products from among the top 40 agricultural commodities whose production value in current dollars rose or fell by 15 percent or more from 2009 through 2010<sup>1</sup>  
Washington state, 2009 to 2010

Source: U.S. Department of Agriculture, National Agricultural Statistics Service (NASS), 2011 Washington Annual Agriculture Bulletin

Commodity	State rank in terms of value of production	Value of production in \$1,000s		Percent change from 2009 to 2010
		2010	2009	Percent change
<b>Value rose by 15 percent or more</b>				
Milk	2	\$950,061	\$684,033	38.9%
Wheat	3	\$925,265	\$594,267	55.7%
Cattle and calves	5	\$568,317	\$472,958	20.2%
Cherries, all	7	\$367,208	\$230,905	59.0%
Pears, all	10	\$189,319	\$158,336	19.6%
Corn for grain	14	\$139,656	\$103,619	34.8%
Blueberries	20	\$54,664	\$30,525	79.1%
Dry edible beans	23	\$38,528	\$32,604	18.2%
Barley	26	\$22,512	\$18,003	25.0%
<b>Value fell by 15 percent or more</b>				
Onions, all	11	\$168,810	\$219,417	-23.1%
Hops	12	\$160,937	\$265,330	-39.3%
Sweet corn, all	13	\$146,656	\$173,447	-15.4%
Alfalfa seed	29	\$20,500	\$28,000	-26.8%
Green peas for processing	30	\$19,061	\$26,527	-28.1%
Dry edible peas	32	\$14,858	\$19,210	-22.7%
Other grass seed	33	\$9,910	\$12,865	-23.0%
Wrinkled seed peas	35	\$8,580	\$18,183	-52.8%
Farm forest products	36	\$8,000	\$15,000	-46.7%
Cranberries	39	\$6,726	\$9,762	-31.1%
<b>Summary</b>				
Total top 40 value of production		\$7,605,940	\$6,825,034	11.4%
Total value of production		\$7,934,483	\$7,113,839	11.5%

<sup>1</sup>NASS re-estimates the value of most products, changing their estimates from year to year.

*Gains for products increasing in total production value outweighed losses from products whose values fell.*

## Changes in the total value of agricultural production

Figure 1-6 provides detail on total value of production by product category. Percentage value changes in 2009 and 2010 are compared against an average base period of 2004 through 2006. The overall picture is one of an increase in total value over time, with a decrease in some specialty products (includes fruits and vegetables, tree nuts, dried fruits and nursery crops including floriculture, not listed separately) and livestock and products.

## The effect of changes in the total value of production on revenue shares

The value of Washington state's highly varied agricultural production is summarized as a yearly total value yield – total physical output multiplied by market price. The production components of this annual total value can be broken down as to both their source (e.g., wheat sales) and their recipients (e.g., hired labor or net farm income).

**Figure 1-6.** Percent change in value of production, 2009 and 2010 compared to the average of the period 2004 through 2006, in current dollars Washington state, 2004 through 2006 and 2009 through 2010

Source: U.S. Department of Agriculture, National Agricultural Statistics Service (NASS), 2011 Washington Annual Agriculture Bulletin

Contribution to total agricultural value and change in total agricultural value	Field crops	Fruits and nuts	Commercial vegetables	Berry crops	Total crops	Specialty products	Livestock and products
2004 to 2006 average percent	31.2%	27.2%	6.0%	1.2%	65.7%	6.9%	27.4%
2009 average percent	35.3%	28.6%	7.9%	1.5%	73.3%	5.3%	21.4%
Difference: 2009 percent minus 2004 to 2006 average percent	4.3%	1.4%	1.9%	0.3%	7.6%	-1.6%	-5.9%
2010 average percent	35.7%	28.1%	6.1%	1.5%	71.4%	4.7%	23.9%
Difference: 2010 percent minus 2004 to 2006 average percent	4.5%	0.9%	0.1%	0.3%	5.7%	-2.2%	-3.5%

*The overall picture of stable, but gradual, change in the composition of agricultural values continues to hold for 2010 compared to the 2004 through 2006 period.*

The year-to-year changes in the total value of production, as well as the changing mix in total values accruing each year to the state's agricultural production, affect the returns to net value added, net farm income and total hired and contract labor, which are discussed in detail in this section. *Figure 1-7* shows these relationships over the period 2006 through 2010.

## Net value added

Net value added is the increase in the value of agricultural production due to the application of the agricultural producer's resource inputs, such as the producer's labor time spent in management and direct agricultural production, the producer's capital and land and the labor that the producer hires.

Factors of production purchased to facilitate agricultural production such as gasoline, diesel fuel, electricity, fertilizer and seed do not contribute to the net value added of agricultural production for that producer. Prior production processes of firms that supply needed inputs, such as fertilizer, capture the net value added of these purchased inputs and must be subtracted from total value in order to measure the net contribution of Washington state agricultural producers to this annual total value of production.

The percent of net value added generally corresponds with the changes in the total value of agricultural sector production over the period 2006

through 2010. When the value of total production rises, net value added rises. When the value of total production falls, net value added falls.

For 2010, Washington's net value added of 44.4 percent of the total value of agricultural production was greater than the net value added nationwide of 37.1 percent.<sup>6</sup> Part of the reason was due to the amount of labor that Washington producers added to the production process. Much of the high-quality Washington agricultural output, such as apples, sweet cherries and pears, and is relatively labor intensive compared to, say, wheat production in Kansas.

## Net farm income

Net farm income is a component of net value added. It is the revenue left over for owners/operators after all expenses, including the cost of hired and contract labor, have been paid out of the revenue earned from final agricultural sector production.

Statewide, net farm income in 2010 was \$1,740,947,000.<sup>7</sup> Nationwide, net farm income in 2010 was \$79,063,174,000. Nationwide, net farm income as a percent of net value added equaled 60.9 percent.<sup>6</sup> For Washington state, the comparable figure is 48.1 percent. This is another example of the impact of Washington's labor-intensive crops.

<sup>6</sup> U.S. Department of Agriculture, Economic Research Service, Farm Sector Income & Finances, Farm Income and Wealth Statistics, "Value-added to the U.S. economy by the agricultural sector via the production of goods and services, 2008-2012F."

<sup>7</sup> For the chart of accounts used to calculate these values, see: U.S. Department of Agriculture, *2011 Washington Annual Agriculture Bulletin*, page 23.

## Total hired and contract labor

Total hired and contract labor is also a share of net value added.<sup>8</sup> Its percentage share of net value added rises as the total value of agricultural production falls, other things equal. Thus, in 2009, this share was a record high of 54.2 percent, but as the demand for agricultural production rose in 2010 relative to 2009, thereby increasing the total value of agricultural production, the share fell to 39.2 percent.

In contrast, for 2010, nationwide, the share of total hired and contract labor as a percent of net value added was only 21.3 percent.<sup>6</sup> Finally, in 2010, the share of hired and contract labor as a percent of the total costs of production was 31.3 percent for Washington state. The comparable nationwide estimate is 12.4 percent.<sup>6</sup>

The total cost of production equals the total value of agricultural sector production minus the net value added. Payments to labor are a part of net value added.<sup>7</sup>

To summarize, these last three relative comparisons reveal the relatively high proportion of labor used in Washington state’s agricultural sector. But this higher labor share also contributes to a higher value added.

**Figure 1-7.** The relationship between measures of agricultural-production value, net value added, net farm income, labor costs and total costs of production, current dollars  
Washington state, 2006 through 2010  
Source: U.S. Department of Agriculture, Economic Research Service

Production measures	2006	2007	2008	2009	2010
Total value of agricultural-sector production in \$1,000s <sup>1</sup>	\$6,815,972	\$8,082,908	\$8,678,973	\$7,502,249	\$8,152,193
Net value added as a percent of total value of agricultural-sector production <sup>2</sup>	40.2%	43.8%	40.5%	37.9%	44.4%
Net farm income as a percent of net value added	41.6%	53.4%	43.6%	33.5%	48.1%
Total hired and contract labor as a percent of net value added	45.9%	36.1%	44.3%	54.2%	39.2%
Total hired and contract labor as a percent of the total value of production	18.5%	15.8%	17.9%	20.6%	17.4%
Total cost of production as a percent of the total value of production <sup>3</sup>	59.8%	56.2%	59.6%	62.0%	55.6%
Total hired and contract labor as a percent of the total costs of production <sup>3</sup>	30.9%	28.1%	30.1%	33.2%	31.3%

<sup>1</sup>Production value is revised annually for prior years, so these figures may not match those in earlier reports. <sup>2</sup>Net farm income includes direct government payments. Final agricultural sector output does not, since such payments are transfer payments and are not net additions. Exclusion of direct government payments would reduce these percentages somewhat. <sup>3</sup>Total cost of production equals total value of agricultural-sector production minus net value added. Factor payments to labor are a part of net value added.

*There is an inverse relationship between net farm income and total hired and contract labor as a percent of net value added.*

<sup>6</sup> U.S. Department of Agriculture, Economic Research Service, Farm Sector Income & Finances, Farm Income and Wealth Statistics, “Value-added to the U.S. economy by the agricultural sector via the production of goods and services, 2008-2012F.”

<sup>7</sup> For the chart of accounts used to calculate these values, see: U.S. Department of Agriculture, *2011 Washington Annual Agriculture Bulletin*, page 23.

<sup>8</sup> We include contract labor as a share of value added since the agricultural producer is hiring some management skills, which are labor search costs and accounting costs in this case, plus the direct agricultural labor provided by this labor.

## International trade

Washington state exports most of its agricultural production either to nations overseas or to its bordering states. It is estimated that from a quarter to a third of each year’s agricultural production value is exported to foreign markets (*Figure 1-10*). So, international trade has a large influence on the economic fortunes of Washington growers and the workers they hire. Such trade affects product demand which in turn affects the demand for agricultural labor.

*Figure 1-8* shows the level of agricultural exports and imports at the national level for federal fiscal and calendar years 2007 through 2011. Both exports and imports show a long-run rising trend, though the impact of the Great Recession is notable for both the 2009 fiscal year and calendar year. For 2011, calendar year exports have surpassed those of the Great Recession, increasing from a low of \$98.5 billion in calendar year 2009, the depth of the recession, to a 2011 total of \$136.3 billion – an increase in three years of \$37.4 billion, or 38.4 percent. The export improvement on a fiscal year basis is considerably higher: \$41.1 billion or 42.7 percent.

Imports of foreign agricultural products also fell during the Great Recession as shown in *Figure 1-8*. In calendar year 2008, imports were \$80.5 billion; they declined to \$71.7 billion in calendar year 2009 but recovered to \$98.9 billion in calendar year 2011. Relative to calendar year 2009, this is an increase of \$27.2 billion, or 38 percent.

Of course, the trade balance is an important economic indicator as well. American agricultural exports are very competitive in world markets, on the whole. This is reflected in the trade balance, which for fiscal year 2011 stood at \$42.9 billion and for calendar year 2011, \$37.4 billion.

**Figure 1-8.** Value of U.S. agricultural trade,<sup>1</sup> federal fiscal and calendar years, in billions of current dollars  
United States, 2007 through 2011  
Source: U.S. Department of Agriculture, Economic Research Service, Data Sets, Foreign Agricultural Trade of the United States

Fiscal year <sup>2</sup>	2007	2008	2009	2010	2011
Agricultural exports	\$82.2	\$114.9	\$96.3	\$108.6	\$137.4
Agricultural imports	\$70.1	\$79.3	\$73.4	\$79.0	\$94.5
Trade balance <sup>3</sup>	\$12.2	\$35.6	\$22.9	\$29.6	\$42.9
Calendar year	2007	2008	2009	2010	2011
Agricultural exports	\$90.0	\$114.8	\$98.5	\$115.8	\$136.3
Agricultural imports	\$71.9	\$80.5	\$71.7	\$81.9	\$98.9
Trade balance <sup>3</sup>	\$18.1	\$34.3	\$26.8	\$34.0	\$37.4

<sup>1</sup>See source document for definitions of agricultural products. <sup>2</sup>October 1 of previous year through September 30 of current year. <sup>3</sup>Exports minus imports.

*Agricultural exports are a major contributor to an improved balance of trade for the United States.*

## Agricultural export prices

As *Figure 1-9* indicates, some of the increase in the value of total U.S. agricultural exports has been due to an increase in the price of those exports. Since the base year of 2000, the price index for all agricultural commodities more than doubled by 2011 – standing at an index value of 211.0. The same is true for the index of prices for foods, feeds and beverages. This rise in prices at the same time that the value of total agricultural exports is increasing suggests that the demand for U.S. agricultural exports is rising faster than the supply of U.S. agricultural goods and services entering international trade.

**Figure 1-9.** Index of U.S. agricultural export prices, base year 2000 = 100  
United States, 2007 through 2011  
Source: U.S. Department of Labor, Bureau of Labor Statistics, Economic News Release, U.S. Import and Export Price Indices

Exports	2007	2008	2009	2010	2011
All agricultural commodities	150.9	183.5	160.0	172.6	211.0
Foods, feeds and beverages	152.3	186.4	163.4	171.1	205.1

*The rise in export prices, while export values are sharply increasing, suggests that export demand for U.S. agricultural products is rising faster than U.S. domestic agricultural supply is increasing.*

## Exchange rates

The foreign exchange rate is the price of one nation's currency in terms of another nation's currency. As the U.S. dollar depreciates against a foreign currency, the price of U.S. agricultural goods decreases for those persons purchasing with that currency.

For example, as of December 29, 2011, a Japanese consumer had to spend only 77.77 yen to buy a U.S. dollar's worth of Washington state sweet cherries. On February 17, 2010, this same Japanese consumer had to spend 90.8422 yen to buy the same dollar's worth of Washington state sweet cherries. In this instance, the price of sweet cherries dropped 14.4 percent for the Japanese consumer.

## Top five U.S. agricultural export destinations and import sources

*Figure 1-10* shows the top five U.S. agricultural export destinations from 2007 through 2011. The same countries have made up the top five over that period, with changes in rank only. China and Canada have changed places as the first and second export destinations in recent years. The greatest year-over-year increase in U.S. agricultural exports came from Mexico, with an increase of \$3.7 billion, or 26 percent in 2011.

Japan's imports increased by over two billion dollars from 2010 to 2011 and the EU-27 increased imports from \$8.8 billion in 2010 to \$9.6 billion in 2011, or 8.3 percent. China accounted for 9.2 percent of total export purchases in 2007, climbing to 15.1 percent in 2010, before dropping to 13.8 percent in 2011. During this same period, total foreign imports of U.S. agricultural products increased 51.5 percent.

**Figure 1-10.** Top five U.S. agricultural export destinations, U.S. value, in billions of current dollars  
United States, 2007 through 2011

Source: U.S. Department of Agriculture, Economic Research Service, Data Sets, Foreign Agricultural Trade of the United States

2007		2008		2009		2010		2011	
Foreign total	\$90.0	Foreign total	\$114.8	Foreign total	\$98.5	Foreign total	\$115.8	Foreign total	\$136.3
Canada	\$14.1	Canada	\$16.3	Canada	\$15.7	China	\$17.5	Canada	\$19.0
Mexico	\$12.7	Mexico	\$15.5	China	\$13.1	Canada	\$16.9	China	\$18.9
Japan	\$10.2	Japan	\$13.2	Mexico	\$12.9	Mexico	\$14.6	Mexico	\$18.4
EU-27	\$8.8	China	\$12.1	Japan	\$11.1	Japan	\$11.8	Japan	\$14.1
China	\$8.3	EU-27	\$10.1	EU-27	\$7.4	EU-27	\$8.9	EU-27	\$9.6

*Calendar year 2011 shows large dollar-value increases in exports of U.S. agricultural products to its five largest importers.*

Figure 1-11 shows the top five agricultural import sources for the United States from 2007 through 2011. The same nations have made up the top five since 2009. Exports to and imports from Canada are basically in balance for calendar year 2011. The EU-27 exports more to America than it imports. Mexico imports more from America than it exports to America. China exported only \$3.9 billion to America in 2011, while importing \$18.8 billion. Its imports from America exceed its exports to America by 372.3 percent.

This disparity in China's imports relative to its exports with the United States reflects in part the higher productivity of U.S. agriculture relative to that of China. For example, while labor costs per hour are very low in China relative to the United States, agricultural production in China is relatively labor intensive, which reduces, to a degree, the labor cost advantage of China in agriculture.<sup>9</sup>

**Figure 1-11.** Top five U.S. agricultural import origins, U.S. value, in billions of current dollars  
United States, 2007 through 2011

Source: U.S. Department of Agriculture, Economic Research Service, Data Sets, Foreign Agricultural Trade of the United States

2007		2008		2009		2010		2011	
Foreign total	\$71.9	Foreign total	\$80.5	Foreign total	\$71.7	Foreign total	\$81.9	Foreign total	\$98.9
EU-27	\$15.3	Canada	\$18.0	Canada	\$14.7	Canada	\$16.2	Canada	\$18.9
Canada	\$15.2	EU-27	\$15.5	EU-27	\$13.4	EU-27	\$14.3	EU-27	\$16.1
Mexico	\$10.2	Mexico	\$10.9	Mexico	\$11.4	Mexico	\$13.6	Mexico	\$15.8
China	\$2.9	China	\$3.5	China	\$2.9	China	\$3.4	Brazil	\$4.1
Brazil	\$2.6	Indonesia	\$2.8	Brazil	\$2.4	Brazil	\$2.9	China	\$4.0

*The largest importers of U.S. agricultural production also tend to be the largest exporters of agricultural production to the United States.*

<sup>9</sup> A worker's real wage rate measures that worker's marginal productivity. A recent study indicates that one hour of unskilled labor in the United States can produce \$7.33 worth of value (in 2007). The contrasting figure for an hour of effort by an unskilled Chinese worker is \$0.81, where physical output is denominated in U.S. dollar terms. See: Ashenfelter, Orley, "Comparing Real Wage Rates," American Economic Review, Vol. 102, No. 2, 2012.

## The current values of Washington agricultural exports<sup>10</sup>

Figure 1-12 describes the dollar values for Washington state agricultural exports from 2006 through 2010. The estimated share of international exports relative to the total value of agricultural production has increased over time but has remained relatively unchanged from 2009, at 32.2 percent, through 2010, at 32.5 percent.

Washington foreign exports dropped in value by 8.2 percent from 2008 to 2009 and rebounded in 2010 by 9.6 percent. This shift from 2008 to 2010 was largely due to far lower commodity prices in 2009 than any reduction in production or export volume. Indeed, from 2008 to 2009, wheat prices per

bushel declined by 22.5 percent on average, while production rose by 3.6 percent. The price per ton for hay declined 39.6 percent, while production rose 26.1 percent.<sup>11</sup> Prices for these products rebounded sharply in 2010, pointing to the influence of the world marketplace on export values, rather than production or export volumes.

Fruits and preparations (such as jellies and dried fruit) exports have shown a steady increase in current dollar terms since 2006. Exports for this product group increased by 4.9 percent from 2008 to 2009 and increased again by 8.8 percent from 2009 to 2010. Vegetables and preparations (such as dried, canned or frozen vegetables) have shown a similar growth trend over the past five years.

**Figure 1-12.** Value of Washington total agricultural exports and by selected commodity group, based on share of production, current dollars in millions Washington state, 2006 through 2010

Source: U.S. Department of Agriculture, National Agricultural Statistics Service 2011 Washington Annual Agriculture Bulletin, page 26

Values	2006	2007	2008	2009	2010	Percent change 2010 compared to 2009
Value of agricultural-sector production	\$6,816.0	\$8,082.9	\$8,679.0	\$7,502.2	\$8,152.2	8.7%
Total estimated foreign exports	\$1,777.0	\$2,140.0	\$2,627.9	\$2,413.5	\$2,646.1	9.6%
Exports as a percent of production value	26.1%	26.5%	30.3%	32.2%	32.5%	3.0%
<b>Commodity group</b>						
Wheat and products	\$372.5	\$433.6	\$643.7	\$372.7	\$435.6	16.9%
Feed grains and products	\$20.1	\$34.8	\$47.6	\$27.9	\$30.9	10.8%
Fruits and preparations	\$709.1	\$828.0	\$935.8	\$981.4	\$1,067.3	8.8%
Vegetables and preparations	\$419.1	\$517.6	\$626.1	\$667.9	\$682.4	2.2%
Live animals, meat and poultry	\$43.9	\$74.4	\$88.9	\$120.8	\$117.6	-2.6%
Hides and skins	\$57.2	\$68.8	\$62.8	\$45.6	\$66.6	46.1%
Poultry and products	\$5.2	\$5.6	\$5.8	\$6.6	\$7.4	12.1%
Fats, oils and greases	\$12.6	\$21.3	\$28.6	\$18.7	\$27.3	46.0%
Feeds and fodders	\$36.2	\$49.3	\$71.1	\$57.4	\$85.9	49.7%
Seeds	\$20.3	\$20.6	\$21.9	\$24.3	\$26.5	9.1%
Other	\$80.9	\$85.8	\$95.6	\$90.2	\$98.6	9.3%

*All export categories except live animals, meat and poultry have shown an increase in foreign-export value between 2009 and 2010.*

<sup>10</sup> For a discussion of how Washington state exports are estimated, see: Cassey, A.J., "The Collection and Description of Washington State Export Data," Washington State University Extension Fact Sheet, FS006E, no date.

<sup>11</sup> U.S. Department of Agriculture, National Agricultural Statistics Service, 2010 Washington Annual Agriculture Bulletin.

## Summary

- After dropping in 2009 relative to 2008, the total value of agricultural production in Washington state rose by 11.5 percent in 2010 compared to 2009, reaching a level of \$7,934,483,000 in current dollars, omitting government transfer payments.
- In inflation-adjusted dollars, the increase was 17.6 percent over 2009.
- The prices of agricultural products continue to be volatile. The overall price picture is one of price volatility along a rising price trend.
- The gradual change in the composition of Washington state agriculture continues through 2010.
- Net value added as a percent of the total value of production is higher for Washington state than for American agriculture nationwide, due to the labor-intensive state crops.
- Agricultural export prices have been rising as well as the total value of exports, suggesting a continuing increase in the demand for Washington state agricultural products.
- Canada, China and Mexico continue to be the largest importers of U.S. agricultural products for calendar year 2011. Each imported over \$18 billion in U.S. agricultural products in 2011.
- Canada, the EU-27 and Mexico are the largest agricultural exporters to the United States.
- Washington state exports have increased for most commodity groups.
- High value commodities account for 81.4 percent of Washington state exports, compared to 65.5 percent nationwide.<sup>12</sup>

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<sup>12</sup>U.S. Department of Agriculture, National Agricultural Statistics Service, U.S. Agricultural Trade.

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## Chapter 2: Washington's agricultural employment and average earnings

Washington state's agricultural economy operates within the context of the economies of the Pacific region of the United States, the United States as a whole and elements of the international economy. Its labor market, for example, is local (within the state), regional (along the Pacific coast in particular) and international (drawing considerable labor from Mexico and some from Central America and the Caribbean, most recently Jamaica) in scope.

We continue to see the effects of the nationwide Great Recession in the employment data for Washington state's overall economy. In December 2011, statewide employment was still 4.3 percent below the level of December 2007.<sup>13</sup> In contrast, seasonal agricultural employment in Washington both before and during the Great Recession has maintained a small but steady increase from 38,669 seasonal workers in 2009, to 39,374 in 2010, rising to 40,282 in 2011 (*Figure 2-10*).

Even though total employment in agriculture has increased, regional/seasonal shortages of labor developed during 2011. Weather is typically a factor in creating spot shortages, regardless of the overall supply of agricultural labor. Weather patterns in 2011 created a significant seasonal shift in the timing and number of apple harvesters needed by growers. Regional shortages were reported and some growers responded to these shortages by raising the apple harvest bin rates they offered. Workers responded by increasing the quantity of labor they supplied and the increased harvest effort proceeded well into November 2011.

Note that there are different sources and definitions for information on employment and earnings in the agricultural economy. Each provides a slightly different picture of the overall agricultural labor market in the state, our region and across the nation. We provide these different sources to more fully describe the agricultural economy in the state, since any one may be deficient in explaining a particular labor market phenomenon. We present the overall data picture with complementary sets of data and have found that these sources all tend to move in the same direction at a given point in time.

### Regional and national agricultural employment<sup>14</sup>

The U.S. Department of Agriculture conducts a quarterly survey of farms to develop estimates of employment, hours worked and wages. These data are not limited to employment that is covered by the unemployment-insurance program. Results are reported by region and nationally. Washington and Oregon are combined to make up the Pacific region. Although results for Washington cannot be singled out, this data does provide an important comparison on the regional and national levels.

*Figure 2-1* compares hired farm-labor employment<sup>15</sup> in Washington and Oregon with California and the nation for the period 2007 through 2011. This period spans the peak of nationwide employment in 2007 through the recovery period of the Great Recession. Over this period, several facts stand out.

The Washington/Oregon, California and United States seasonal patterns of agricultural employment are similar, with the lowest employment in the first quarter of each calendar year and the highest

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<sup>13</sup> See: Washington State Quarterly Benchmarked employment estimates, total nonfarm employment by year and month, seasonally, Employment Security Department/LMEA.

<sup>14</sup> The data in this section are based on the quarterly nationwide Farm Labor survey conducted by the U.S. Department of Agriculture. An important characteristic of this design is the designation of a "farm" – an agricultural entity that has at least \$1,000 in sales in the given sample period. This definition of "farm" is different from the type of agricultural operation typically reported in this report, since much of the data in this report comes from farm operations that hire at least one worker who is covered by the unemployment-insurance program. Any agricultural producer who does not hire labor outside of the family is not represented, even if the producer has a significant quantity of output and sales.

<sup>15</sup> The Farm Labor survey distinguishes between hired farmworkers and agricultural service workers. Both perform agricultural work, but hired farmworkers are employed by the farm while agricultural service workers perform services on a contract or fee basis. The survey only collects information on agricultural services workers for California and Florida, so those data are not included in this report. Hired farmworkers also include supervisors.

generally in the third quarter. California is distinct in that the highest employment levels sometimes occur in the fourth quarter. Given the heavy concentration of labor in both the third and fourth quarters, *Figure 2-1* also includes the average of those two quarters for each year and region. Second, agricultural employment has been relatively stable over this five-year period.

It does appear, however, that total agricultural employment has varied over this five-year period. Viewing average employment over the third and fourth quarters in Washington/Oregon, we see that this average stood at 83,500 workers in 2007. It increased to 108,000 workers by 2009 before falling back to 100,500 in 2011 – lower than in 2009 but much higher compared to 2007.

**Figure 2-1.** Agricultural employment

Pacific region, California and the United States, 2007 through 2011

Source: U.S. Department of Agriculture, National Agricultural Statistics Service, Economics, Statistics and Market Information System, Farm Labor

Year	Month	Employment		
		Pacific Region (Washington/Oregon)	California	United States except Alaska
2007	January <sup>1</sup>	N/A	N/A	N/A
	April	63,000	176,000	736,000
	July	92,000	188,000	843,000
	October	75,000	188,000	817,000
	Average last two quarters	83,500	188,000	830,000
2008	January	42,000	132,000	594,000
	April	68,000	156,000	700,000
	July	110,000	160,000	828,000
	October	90,000	173,000	801,000
	Average last two quarters	100,000	166,500	814,500
2009	January	52,000	132,000	595,000
	April	61,000	138,000	680,000
	July	117,000	170,000	875,000
	October	99,000	157,000	807,000
	Average last two quarters	108,000	163,500	841,000
2010	January	52,000	139,000	612,000
	April	65,000	140,000	737,000
	July	120,000	200,000	855,000
	October	94,000	193,000	827,000
	Average last two quarters	107,000	196,500	841,000
2011	January	52,000	132,000	602,000
	April <sup>1</sup>	N/A	N/A	N/A
	July	111,000	179,000	836,000
	October	90,000	185,000	828,000
	Average last two quarters	100,500	182,000	832,000

<sup>1</sup>Data are not available since surveys were not conducted for January 2007 and April 2011.

*Agricultural employment has been relatively stable in the Pacific region, California and the nation.*

## Weekly hours worked

Figure 2-2 shows a stable trend in the year-to-year pattern of weekly hours worked for Washington/Oregon, California and the United States. There may be a pattern related to the Great Recession, however, with slightly fewer hours in the third and fourth quarters of 2009. By the recovery period in 2011, we see average weekly hours rising in all areas.

**Figure 2-2.** Average weekly hours worked in agricultural employment  
Pacific region, California and the United States, 2007 through 2011

Source: U.S. Department of Agriculture, National Agricultural Statistics Service, Economics, Statistics and Market Information System, Farm Labor

Year	Month	Weekly hours worked		
		Pacific Region (Washington/Oregon)	California	United States except Alaska
2007	January <sup>1</sup>	N/A	N/A	N/A
	April	38.5	45.5	40.7
	July	39.7	46.9	41.4
	October	40.7	45.7	42.1
	Average last two quarters	40.2	46.3	41.8
2008	January	35.7	40.7	38.4
	April	44.0	44.5	41.0
	July	40.6	45.5	40.5
	October	45.5	45.8	41.3
	Average last two quarters	43.1	45.7	40.9
2009	January	37.8	41.3	38.3
	April	38.0	43.9	40.1
	July	40.4	45.6	39.7
	October	38.0	42.1	39.0
	Average last two quarters	39.2	43.9	39.4
2010	January	37.0	40.9	37.2
	April	41.4	43.0	39.8
	July	42.5	43.4	40.7
	October	41.2	44.7	41.7
	Average last two quarters	41.9	44.1	41.2
2011	January	36.0	42.4	38.9
	April <sup>1</sup>	N/A	N/A	N/A
	July	42.5	44.7	41.2
	October	41.2	44.7	41.7
	Average last two quarters	41.9	44.7	41.5

<sup>1</sup>Data are not available since surveys were not conducted for January 2007 and April 2011.

*Weekly hours worked is a complementary dimension to employment, likewise remaining relatively stable.*

## Average hourly earnings

Estimated average hourly earnings are total weekly earnings divided by total hours worked per week. Weekly earnings are a composite of the average hourly wage rate, piece rates and any bonuses, overtime, jury pay, etc. that a worker may receive. Average hourly earnings are often, but not always, lower in the first quarter of the year than they are in the remaining three quarters of the calendar year.

Of agricultural employment, *Figure 2-3* shows livestock workers consistently earned more than field workers across all areas. Field workers in Washington/Oregon generally have higher average hourly earnings in the third and fourth quarters than do field workers in other areas.<sup>16</sup> For all agricultural workers, those in Washington/Oregon earned 9.9 percent more than their counterparts in California and 8 percent more than their counterparts in the United States overall.

**Figure 2-3.** Average hourly earnings by type of agricultural labor,<sup>17</sup> current dollars Pacific region, California (CA) and the United States, 2007 through 2011

Source: U.S. Department of Agriculture, National Agricultural Statistics Service, Economics, Statistics and Market Information System, Farm Labor

		Average hourly earnings											
		Field workers only			Livestock workers only			Field and livestock workers			All agricultural workers		
Year	Month	Pacific Region	CA	U.S. <sup>1</sup>	Pacific region	CA	U.S. <sup>1</sup>	Pacific Region	CA	U.S. <sup>1</sup>	Pacific Region	CA	U.S. <sup>1</sup>
2007	January <sup>2</sup>	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	April	\$9.39	\$9.62	\$9.35	\$9.70	\$10.90	\$9.59	\$9.45	\$9.82	\$9.42	\$10.24	\$10.71	\$10.20
	July	\$9.64	\$9.60	\$9.24	\$10.65	\$10.60	\$9.73	\$9.71	\$9.72	\$9.37	\$10.41	\$10.32	\$9.99
	October	\$10.48	\$9.70	\$9.62	\$11.07	\$11.00	\$10.02	\$10.55	\$9.89	\$9.73	\$11.30	\$10.74	\$10.38
2008	January	\$9.94	\$10.20	\$9.67	\$11.68	\$10.70	\$10.18	\$10.14	\$10.32	\$9.88	\$11.25	\$11.56	\$10.81
	April	\$9.14	\$10.00	\$9.65	\$11.34	\$11.00	\$10.24	\$9.41	\$10.16	\$9.84	\$10.00	\$11.05	\$10.57
	July	\$9.85	\$9.85	\$9.66	\$10.22	\$11.00	\$9.98	\$9.87	\$10.00	\$9.74	\$10.35	\$10.74	\$10.34
	October	\$10.94	\$9.95	\$10.05	\$10.54	\$11.90	\$10.21	\$10.90	\$10.22	\$10.09	\$11.37	\$10.93	\$10.70
2009	January	\$10.35	\$9.80	\$9.96	\$9.48	\$10.95	\$10.27	\$10.25	\$10.09	\$10.08	\$11.40	\$11.15	\$10.93
	April	\$10.67	\$9.96	\$9.99	\$12.09	\$10.85	\$10.25	\$10.80	\$10.14	\$10.07	\$11.55	\$11.07	\$10.84
	July	\$10.93	\$10.10	\$10.04	\$11.77	\$11.30	\$10.05	\$11.00	\$10.30	\$10.04	\$11.43	\$11.08	\$10.66
	October	\$11.07	\$10.25	\$10.25	\$10.42	\$11.05	\$10.23	\$11.00	\$11.40	\$10.24	\$11.82	\$11.25	\$10.91
2010	January	\$9.77	\$10.32	\$10.10	\$10.55	\$11.24	\$10.31	\$9.95	\$10.56	\$10.18	\$11.05	\$11.68	\$11.08
	April	\$10.02	\$10.00	\$10.04	\$11.73	\$11.00	\$10.30	\$10.25	\$10.20	\$10.12	\$11.18	\$11.11	\$10.82
	July	\$10.65	\$10.10	\$10.09	\$11.89	\$11.10	\$10.15	\$10.75	\$10.23	\$10.11	\$11.27	\$11.12	\$10.79
	October	\$10.95	\$10.20	\$10.49	\$10.97	\$11.25	\$10.28	\$10.95	\$10.35	\$10.43	\$11.59	\$11.20	\$11.13
2011	January	\$10.72	\$9.87	\$10.23	\$11.53	\$10.75	\$10.52	\$10.90	\$10.05	\$10.35	\$11.80	\$11.05	\$11.29
	April <sup>2</sup>	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	July	\$10.82	\$10.00	\$10.24	\$10.56	\$10.80	\$10.28	\$10.80	\$10.10	\$10.25	\$11.28	\$10.80	\$10.90
	October	\$11.42	\$10.15	\$10.54	\$11.78	\$11.20	\$10.67	\$11.45	\$10.30	\$10.57	\$12.04	\$10.96	\$11.15

<sup>1</sup>United States excludes Alaska.

<sup>2</sup>Data are not available since surveys were not conducted for January 2007 and April 2011.

*Average hourly earnings for the third and fourth quarters for 2007 through 2011 tend to be higher in Washington/Oregon relative to California and the United States overall.*

<sup>16</sup>It is important to note that higher average hourly earnings do not necessarily mean higher labor costs. Insofar as the wage rate measures the productivity of workers, higher average hourly earnings are an index of higher hourly productivity, other things equal.

<sup>17</sup>Types of work identified in the survey include field, livestock, supervisors and other.

## The H-2A program and agricultural labor supply

The federal H-2A guest-worker program allows agricultural employers to temporarily hire workers from other countries when there are not enough qualified U.S. workers available. The H-2A program is a small but increasing source of labor in Washington state and across the United States. *Figure 2-4* shows data for the program from 2006 through 2011. The number of certified workers has increased both nationally and in Washington state since 2006.

The use of H-2A workers in Washington state has increased over time (*Figure 2-4*). However, they remain a small fraction of the total number of seasonal and migrant workers utilized in meeting Washington’s need for fruit harvesters. The 3,182 H-2A workers for 2011 represent 3.7 percent of the July and 4.8 percent of the October peak (*Figure 2-7*).<sup>18</sup>

### Figure 2-4. H-2A certifications

United States and Washington state, fiscal years 2006 through 2011  
Source: U.S. Department of Labor, H-2A Certification and the Office of Foreign Labor Certification

Year	H-2A certifications							
	United States <sup>1</sup>				Washington state <sup>2</sup>			
	Employer applications certified	Percent change year-to-year	Workers certified	Percent change year-to-year	Employer applications certified	Percent change year-to-year	Workers certified	Percent change year-to-year
2006	6,550	-8.0%	59,112	22.2%	11.0	57.1%	814	-
2007	7,491	14.4%	76,818	30.0%	26.0	136.4%	1,688	107.4%
2008	7,943	6.0%	94,445	22.9%	34.0	30.8%	2,513	48.9%
2009	8,150	2.6%	99,472	5.3%	30.0	-11.8%	1,882	-25.1%
2010	7,425	-8.9%	94,218	-5.3%	25.0	-16.7%	2,981	58.4%
2011	7,000	-6.1%	90,326	-4.3%	19.0	-24.0%	3,182	6.7%

<sup>1</sup>National data are on a federal fiscal year basis. <sup>2</sup>Washington state data are recorded on a seasonal basis.

*There has been a long-term increase in the number of workers certified under the H-2A program in Washington state.*

<sup>18</sup> See: *Figure 2-7* for monthly seasonal totals.

<sup>19</sup> For a brief overview of the major costs of the H-2A program for a major Washington state grower, see the discussion by Geraldine Warner, “H-2A changes add cost, difficulty,” and “H-2A workers are costly, but valuable,” *Good Fruit Grower*, June 2011. The H-2A program increases the fixed costs of hiring labor and increases the variable costs as well, since the imposition of the AEWL can require shifting the entire wage distribution in order to maintain appropriate wage differentials among different types of workers.

<sup>20</sup> Every two years, the Washington State Employment Security Department conducts a survey of tree fruit growers relating to wages and employment practices for domestic workers. The U.S. Department of Labor uses the results of that survey to establish prevailing rates under the H-2A program.

<sup>21</sup> See: United States Department of Labor, Employment and Training Administration, Foreign Labor Certification, Adverse Effect Wage Rates – Year 2012, Historical State AEWL (2007 to 2012). The highest AEWL for 2012 is Hawaii at \$12.26 with North and South Dakota, Nebraska and Kansas at \$11.61. The lowest is \$9.30 for Louisiana and Mississippi.

For this supplement to the available local labor supply, the H-2A program creates increased costs for employers who participate through:

- 1) The application and domestic-worker recruitment process that includes federal processing fees,
- 2) The payments for round-trip travel and housing for foreign and out-of-area domestic workers; and
- 3) The payment of the Adverse Effect Wage Rate (AEWR) or prevailing rates – whichever is higher for the specific crop activity – to workers.<sup>19</sup>

Employers participating in the H-2A guest-worker program must pay their workers under the program the highest of the following: AEWL; prevailing rate for a given crop/area;<sup>20</sup> or the federal or state minimum wage.

For 2011, Washington’s AEWL was \$10.60 per hour in current dollars. It rose to \$10.92 per hour in 2012. The AEWL for Washington and Oregon (Pacific Region) have been identical starting in 2010. The Washington/Oregon AEWL is typically higher than that in California.<sup>21</sup>

## Agricultural employment in Washington state

### Full- and part-time employment

The U.S. Department of Commerce’s Bureau of Economic Analysis (BEA) uses a combination of administrative records and census data to develop estimates of agricultural employment.<sup>22</sup> BEA reaches total employment estimates by combining proprietors’ employment and wage and salary employment, the latter of which is based on the Quarterly Census of Employment and Wages (QCEW), which is based on unemployment-insurance program data. As with the U.S. Department of Agriculture data discussed in the first section of this chapter, these estimates are not limited to employment that is covered by the unemployment-insurance program.

In *Figure 2-5* we compare average employment from 2001 to 2003 with average employment from 2008 to 2010, to adjust for the short-term effects of weather and the business cycle. Note, however,

that these data also reflect the effects of the Great Recession, which can be seen by comparing the 2009 data with the 2008 and 2010 data.

From 2001 to 2003, there was an average of 34,251 employed farm proprietors. This number increased slightly to an average of 34,582 jobs for the period from 2008 to 2010. This change represents an increase over the decade of about one percent. Total wage and salary employment rose from 45,407 to 48,861, an increase of 7.6 percent. Total farm employment over the two periods in question rose from 79,658 to 83,443, an increase of 4.8 percent.

In nonfarm employment, *Figure 2-5* provides estimates for agriculture and forestry support activities. This includes soil preparation, planting and cultivating; crop harvesting, primarily by machine; post-harvest crop activities, except cotton ginning; farm-labor contractors and crew leaders; farm management services; support activities for animal production; and support activities for forestry. Total agriculture and forestry support employment has increased over the decade from

**Figure 2-5.** Full- and part-time agricultural employment Washington state, 2001 through 2010  
Source: U.S. Department of Commerce, Bureau of Economic Analysis, Regional Economic Accounts, Table SA-25N

Year	Farm employment (jobs)			Agriculture and forestry support (jobs) activities	
	Farm proprietors employment	Wage and salary employment	Total farm employment*	Wage and salary employment	Total support activity Employment
2001	35,472	44,423	79,895	15,717	19,178
2002	34,547	44,116	78,663	15,809	20,063
2003	32,733	47,682	80,415	16,320	19,769
2004	31,561	42,139	73,700	16,969	20,550
2005	31,097	42,649	73,746	18,036	21,487
2006	30,089	43,496	73,585	18,775	22,102
2007	34,673	40,162	74,835	18,905	22,751
2008	34,699	47,163	81,862	18,531	22,495
2009	34,522	50,520	85,042	19,543	23,712
2010	34,526	48,899	83,425	18,931	23,044

\*Estimates are based on the 2002 and 2007 North American Industry Classification System (NAICS).

*Agriculture and forestry and support activities have increased by nearly one-fifth from 2001 to 2010. This out-contracting has likely reduced the fixed costs of agricultural production in the state.*

<sup>22</sup> See: State Personal Income and Employment Methodology, U.S. Department of Commerce, Bureau of Economic Analysis, September 2012 (<http://www.bea.gov/regional/pdf/spi2011.pdf>).

19,670 jobs to 23,084 jobs, an increase of 17.4 percent. Again, comparing three-year averages, the average number of wage and salary jobs in this subsector increased from 15,949 to 19,002 between the two three-year periods – an increase of 19.1 percent. The change in these support activities represents a clear-cut change in how agricultural production is now performed in the state. There is a slight shift over time to the use of more capital and more high-productivity labor.

### Seasonal and nonseasonal employment

Given the seasonal nature of agricultural labor, the Washington State Employment Security Department conducts a monthly survey of agricultural employers to gather information on seasonal employment and wages.<sup>23</sup> *Figures 2-6 and 2-7* show seasonal, nonseasonal and total employment for 2010 and 2011, respectively, based on the monthly survey and the Quarterly Census of Employment and Wages (QCEW), which is based on unemployment-insurance program data.

Average monthly seasonal employment for 2011 was 40,282. Average monthly nonseasonal employment was 41,294. Summed together, this represents an average employment of 81,573 workers per month over the calendar year.

The monthly pattern of seasonal and total employment is bi-modal – there are two humps in the distribution of employment by month. This historical pattern has existed for several decades, varying slightly from year to year based largely on weather patterns as these affect apples, cherries and pears, to name the key crops. The July 2011 peak represents the height of the sweet cherry harvest; the October 2011 peak represents the height of the apple harvest. In some years, the cherry peak occurs earlier, in June and the apple peak occurs in September. These weather patterns have an important effect on the timing of the demand and supply of migrant and seasonal labor.

In 2011 a cool spring delayed the apples, cherries and pears harvests by as much as two weeks. In 2011 seasonal employment in June, the start of the sweet cherry harvest was only 43,323 workers; in 2010, it was 56,571. In July 2011, peak seasonal employment was 86,020; in 2010, it was 84,214. The late harvest for cherries extended well into August in 2011, with 65,991 seasonal workers at that time compared to only 55,795 for August 2010.<sup>24</sup> In addition, the pear harvest then overlapped the apple harvest significantly.<sup>25</sup>

For the 2011 apple harvest, seasonal employment was 37,767, 47,793 and 23,707 for September, October and November, respectively. In contrast, over the same three months in 2010, employment was 42,005, 43,498 and 14,693, respectively. About 9,000 more seasonal workers were involved in harvesting apples in November 2011 compared to the year before. The delay to harvest resulted in a regional, crop-specific shortage of labor for 2011. This phenomenon is discussed further on in the chapter.

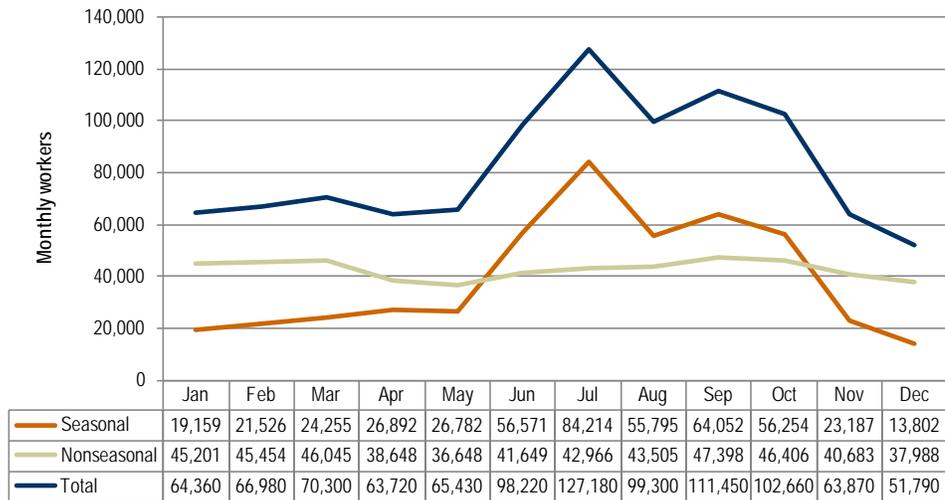
<sup>23</sup> See: Monthly Agriculture Employment and Wage Report, Employment Security Department/LMEA (<https://fortress.wa.gov/esd/employmentdata/reports-publications/industry-reports/agricultural-employment-and-wage-report>).

<sup>24</sup> See: *2010 Agricultural Workforce*, Washington State Employment Security Department/LMEA, Chapter 2, Figure 2-7, page 22, for the 2010 data. See the bibliography in this report for a selection of news reports on the delayed harvest season and worker shortage. At least 24 separate articles were published in the newspaper print media concerning the 2011 late harvest during the summer and fall of 2011.

<sup>25</sup> See: Dan Wheat, “Late cherry crop still a good one,” *The Capital Press*, October 7, 2011; and Dan Wheat, “Orchards tackle picky challenge,” *The Capital Press*, October 14, 2011.

**Figure 2-6.** Total, seasonal and nonseasonal agricultural employment, by month  
Washington state, 2010

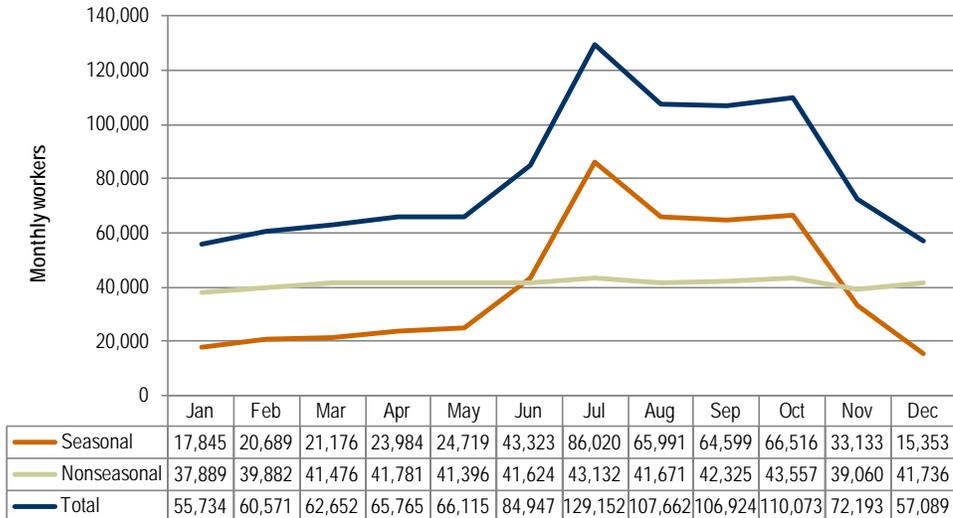
Source: Employment Security Department/LMEA, Agricultural Labor Employment and Wages Survey



*Agricultural employment peaks during the months of July through September.*

**Figure 2-7.** Total, seasonal and nonseasonal agricultural employment, by month  
Washington state, 2011

Source: Employment Security Department/LMEA, Agricultural Labor Employment and Wages Survey



*A cool spring in 2011 shifted the typical harvest peaks for apples, cherries and pears by about two weeks, resulting in high seasonal worker employment in November.*

## The regional distribution of agricultural employment

The Employment Security Department’s monthly seasonal agriculture survey provides information on seasonal employment by region.

The geographic distribution of Washington state’s agricultural employment is shown in *Figure 2-8*. Year-over-year the percentage distribution of agricultural employment in the 12 Workforce Development Areas (WDAs) is relatively stable. The two Metropolitan Divisions (MDs), Seattle-Bellevue-Everett and Tacoma, also show very little change. The Yakima Metropolitan Statistical Area (MSA) had 26.3 percent of total agricultural employment in 2011; the figure was 25.9 percent in 2010.<sup>26</sup> Wenatchee MSA in WDA 8 had 13 percent of total agricultural employment in 2011; the figure for 2010 was 13.2 percent. Richland-Kennewick-

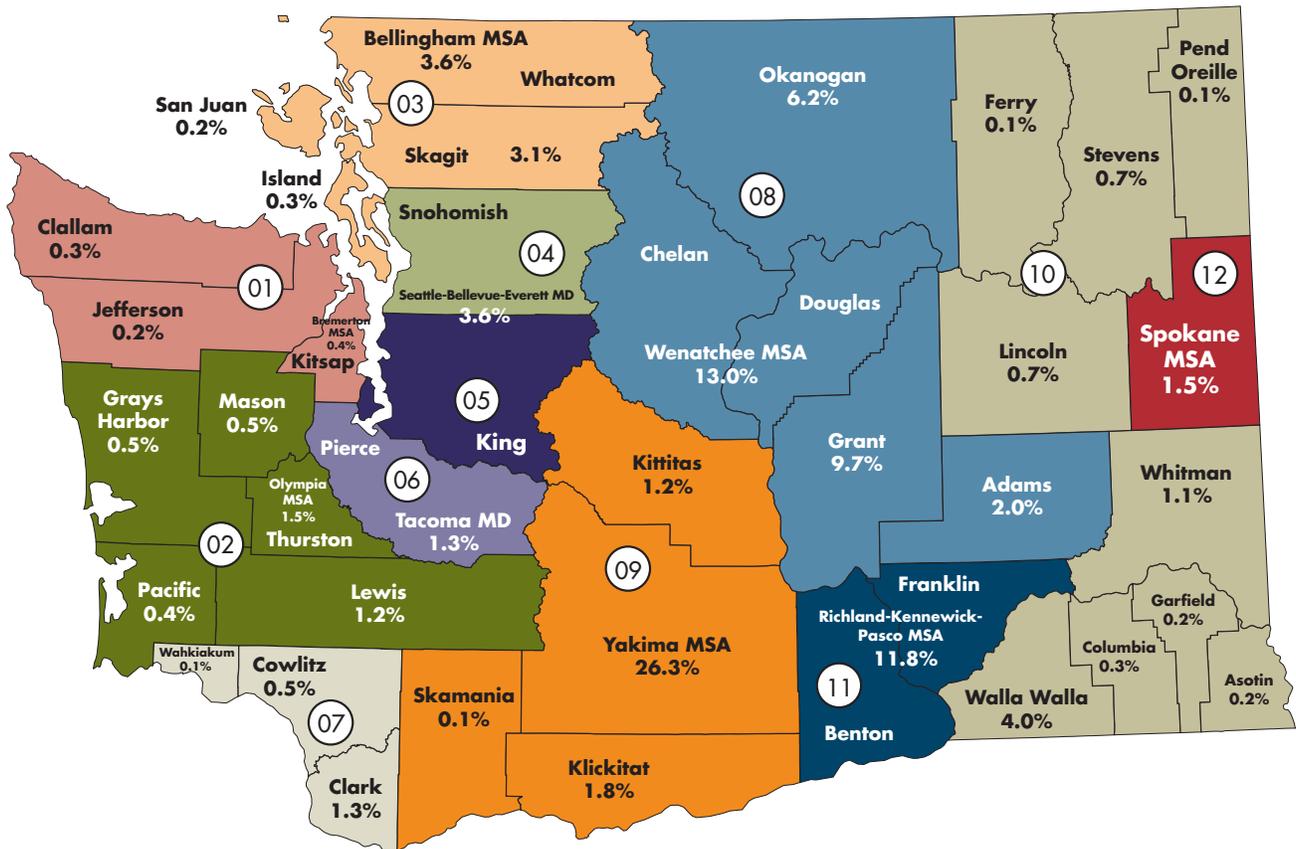
Pasco MSA employed 11.8 percent of the agricultural labor force in 2011; in 2010, the MSA employed 12 percent. These three MSAs employed 51.1 percent of the total agricultural labor force in the state for 2011. They employed the same percent in 2010.

Four counties employed an additional 23 percent of the state’s agricultural employment: Grant, 9.7 percent; Okanogan, 6.2 percent; Skagit, 3.1 percent; and, Walla Walla, 4 percent.

The state is divided into six agricultural growing regions (*Figure 2-9*) for statistical reporting purposes. The regions are based on agricultural economic similarity. Some of these regions are geographically similar to the state’s Workforce Development Areas shown in *Figure 2-8*.

**Figure 2-8.** Total agricultural employment in percent by Metropolitan Division (MD), Metropolitan Statistical Area (MSA) and county within the 12 Workforce Development Areas (WDAs) Washington state, 2011

Source: Employment Security Department/LMEA; U.S. Department of Labor, Bureau of Labor Statistics, Local Area Unemployment Statistics



Three MSAs and four counties employed 74.1 percent of all agricultural employment in the state.

<sup>26</sup> See: 2010 Agricultural Workforce, Washington State Employment Security Department/LMEA, July 2011, *Figure 2-10*, page 24, for 2010 data.

**Figure 2-9.** Agricultural Reporting Areas 1 through 6 Washington state, 2011

Source: Employment Security Department/LMEA; U.S. Department of Labor, Bureau of Labor Statistics, Local Area Unemployment Statistics

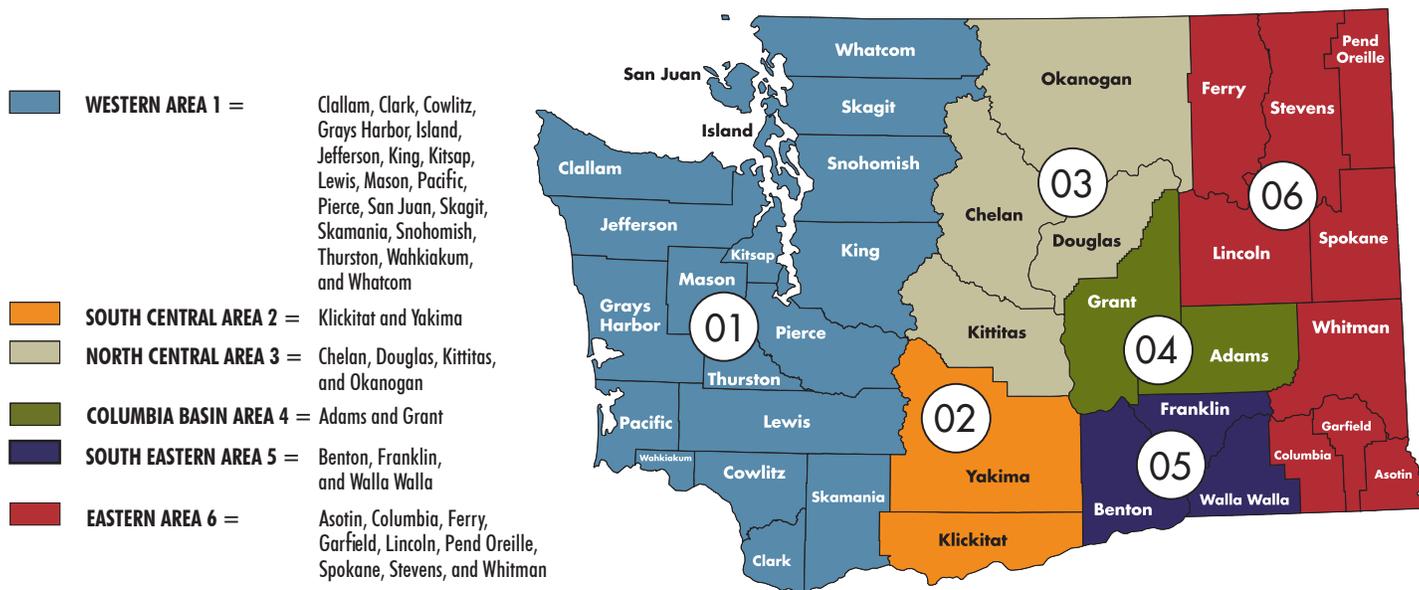


Figure 2-8 shows agricultural employment is concentrated in reporting areas 2 through 6.

### Seasonal employment by region and crop

The Employment Security Department’s monthly seasonal agriculture survey provides information on seasonal employment by crop and by region. Seasonal employment varies by crop and by region mainly due to weather in any given growing year. Over time, seasonal employment varies by crop composition due to changing demand and by technology.

There is considerable fluctuation in seasonal employment as shown in *Figure 2-10*. Monthly seasonal employment in Western Area 1 was the most stable in recent years, averaging 3,781 jobs from 2009 to 2011. Seasonal variations in employment in the other five areas are more volatile, with the greatest year-over-year swings in employment occurring in areas 5 and 6 for the 2009 through 2011 period.

Crops showing a consistent increase in production in the past three years were apples, cherries, blueberries, raspberries and potatoes. Crops showing a consistent decrease in production in the past three years were other tree fruits including peaches, nectarines, prunes, plums, and asparagus and green peas. Crops showing a mixed pattern of increase then decrease over the past three years were pears, grapes, strawberries, wheat/grain, onions and other seasonal crops including carrots and processed sweet corn. Crops showing a mixed pattern of decrease then increase in production over the past three years were hops and nurseries.

**Figure 2-10.** Average monthly seasonal agricultural employment by region and crop  
Washington state, 2011 compared to 2009 and 2010

Source: Employment Security Department/LMEA, Agricultural Labor Employment and Wages survey

Areas and crops	2009 Average seasonal employment	2010 Average seasonal employment	2011 Average seasonal employment	2011 to 2009 Change	2011 to 2009 Percent change	2011 to 2010 Change	2011 to 2010 Percent change
<b>State totals</b>	<b>38,669</b>	<b>39,374</b>	<b>40,282</b>	<b>1,614</b>	<b>4.2%</b>	<b>908</b>	<b>2.3%</b>
<b>Agricultural reporting area totals</b>							
Western Area 1	3,754	3,865	3,724	-30	-0.8%	-141	-3.6%
South Central Area 2	11,935	11,142	12,764	829	6.9%	1,622	14.6%
North Central Area 3	10,089	9,513	10,220	131	1.3%	707	7.4%
Columbia Basin Area 4	6,053	5,920	6,419	366	6.0%	499	8.4%
South Eastern Area 5	6,476	8,392	6,765	289	4.5%	-1,627	-19.4%
Eastern Area 6	362	543	390	28	7.6%	-153	-28.2%
<b>Crop totals</b>							
Apples	18,886	18,909	19,663	777	4.1%	754	4.0%
Cherries	5,680	6,213	6,685	1,005	17.7%	472	7.6%
Pears	1,262	1,705	1,560	299	23.7%	-145	-8.5%
Other tree fruit	952	503	382	-570	-59.9%	-121	-24.1%
Grapes	1,594	1,717	1,629	36	2.2%	-88	-5.1%
Blueberries	430	500	726	296	69.0%	226	45.2%
Raspberries	699	728	835	136	19.5%	107	14.7%
Strawberries	331	368	335	4	1.3%	-33	-9.0%
Hops	957	534	844	-113	-11.8%	310	58.1%
Nurseries	1,121	417	967	-154	-13.8%	550	131.9%
Wheat/grain	182	462	414	232	127.9%	-48	-10.4%
Asparagus	899	462	323	-576	-64.1%	-139	-30.1%
Onions	690	851	831	141	20.5%	-20	-2.4%
Potatoes	1,159	913	1,577	418	36.1%	664	72.7%
Miscellaneous vegetables	1,223	1,205	678	-545	-44.5%	-527	-43.7%
Other seasonal crops	2,556	3,056	2,791	235	9.2%	-265	-8.7%

*Season-over-season variations in crop production affect the timing and location of the demand for harvest season labor.*

## Employment and earnings by industry

The Quarterly Census of Employment and Wages (QCEW), which is based on unemployment-insurance program data, provides historical actual information on agricultural employment and wages. Based on that source, in 2010 there were 5,430 producers in production agriculture, a 2.5 percent decrease from 5,572 agricultural producers in 2009. In 2010, production agriculture employed a monthly average of 71,082 workers, a 9.3 percent decline from 76,290 workers in 2009 (*Figure 2-11*).

The total wage bill, wages paid to all workers over the calendar year, for production agriculture was \$1,511,097,697 in 2010, dropping from \$1,634,117,872 in 2009, or 8.1 percent. Average annual earnings paid per worker also dropped in 2010 compared to 2009, decreasing from \$21,420 in 2009 to \$20,974 in 2010, or 2.1 percent.

The output from the agricultural production sector and agricultural imports from outside of Washington supply the agriculture manufacturing sector. In 2010,

1,249 firms in agriculture manufacturing employed 39,574 workers per month, on average. In 2009, there were 1,282 such firms employing an average monthly labor force of 38,025 workers over the calendar year. Thus, while the number of firms in this subsector has declined, their average size in terms of their labor force has increased.

While the total wage bill of production agriculture and agricultural manufacturing is approximately the same, average annual earnings in agricultural manufacturing are almost double that of average

annual earnings in production agriculture – \$39,188 versus \$20,974 – or 86.8 percent higher for agriculture manufacturing.

For production agriculture, average annual earnings show a mixed pattern of increases and decreases for 2010 compared to 2009. Average annual earnings rose in cattle ranching and farming, other crop farming, support activities for crop production, greenhouse, nursery and floriculture, support activities for animal production and oilseed and grain farming. Average annual earnings fell in 2010 compared to 2009 in

**Figure 2-11.** Total firms, total jobs, annual total and average before-tax earnings by industry, in current dollars

Washington state, 2010 compared to 2009 and 2008

Source: Employment Security Department/LMEA; U.S. Bureau of Labor Statistics, Quarterly Census of Employment and Wages

Industry	2010 Average number of firms	2010 Annual total wages	2010 Average monthly jobs	2010 Average annual earnings per job	2009 Average annual earnings per job	Percent change in 2010 earnings compared to 2009	Percent change in 2010 earnings compared to 2008*
<b>Production agriculture total</b>	<b>5,430</b>	<b>\$1,511,097,697</b>	<b>71,082</b>	<b>\$20,974</b>	<b>\$21,420</b>	<b>-2.1%</b>	<b>-2.2%</b>
Poultry and egg production	39	\$17,325,829	619	\$27,990	\$31,638	-11.5%	-6.0%
Cattle ranching and farming	601	\$129,676,791	4,432	\$29,259	\$28,789	1.6%	3.3%
Other crop farming	743	\$162,635,456	6,047	\$26,895	\$26,312	2.2%	7.6%
Support activities for crop production	252	\$315,557,875	12,839	\$24,578	\$24,303	1.1%	0.5%
Greenhouse, nursery and floriculture	331	\$105,111,980	4,382	\$23,987	\$23,287	3.0%	5.0%
Other animal production	112	\$7,707,338	332	\$23,215	\$23,701	-2.1%	-4.4%
Vegetable and melon farming	228	\$70,507,048	2,717	\$25,950	\$27,973	-7.2%	-7.5%
Support activities for animal production	164	\$11,913,193	474	\$25,133	\$23,828	5.5%	7.3%
Oilseed and grain farming	827	\$36,544,269	1,503	\$24,314	\$22,598	7.6%	12.1%
Fruit and tree nut farming	2,072	\$633,709,527	36,976	\$17,138	\$17,221	-0.5%	-1.6%
Other industries	57	\$20,247,546	753	\$26,889	\$28,860	-6.8%	-5.3%
<b>Agriculture manufacturing total</b>	<b>1,249</b>	<b>\$1,550,842,022</b>	<b>39,574</b>	<b>\$39,188</b>	<b>\$41,413</b>	<b>-5.4%</b>	<b>-7.0%</b>
Seafood product preparation and packaging	93	\$341,252,789	6,665	\$51,201	\$52,698	-2.8%	-14.9%
Beverage manufacturing	297	\$170,956,961	4,334	\$39,446	\$39,949	-1.3%	-2.9%
Animal food manufacturing	49	\$28,160,534	703	\$40,058	\$41,733	-4.0%	-1.7%
Other food manufacturing	152	\$141,612,100	3,737	\$37,895	\$37,525	1.0%	-0.7%
Fruit and vegetable preserving and specialty	73	\$408,651,329	10,588	\$38,596	\$37,908	1.8%	3.3%
Animal slaughtering and processing	77	\$124,858,782	3,536	\$35,311	\$33,647	4.9%	5.5%
Other industries	231	\$191,038,117	5,692	\$33,563	\$34,399	-2.4%	-4.1%

\*For a comparison of calendar year 2009 with calendar year 2008, see: *2010 Agricultural Workforce*, Washington State Employment Security Department/LMEA, July 2011, Figure 2-12, page 27.

*Production agriculture employs 79.6 percent more workers than does agriculture manufacturing; but agriculture manufacturing workers earn 86.8 percent more per year than do workers in production agriculture.*

poultry and egg production, other animal production, vegetable and melon farming, fruit and tree nut farming and other industries.

There was also a mixed pattern of average annual earnings increases and decreases in agriculture manufacturing in 2010 compared to 2009, with workers in animal food manufacturing suffering the biggest decrease – 4 percent – and workers in animal slaughtering and processing gaining the biggest increase – 4.9 percent.

The highest average annual earnings in production agriculture were for workers in cattle ranching and farming, at \$29,259 per year. The lowest average annual earnings were for workers in fruit and tree nut farming, at \$17,138. This pattern has persisted for a number of years.

For agriculture manufacturing, the highest average annual earnings were for workers in seafood production preparation and packaging. These workers earned 30.7 percent more per year than the average worker in agricultural manufacturing – \$51,201 compared to \$39,188.

## Apples, cherries and pears

Unemployment-insurance program wage files provide historical actual information on agricultural employment and wages for specific crops. This is supplemented by the monthly survey of growers to provide earnings estimates. The production of apples, cherries and pears dominates the demand for seasonal and migrant labor in Washington during the state’s long harvest season, as shown in *Figure 2-10*. Thus, the wage level and distribution in these three types of production are of particular concern to both growers of these crops and the workers involved in their production.

Both current and inflation-adjusted measures are important to the grower. First, current wages measure how much – more, the same or less – the grower must pay to hire labor to produce a unit of output in the current growing and harvesting season. Given the crop quality and quantity, factors that interact with the weather over the growing and harvest season, will the grower need more or less

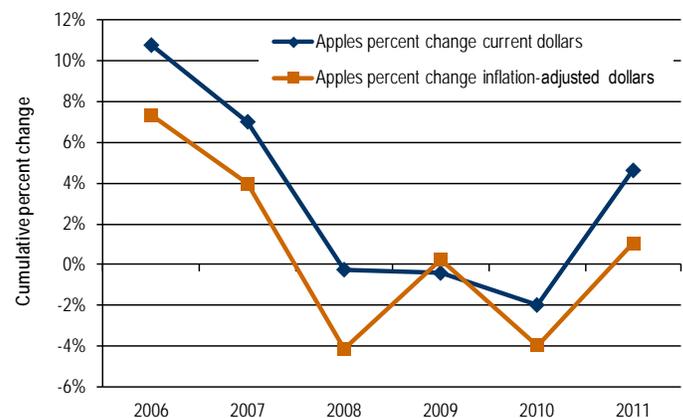
cash to finance the labor needed? Second, inflation-adjusted dollars inform the grower as to whether the real cost of labor is rising, falling or staying constant over time.<sup>27</sup>

*Figures 2-12, 2-13 and 2-14* show the pattern of percent wage change, compared to wages paid in 2000 (current dollars), over the period 2006 through 2011. In contrast to previous reports, this year we index inflation-adjusted wages to the base year 2010, rather than 2000. Instead of looking from the past to the present, we now view the data looking from the present to the past. The fundamental story for these three crops stays the same, regardless of the reference base period used.

## Apples

Over the period 2006 through 2011, current-dollar average hourly earnings for the apple harvest season increased by an average 9.0 percent. In comparison we see that in inflation-adjusted dollars, the wage rate (price) of apple harvest labor has fallen by an estimated 3.1 percent in terms of inflation-adjusted dollars.

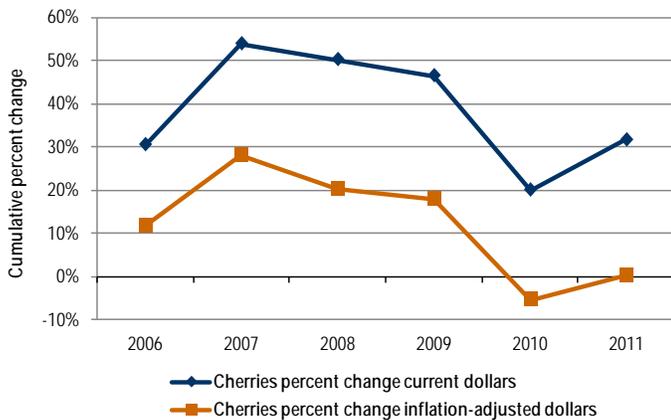
**Figure 2-12.** Average percent change in hourly before-tax earnings, apples, current and inflation-adjusted dollars, CPI-W 2010 = 100 Washington state, 2006 through 2011, fourth quarter data  
Source: Employment Security Department/LMEA, Unemployment Insurance Wage File



*Current-dollar and inflation-adjusted average hourly before-tax earnings have decreased since 2006.*

<sup>27</sup> The only meaningful way to compare average hourly earnings or piece rates over time is to present them in inflation-adjusted terms.

**Figure 2-13.** Average percent change in hourly before-tax earnings, cherries, current and inflation-adjusted dollars, CPI-W 2010 = 100 Washington state, 2006 through 2011, third quarter data  
Source: Employment Security Department/LMEA, Unemployment Insurance Wage File



The pattern of change in inflation-adjusted average hourly earnings shows a decline since 2007.

### Cherries

The picture for cherries is different from that of apples. The average percent change in current-dollar wages increased 0.5 percent from 2006 through 2011. In inflation-adjusted dollars, average hourly earnings fell by 10.3 percent.

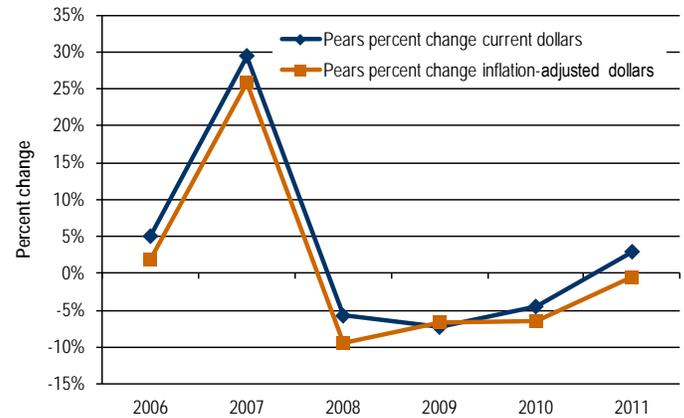
### Pears

Figure 2-14 shows the pattern of average percent change in hourly earnings for pears. The current-dollar pattern is similar to that of apples (up 11.3 percent), except that the big jump in average hourly earnings occurs in 2007. In terms of inflation-adjusted dollars, the average percent decrease in hourly earnings was 1.0 percent from 2006 to 2011.

## Apples, cherries, pears and the Washington state minimum wage

Figures 2-15, 2-16 and 2-17 contrast inflation-adjusted average hourly earnings at the peak harvest period for apples, cherries and pears with the inflation adjusted Washington state minimum wage, for the years 2006 through 2011. Since the approval

**Figure 2-14.** Average percent change in average hourly before-tax earnings, pears, current and inflation-adjusted dollars, CPI-W 2010 = 100 Washington state, 2006 through 2011, third quarter data  
Source: Employment Security Department/LMEA, Unemployment Insurance Wage File



Inflation-adjusted pear worker wages have increased since 2008.

of Initiative 688 in 1998, the state minimum wage has been indexed to the Consumer Price Index for Urban Wage Earners and Clerical Workers (CPI-W).<sup>28</sup>

### Apples

Inflation-adjusted average hourly earnings for apple harvesters, measured during the fourth quarter of each year, the peak of the apple harvest season, ranged from a high of \$12.89 in 2007 to a low of \$11.90 in 2010. For 2011, the inflation-adjusted average hourly earnings for apple harvesters was an estimated \$12.02.

Over the six-year history shown in Figure 2-15, we see that the average difference in hourly earnings for apple harvesters and the state minimum wage was \$3.91. This does not mean, however, that the minimum wage has no effect on the wage distribution for apple harvesters. Note that the average apple harvester is guaranteed by law to earn at least the state minimum wage. Picking apples is strenuous work that requires strength, speed and skill in selecting the appropriate fruit to pick. Some workers can earn considerably more than the average. Others will earn less. Some will earn only the minimum wage.<sup>29</sup>

<sup>28</sup> The same inflation adjustment is used throughout this report.

<sup>29</sup> Regardless of a given worker’s harvest productivity, the grower must pay the picker at least the state minimum wage. For the difficulty involved in harvesting apples, see: Rick Steigmeyer, “It’s no bowl of fruit,” *Wenatchee World*, October 26, 2011.

**Figure 2-15.** Comparison of average hourly before-tax earnings, apples, with the state minimum wage, both in inflation-adjusted dollars, CPI-W 2010 = 100  
Washington state, 2006 through 2011, fourth quarter data  
Source: Source: Employment Security Department/LMEA, Unemployment Insurance Wage File



Over the period 2006 through 2011, inflation-adjusted average hourly earnings for apple harvesters have been on average \$3.91 greater than the state minimum wage.

That some workers do in fact earn only the minimum wage means that the minimum wage puts a floor under their wages. The average hourly earnings data for apples, cherries and pears in these three figures reflect any effects due to the changes in the minimum wage.<sup>30</sup>

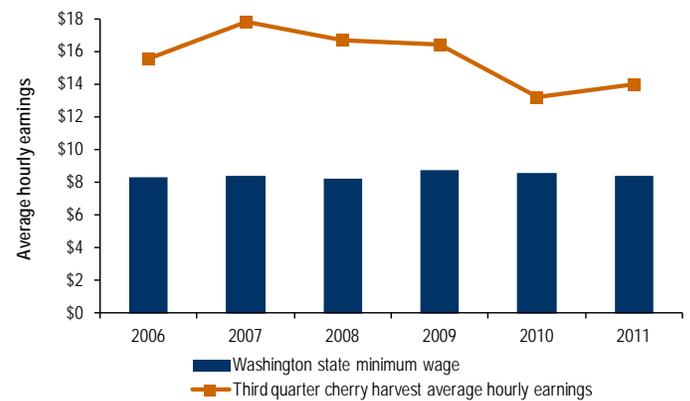
### Cherries

The difference between inflation-adjusted average hourly earnings for cherry harvesters and the state minimum wage is much greater than that for apple and pear harvesters. Typically, over the years, the difference averaged \$7.18 per hour.

### Pears

Over the six-year period, the average wage difference from the minimum wage for pear workers was \$4.33, between that of apples and cherries.

**Figure 2-16.** Comparison of average hourly before-tax earnings, cherries, with the state minimum wage, both in inflation-adjusted dollars, CPI-W 2010 = 100  
Washington state, 2006 through 2011, third quarter data  
Source: Source: Employment Security Department/LMEA, Unemployment Insurance Wage File



The difference between the minimum wage and average hourly earnings for cherry harvesters, at \$7.18, is greater than that for apple and pear harvesters.

**Figure 2-17.** Comparison of average hourly before-tax earnings, pears, with the state minimum wage, both in inflation-adjusted dollars, CPI-W 2010 = 100  
Washington state, 2006 through 2011, third quarter data  
Source: Source: Employment Security Department/LMEA, Unemployment Insurance Wage File



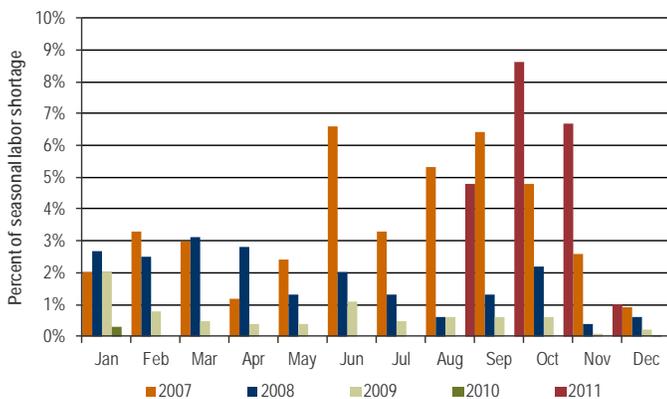
Pear harvesters' average hourly earnings were \$4.33 above the state minimum wage.

<sup>30</sup> If at least one worker is able to earn only the state minimum wage, the wage distribution will shift, however small the shift. If all growers will not hire anyone who is only able to earn the state minimum, then the wage distribution will not shift due to the minimum wage. Average wages paid will be higher, but worker productivity will also be higher, other things equal. See: Warner, Geraldine, "H-2A changes add cost, difficulty," *Good Fruit Grower*, Vol. 62, No. 11, June 2011.

## 2011 labor shortage

For a number of years there has been concern among growers over a shortage of seasonal labor to help plant, grow and harvest Washington state’s crops. Apples, cherries and pears have been of particular concern given their large peak demands for seasonal harvest labor. Typically, as *Figure 2-18* shows, there have been relatively small spot shortage reports over the planting, growing and harvesting season since 2008. During the 2011 cherry, pear and apple harvest seasons, information from the Agricultural Labor and Wage Survey suggested shortages occurred throughout the state – not just in a few locales.

**Figure 2-18.** Seasonal agricultural employment shortage as reported by agricultural producers, in percent, weighted by labor force size of employer reporting Washington state, 2007 through 2011  
Source: Employment Security Department/LMEA, Agriculture Employment and Wages survey



*After two years with few reports of labor shortages (2009 and 2010), a labor shortage developed during the 2011 harvest season.*

## Employment and piece rates

*Figure 2-19* compares the year-over-year seasonal employment and average piece rates for apples, cherries and pears for the relevant harvest months of these crops. The harvest season for apples, the greatest consumer of seasonal labor, extended well into November, assisted by favorable weather that month. Based on survey reports, apple growers became aware of a pending shortage of apple harvest workers in September 2011.<sup>31</sup>

On average, growers raised apple bin rates from \$19.15 in September 2010 to \$20.48 in September 2011. The increases year-over-year for October were \$21.23, rising a year later to \$22.16; for November, \$19.65 rising to \$22.77. This November increase was 15.9 percent year-over-year.

Apple seasonal employment was actually down, year-over-year, for September – 35,620 workers in 2011 compared to 42,510 in 2010 – a drop of 19.3 percent year-over-year. However, by October, year-over-year, employment increased from 42,650 to 47,090 – 10.4 percent. The year-over-year response of workers in November was even greater – from 12,560 workers to 18,170 workers – a 44.7 percent increase.

<sup>31</sup> See Lester, David, “Apple harvest late, too,” *Yakima Herald-Republic*, September 20, 2011 and “Late apple harvest puts some growers in a labor crunch,” *The Yakima Herald-Republic*, October 8, 2011.

**Figure 2-19.** Average piece rates and seasonal employment for apple, cherry and pear harvest periods, current wages Washington state, 2011 compared to 2010

Source: Employment Security Department/LMEA, Agricultural Labor Employment and Wages survey

Piece rates and seasonal employment	2010	2011	Percent change from 2010 to 2011	2010	2011	Percent change from 2010 to 2011	2010	2011	Percent change from 2010 to 2011
	September			October			November		
Apple bin rates <sup>1</sup>	\$19.15	\$20.48	7.0%	\$21.23	\$22.16	4.4%	\$19.65	\$22.77	15.9%
Apple seasonal employment	42,510	35,620	-19.3%	42,650	47,090	10.4%	12,560	18,170	44.7%
	June			July			August		
Cherry lug rates <sup>1</sup>	\$5.66	\$4.50	-20.5%	\$4.99	\$5.49	10.0%	\$4.50	\$4.75	5.6%
Cherry seasonal employment	8,920	3,230	-176.2%	32,270	20,510	-57.3%	4,050	10,690	164.0%
	August			September			October		
Pear bin rates <sup>1</sup>	\$19.21	\$16.00	-16.7%	\$19.35	\$18.42	-4.8%	\$18.50	\$19.83	7.2%
Pear seasonal employment	4,470	1,280	-249.2%	5,790	5,740	-0.9%	1,320	3,772	185.8%

<sup>1</sup>Based on the midpoint of survey-estimated bin or lug rates.

*The quantity of labor supplied in Washington's seasonal labor market for the apple harvest in 2011 was responsive to increases in the wage rate offers.*

## Summary

- Average annual employment of seasonal and nonseasonal labor in Washington state agriculture increased over the period of the Great Recession.
- A cool spring delayed the 2011 harvest season for apples, cherries and pears, upsetting the annual pattern of seasonal labor employment, for the apple harvest season in particular.
- There is no conclusive evidence of a long-run up or down trend in average weekly hours worked in agriculture for Washington/Oregon, California or the United States overall.
- On the whole, average hourly earnings in agriculture are higher for Washington/Oregon than for California or the United States overall.
- The federal H-2A guest worker program is a small but increasing source of labor supply for the United States and for Washington.
- Both the H-2A Adverse Effect Wage Rate and the state minimum wage have the effect of raising the average wage rate in agriculture for the state and in shifting the overall distribution of wage rates in agriculture upward.
- The regional distribution of agricultural labor in Washington has remained relatively stable in recent years.

# Chapter 3: Employment and unemployment in Washington's agricultural labor market

The agricultural component to the state's labor market has been a mitigating factor to unemployment in the state over the three-year period from 2009 through 2011. The composition of employed and unemployed can change from month to month, in a given year and over the business cycle, as recent experience with the Great Recession has shown.

**Figure 3-1.** Total employment for January and peak labor-force participation month, selected counties, Metropolitan Division (MD) and Metropolitan Statistical Area (MSA), not seasonally adjusted Washington state, 2009 through 2011  
Source: U.S Department of Labor, Bureau of Labor Statistics, Local Area Unemployment Statistics

Agricultural areas	Employment level											
	2009				2010				2011			
	January empl.	Peak month	Peak empl.	Percent change 2009	January empl.	Peak month	Peak empl.	Percent change 2010	January empl.	Peak month	Peak empl.	Percent change 2011
<b>Key agricultural counties</b>												
Benton	82,080	6	90,930	10.8%	84,100	6	94,030	11.8%	86,770	7	93,580	7.8%
Franklin	32,090	6	35,550	10.8%	31,920	6	35,690	11.8%	32,930	7	35,520	7.9%
Grant	34,590	9	43,360	25.4%	33,130	9	41,220	24.4%	33,670	9	41,790	24.1%
Okanogan	17,660	7	25,010	41.6%	16,180	7	25,160	55.5%	16,430	7	24,210	47.4%
Skagit	53,180	8	53,430	0.5%	50,660	7	53,350	5.3%	50,240	10	52,050	3.6%
Walla Walla	27,760	10	30,380	9.4%	27,480	6	30,650	11.5%	27,550	10	29,820	8.2%
<b>Total</b>	<b>247,360</b>		<b>278,660</b>	<b>12.7%</b>	<b>243,470</b>		<b>280,100</b>	<b>15.0%</b>	<b>247,590</b>		<b>276,970</b>	<b>11.9%</b>
<b>MD/MSA*</b>												
Bellingham MSA	100,330	3	101,570	1.2%	95,770	4	97,890	2.2%	95,990	11	98,830	3.0%
Bremerton MSA	118,360	1	118,360	0.0%	114,710	12	115,310	0.5%	113,160	12	114,250	1.0%
Olympia MSA	124,310	1	124,310	0.0%	119,370	11	120,810	1.2%	118,400	11	121,190	2.4%
Seattle MD	1,371,990	4	1,376,220	0.3%	1,344,000	4	1,368,050	1.8%	1,344,060	12	1,383,080	2.9%
Spokane MSA	222,990	1	222,990	0.0%	211,340	11	216,560	2.5%	209,410	11	213,340	1.9%
Tacoma MD	369,240	1	369,240	0.0%	351,890	12	356,800	1.4%	349,550	12	357,620	2.3%
Wenatchee MSA	54,350	7	77,240	42.1%	52,520	7	69,400	32.1%	52,160	7	69,080	32.4%
Yakima MSA	108,080	7	127,710	18.2%	105,130	7	124,190	18.1%	104,950	7	125,180	19.3%
<b>Total</b>	<b>2,469,650</b>		<b>2,517,640</b>	<b>1.9%</b>	<b>2,394,730</b>		<b>2,469,010</b>	<b>3.1%</b>	<b>2,387,680</b>		<b>2,482,570</b>	<b>4.0%</b>

\*MD = Metropolitan Division; MSA = Metropolitan Statistical Area; Bellingham, Wenatchee and Yakima MSAs are significant agricultural labor markets.

*Seasonal employment has a greater impact in the agricultural counties of the state than in the eight MDs and MSAs.*

## Data sources

Every month, the federal Bureau of Labor Statistics (BLS) surveys households to learn whether residents are employed or unemployed and looking for work. The survey does not count people who have stopped looking for work. We use these survey data to create local unemployment estimates. These Local Area Unemployment Statistics (LAUS) are monthly estimates of the labor force, including employment, unemployment and total unemployment rates statewide, by county and by metropolitan area. Employed persons in the LAUS survey, shown in *Figure 3-1*, may or may not be covered by the unemployment-insurance program. *Figures 3-2*, *3-3*, and *3-4* include only unemployed individuals who are receiving unemployment benefits. This information comes from Employment Security Department administrative records.

## Employment levels

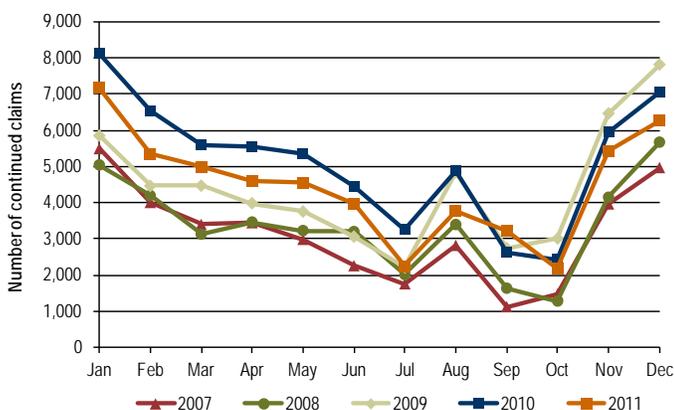
### Key agricultural counties

Figure 3-1 compares the level of January employment to employment during the peak employment month for specific agricultural counties, Metropolitan Divisions (MDs) and Metropolitan Statistical Areas (MSAs) for 2009 through 2011. All six agricultural counties increased workers from January levels during the course of the year. The peak month comparisons are 31,300 for 2009, 36,630 for 2010 and 29,380 for 2011. The peak employment month varied from June to October for these counties.

### MDs and MSAs

The eight MDs and MSAs supply over 2,400,000 employed workers to the state economy, and have a much higher component of nonfarm employment than do the six agricultural counties. Seasonal hiring is less a factor for these areas and peak employment months occur throughout the year, as shown below. Consistent with the employment numbers for the six agricultural counties, the Yakima and Wenatchee MSAs see the greatest seasonal increases.

**Figure 3-2.** Agriculture continued claims for unemployment benefits, by month  
Washington state, 2007 through 2011  
Source: Employment Security Department/LMEA, Unemployment Insurance Data Warehouse, Continued Claims Table



The pattern of continued claims for agricultural workers tracks the seasonal demand pattern for agricultural labor.

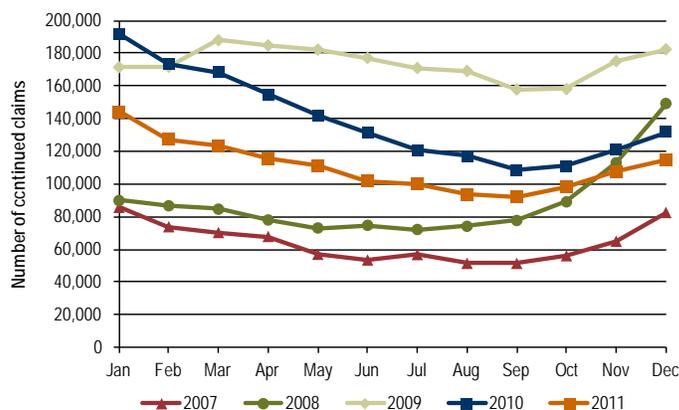
## Unemployed workers covered by unemployment insurance

### Agriculture continued claims

Examination of the number of continued claims for unemployment benefits provides an idea of the number of unemployed workers available and looking for work. The data shown in Figure 3-2 are totals for farmworker continued claims. To put these numbers in context, total covered employment, averaged over the year, was estimated at 76,500 workers in 2007, 78,155 in 2008, 82,857 in 2009, 81,073 in 2010 and 82,847 in 2011.<sup>32</sup>

The seasonal pattern of the demand for farm labor shows up in the data, with claims declining in May, June and July, rising in August and declining again in September and October before rising at year’s end. The effect on claims of a delayed harvest season in 2011 is shown with higher numbers in September 2011, returning to more normal levels for the balance of the season.

**Figure 3-3.** Nonfarm continued claims for unemployment benefits, by month  
Washington state, 2007 through 2011  
Source: Employment Security Department/LMEA, Unemployment Insurance Data Warehouse, Continued Claims Table



The continued claims data for all nonagricultural workers reflects both the long-term business cycle and the seasonal pattern of unemployment statewide.

<sup>32</sup> See Employment Security Department/LMEA, Agricultural Employment and Wage Report, data library, total employment.

**Figure 3-4.** Continued claims by selected agricultural industries, annually  
Washington state, 2007 through 2011

Source: Employment Security Department/LMEA, Unemployment Insurance Data Warehouse, Continued Claims Table

Industry	Continued claims 2007	Continued claims 2008	Annual change 2007/2008	Continued claims 2009	Annual change 2008/2009	Continued claims 2010	Annual change 2009/2010	Continued claims 2011	Annual change 2010/2011
Deciduous tree fruits	4,682	4,522	-3.40%	5,384	19.10%	5,721	6.30%	5,374	-6.10%
Crop preparation services	3,412	3,622	6.20%	4,313	19.10%	4,984	15.60%	4,514	-9.40%
Field crops	1,001	1,004	0.30%	1,167	16.20%	1,180	1.10%	1,104	-6.40%
Ornamental floriculture	522	614	17.60%	887	44.50%	946	6.70%	867	-8.40%
Grapes	580	617	6.40%	671	8.80%	683	1.80%	661	-3.20%
General farms	461	569	23.40%	687	20.70%	707	2.90%	693	-2.00%
Vegetables and melons	591	505	-14.60%	595	17.80%	600	0.80%	553	-7.80%
Potatoes	452	433	-4.20%	434	0.20%	477	9.90%	499	4.60%
Wheat	208	193	-7.20%	274	42.00%	332	21.20%	315	-5.10%
Berry crops	155	173	11.60%	279	61.30%	320	14.70%	297	-7.20%
Animal specialty services	137	177	29.20%	294	66.10%	298	1.40%	228	-23.50%
Farm labor contractors	102	162	58.80%	184	13.60%	185	0.50%	231	24.90%
Farm management services	173	154	-11.00%	158	2.60%	132	-16.50%	116	-12.10%
Dairy farms	105	106	1.00%	197	85.80%	169	-14.20%	128	-24.30%
<b>Totals</b>	<b>12,581</b>	<b>12,851</b>	<b>2.10%</b>	<b>15,524</b>	<b>20.80%</b>	<b>16,734</b>	<b>7.80%</b>	<b>15,580</b>	<b>-5.60%</b>

*The number of continued claims for deciduous tree fruits in 2011 was down from 2009 and 2010, but still higher than 2007 and 2008.*

## Nonfarm continued claims

Figure 3-3 shows the pattern of continued claims for nonfarm workers over the current cycle of the Great Recession. To put these numbers in context, recall that the state’s employment, not seasonally adjusted, was estimated at 2,933,600 workers in 2007.<sup>33</sup> This number rose to an estimated 2,958,900 workers in 2008, before dropping to 2,786,300 workers in 2010. For 2011, the estimate was 2,829,500. The seasonal pattern of continued claims is similar for each year in this timeframe.

## Agriculture continued claims by industry

Figure 3-4 shows continued claims in agriculture by industry, not seasonally adjusted, on an annual basis. For 2009 compared to 2008, continued claims rose for every agricultural industry. With only two exceptions, farm management services and dairy farms, this is also true when comparing 2010 with 2009. However, from 2010 to 2011, all industries declined except for farm labor contractors.

The deciduous tree fruit and crop preparation service industries represent more than half of the continued claims in any given year and more than half of all crop production covered employment. For the most part, these are highly seasonal industries. The crop preparation service employment is highly concentrated in postharvest crop activities, including crop cleaning, sun drying, shelling, fumigating, curing, sorting, grading, packing and cooling.

<sup>33</sup> Source: Employment Security Department/LMEA; U.S. Department of Labor, Bureau of Labor Statistics, Current Employment Statistics, not seasonally adjusted.

## Summary

- The agricultural component to the state’s labor market has been a mitigating factor to unemployment in the state over the three-year period from 2009 through 2011.
- Seasonal hiring is more of a factor for the six key agricultural counties in the state than for the state’s eight Metropolitan Divisions and Metropolitan Statistical Areas.
- Statewide unemployment and continued claims data reveal both seasonal patterns in the demand for agricultural labor and the effect of the business cycle.

# Chapter 4: The wine, vineyard and hop industries in Washington state

## The Washington winery industry

Washington state was the second largest premium wine producer in the United States in 2010, after California. Washington winery sales were just under \$438 million in 2010, compared to \$18.5 billion in sales for California wines. In 2010, the state produced an estimated 12 million cases of wine.<sup>34</sup>

Wine is produced in 30 of the 39 counties in the state. However, most of the production is concentrated in four counties: Benton, King, Walla Walla and Yakima. The top five wine producing groups account for over 70 percent of this output.<sup>35</sup>

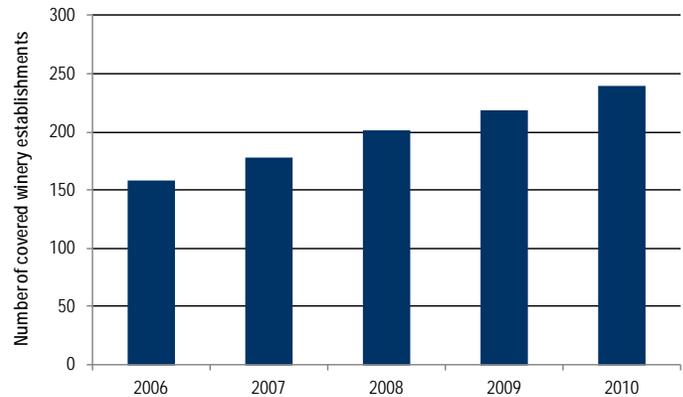
### Winery growth

In 2011, there were 739 licensed wineries in the state.<sup>36</sup> This industry comprises establishments primarily engaged in one or more of the following: (1) growing grapes and manufacturing wines and brandies; (2) manufacturing wines and brandies from grapes and other fruits grown elsewhere; and (3) blending wines and brandies. In contrast, the vineyard industry comprises establishments primarily engaged in growing grapes and/or growing grapes to sun dry into raisins, i.e., grape farming without making wine. Wineries often own vineyard acreage, but remained classified as wine manufacturers.

### Winery establishments

Many of the wineries are small, family-run establishments that employ no labor covered by the unemployment-insurance program. The number of wineries employing at least one worker covered by the unemployment-insurance program has grown to 239, compared to only 158 in 2006, an increase of 51.3 percent in just five years, as shown in *Figure 4-1*.<sup>37</sup>

**Figure 4-1.** Winery establishments, for firms covered by the unemployment-insurance program Washington state, 2006 through 2010  
Source: U.S. Department of Labor, Bureau of Labor Statistics, Quarterly Census of Employment and Wages



*There is an upward trend in the number of winery establishments covered by the unemployment-insurance program over the period 2006 through 2010.*

### Winery average annual employment

Since 2006, there has been a steady increase in employment in wineries covered by the unemployment-insurance program. Winery employment stood at 1,555 workers in 2006. By 2010 covered winery employment rose to 2,238 workers, representing a 43.9 percent increase, as shown in *Figure 4-2*.

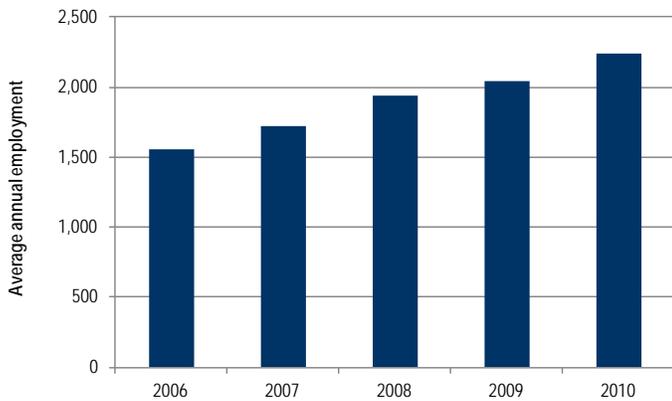
<sup>34</sup>Washington State Wine Commission; U.S. Department of Commerce Census of Manufacturers – 2007, NAICS 31213.

<sup>35</sup>Washington State Wine Commission, economic impact study of Washington state wine, April 2012.

<sup>36</sup>Washington State Liquor Control Board, FY 2011 Annual Report, page 12.

<sup>37</sup>The data on vineyard and winery employment and earnings in this chapter are limited to those wineries that employ at least one worker who is covered by the state unemployment-insurance program, whose records are the source for this information.

**Figure 4-2.** Average annual employment in winery establishments with covered employment Washington state, 2006 through 2010  
Source: U.S. Department of Labor, Bureau of Labor Statistics, Quarterly Census of Employment and Wages



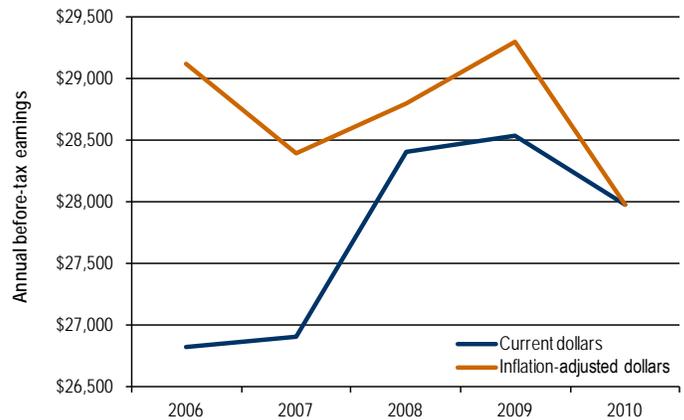
*Winery employment covered by the unemployment-insurance program increased by 43.9 percent over the period 2006 through 2010.*

### Average annual before-tax earnings in winery establishments

Annual average before-tax earnings in winery establishments exceed those in vineyard establishments. *Figure 4-3* shows that, in current dollars, average annual before-tax earnings were \$26,827 in 2006, rising to \$27,981 in 2010. Comparing 2006 earnings with 2010 earnings, we see an increase of 4.3 percent.

The picture for inflation-adjusted dollars is different. With 2010 being the base year for comparison, before-tax earnings were \$29,123 in 2006. They were \$27,981 in 2010. Comparing 2006 earnings with 2010 earnings, we see a 3.9 percent decrease. This decrease can be due to any combination of decreased annual hours worked and decreases in average hourly wage rates or in piece rates.

**Figure 4-3.** Average annual before-tax earnings in winery establishments, for firms with covered employment, current and inflation-adjusted dollars, CPI-W 2010 = 100 Washington state, 2006 through 2010  
Source: U.S. Department of Labor, Bureau of Labor Statistics, Quarterly Census of Employment and Wages



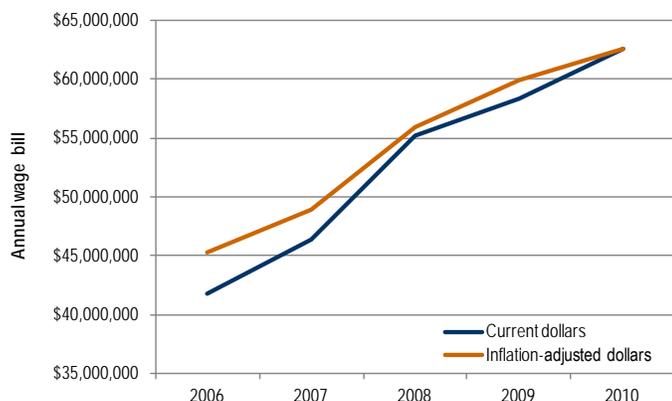
*While current-dollar before-tax wages increased, inflation-adjusted wages have declined.*

### Annual wage bill for winery establishments

The wage bill is the total number of workers employed times the average annual before-tax earnings of those workers – total wages paid for all workers employed. The wage bill, apart from being a cost of production, also represents the value added to production via the contribution of hired workers employed in the production process. There has been a steady, long-run increase in the wage bill over time.

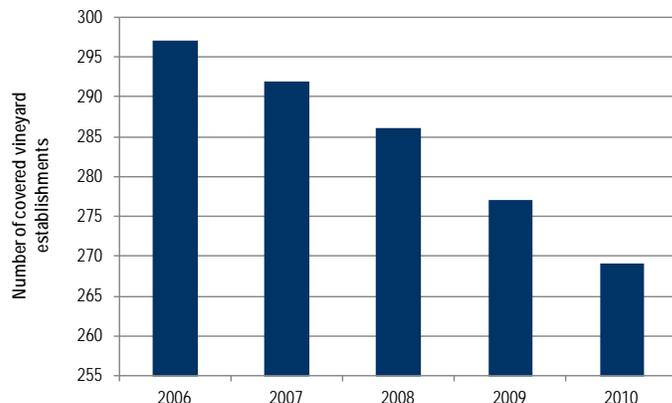
*Figure 4-4* shows that in current and inflation-adjusted dollars, the wage bill rose by 50.1 and 38.3 percent respectively, since 2006. This number indexes industry growth and follows closely the increases in winery establishments and their workforce.

**Figure 4-4.** Annual wage bill for winery establishments with covered employment, current and inflation-adjusted dollars, CPI-W 2010 = 100 Washington state, 2006 through 2010  
Source: U.S. Department of Labor, Bureau of Labor Statistics, Quarterly Census of Employment and Wages



There has been a steady, long-run increase in the wage bill for wineries over this period.

**Figure 4-5.** Vineyard establishments, for firms covered by the unemployment-insurance program, all grape types Washington state, 2006 through 2010  
Source: U.S. Department of Labor, Bureau of Labor Statistics, Quarterly Census of Employment and Wages



The number of vineyard establishments with covered employment has decreased by 9.4 percent in the period from 2006 through 2010.

## The Washington vineyard industry

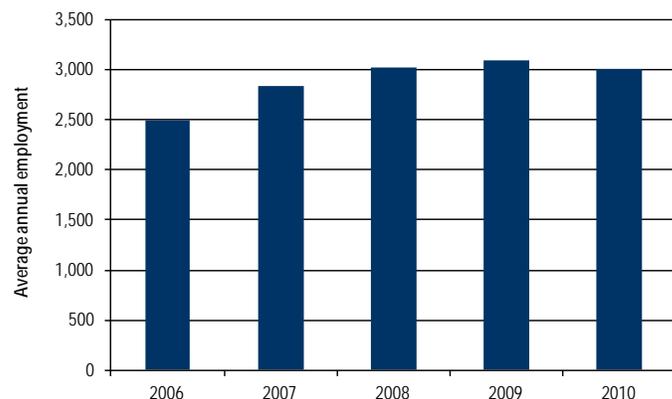
### Vineyard establishments

Figure 4-5 displays the number of vineyard establishments in the state over the period 2006 through 2010. What stands out is that the number of vineyard establishments with covered employment has been steadily declining. Since overall acreage has been increasing over this period, the decline could imply a consolidation of wine-grape acreage into a smaller set of vineyard establishments.<sup>38</sup> Another factor is the evolution of vineyards into wineries. Wine grapes account for about 50 percent of all grape production in the state and 29.4 percent of wine grapes are from vineyards owned or controlled by wineries.

### Vineyard average annual employment

Average annual employment in vineyards with covered employment increased from 2,494 workers in 2006 to 3,017 in 2008 and has remained fairly steady since then. (Figure 4-6). These employment numbers include the production of wine grapes and all other varieties.

**Figure 4-6.** Average annual employment in vineyard establishments with covered employment, all grape types Washington state, 2006 through 2010  
Source: U.S. Department of Labor, Bureau of Labor Statistics, Quarterly Census of Employment and Wages



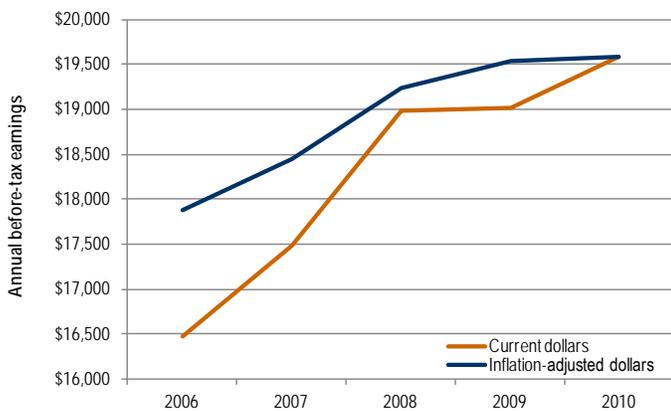
In recent years, vineyard employment has remained steady.

<sup>38</sup>A firm is a legal business entity, such as Starbucks. An establishment is any retail store of Starbucks.

## Average annual before-tax earnings in vineyard establishments

Average annual before-tax earnings of workers in vineyard establishments are shown in *Figure 4-7*. Current-dollar earnings were \$16,475 per year in 2006, rising to \$19,582 by 2010. For inflation-adjusted dollars, earnings were \$17,885 in 2006, rising to \$19,582 in 2010, a change of 9.5 percent.

**Figure 4-7.** Average annual before-tax earnings in vineyard establishments, for firms with covered employment, current and inflation-adjusted dollars, CPI-W 2010 = 100 Washington state, 2006 through 2010  
Source: U.S. Department of Labor, Bureau of Labor Statistics, Quarterly Census of Employment and Wages

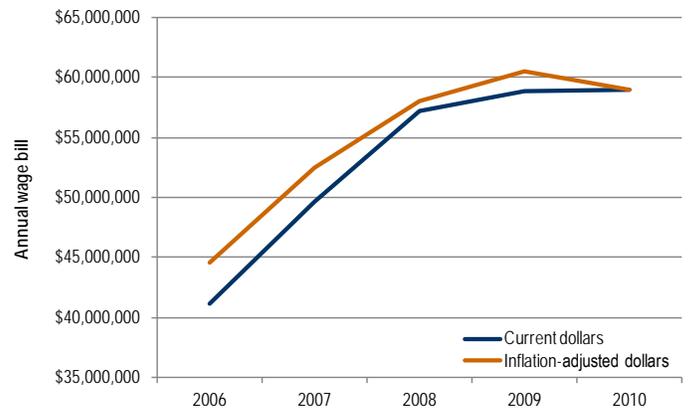


*Annual before-tax earnings of workers in vineyards increased by 9.5 percent from 2006 through 2010, inflation-adjusted dollars.*

## Annual wage bill for vineyard establishments

As with winery establishments, the wage bill for vineyard establishments has shown an increase since 2006. *Figure 4-8* shows that the vineyard before-tax wage bill in current and inflation-adjusted dollars rose by 43.6 and 32.3 percent respectively, since 2006. As for winery establishments, this number indexes industry growth and has tracked vineyard employment numbers in recent years.

**Figure 4-8.** Annual wage bill for vineyard establishments with covered employment, current and inflation-adjusted dollars, CPI-W 2010 = 100 Washington state, 2006 through 2010  
Source: U.S. Department of Labor, Bureau of Labor Statistics, Quarterly Census of Employment and Wages



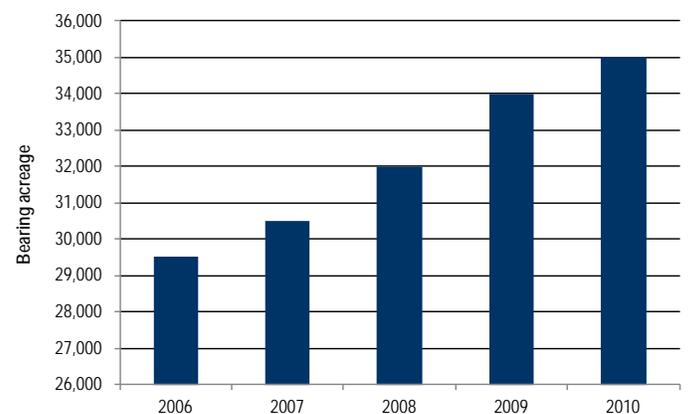
*There has been stabilization in the wage bill for vineyards in both current and inflation-adjusted dollars in recent years.*

## Vineyard Production

### Wine-grape bearing acres

There has been a steady upward trend in the number of wine-grape bearing acres over the five-year period from 2006 through 2010 as shown in *Figure 4-9*. This acreage grew to an estimated 35,000 acres in 2010 – just shy of 55 square miles.

**Figure 4-9.** Wine-grape bearing acreage Washington state, 2006 through 2010  
Source: U.S. Department of Agriculture, National Agricultural Statistics Service, 2011 Washington Annual Agriculture Bulletin, Agricultural Prices, Prices Received by Farmers, Fruits and Nuts



*There has been a steady growth in acreage devoted to wine-grape production over the period from 2006 through 2010.*

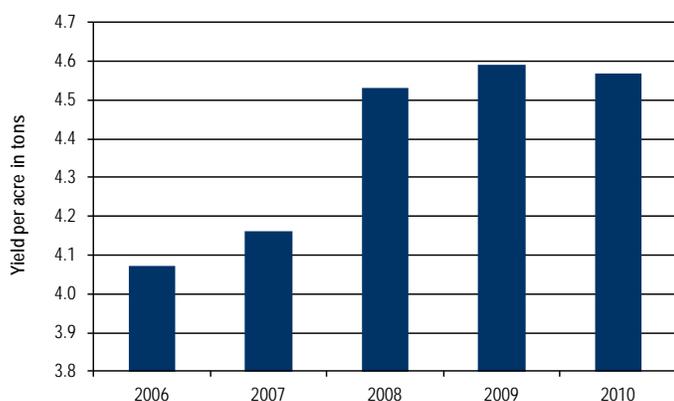
## Wine-grape yield per acre

Figure 4-10 shows the pattern of wine-grape yield per acre. After declining in 2004 and 2005, yield per acre began to increase in 2006. In 2010, yield per acre stood at 4.57 tons.<sup>39</sup> Apart from variations in the weather, the changing mix of varieties may be influencing this yield pattern. In addition, depending on the varietal, vineyard managers control the amount of wine-grape yield per acre in an effort to improve the quality of a given varietal wine.<sup>40</sup>

**Figure 4-10.** Wine-grape yields per acre

Washington state, 2006 through 2010

Source: U.S. Department of Agriculture, National Agricultural Statistics Service 2011 Washington Annual Agriculture Bulletin, page 75



*In recent years, wine-grape production per acre has gradually increased.*

## Wine-grape price per ton

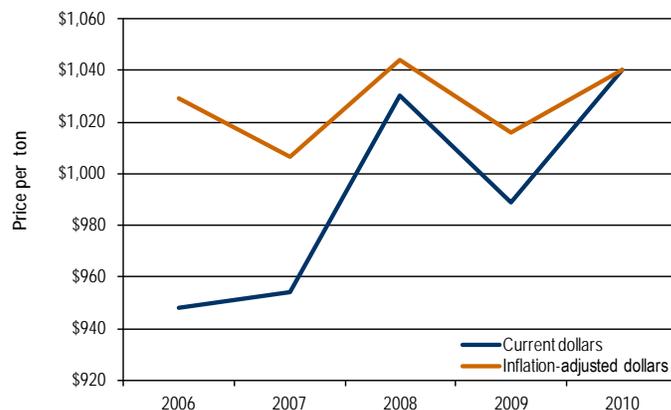
Figure 4-11 shows the trend in price per ton for wine grapes over the period from 2006 through 2010. From 2006 on, the current-dollar price per ton for wine grapes was growing slowly, with a slight dip in 2009 and then gradually rising through 2010 to \$1,040 in current dollars.

The pattern of price per ton in inflation-adjusted dollars is somewhat different. There is less year-to-year fluctuation in the inflation-adjusted price.

**Figure 4-11.** Wine-grape price per ton, current and inflation-adjusted dollars, CPI-W 2010 = 100

Washington state, 2006 through 2010

Source: U.S. Department of Agriculture, National Agricultural Statistics Service, 2011 Washington Annual Agriculture Bulletin, Agricultural Prices, Prices Received by Farmers, Fruits and Nuts



*Based on inflation-adjusted dollars, the price per ton of wine grapes has varied somewhat during this period.*

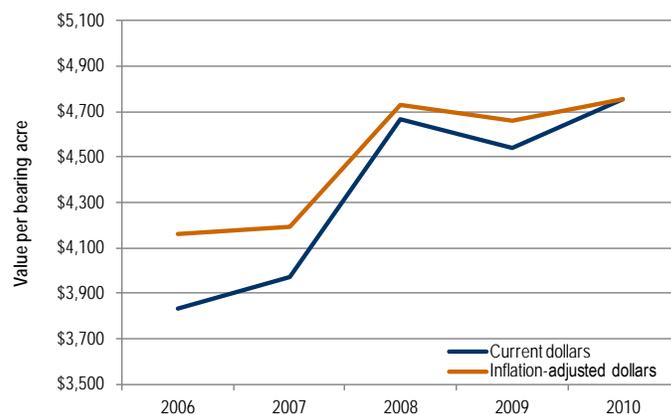
## Wine-grape value per acre

Figure 4-12 shows wine-grape value per acre. Values began a fairly steady rise beginning in 2006, culminating in a price of \$4,754 in 2010. This pattern holds for both current and inflation-adjusted dollars.

**Figure 4-12.** Wine-grape value per bearing acre, current and inflation-adjusted dollars, CPI-W 2010 = 100

Washington state, 2006 through 2010

Source: U.S. Department of Agriculture, National Agricultural Statistics Service, 2011 Washington Annual Agriculture Bulletin, page 76



*In inflation-adjusted dollars, value per acre has increased by 14.3 percent from 2006 through 2010.*

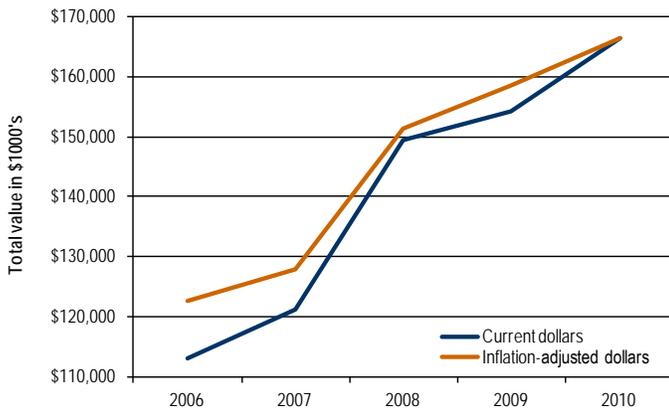
<sup>39</sup>To manage the wine quality of grapes, tonnage is usually managed to produce about four tons of wine grapes per acre. See: MFK Research LLC, *Economic Impact of Washington Grapes and Wine*, page 11.

<sup>40</sup>Various annual editions of the *Washington Annual Agriculture Bulletin* provide detail on the changing mix of white and red varietal wine grapes over time. See, for example: *2011 Washington Annual Agriculture Bulletin*, page 77. On the control of grape yield per acre, see: Calwineries, "Grape Yield: The Importance of Grape Yield in Vineyard Management." ([www.nass.usda.gov/Statistics\\_by\\_State/Washington/Publications/Annual\\_Statistical\\_Bulletin/annual2011.pdf](http://www.nass.usda.gov/Statistics_by_State/Washington/Publications/Annual_Statistical_Bulletin/annual2011.pdf) and [www.calwineries.com](http://www.calwineries.com))

## Total value of wine grapes utilized in production

Figure 4-13 displays the time trend of total value gained from wine grapes that were utilized in production over the period from 2006 through 2010. The increase in value is substantial over this five-year period, in both current and inflation-adjusted dollars. Current-dollar value rose from \$113,040,000 to \$166,400,000 by 2010, a 47.2 percent increase. Inflation-adjusted revenues rose from \$122,714,000 to \$166,400,000 by 2010, a 35.6 percent increase.

**Figure 4-13.** Total value of wine grapes utilized in production, current and inflation-adjusted dollars, CPI-W 2010 = 100 Washington state, 2006 through 2010  
Source: U.S. Department of Agriculture, National Agricultural Statistics Service, 2011 Washington Annual Agriculture Bulletin, Agricultural Prices, Prices Received by Farmers, Fruits and Nuts



*Inflation-adjusted values rose to \$166,400,000 by 2010.*

**Figure 4-14.** Average and median before-tax hourly earnings, vineyard and winery workers, current and inflation-adjusted dollars, CPI-W, 2010 = 100 Washington state, 2006 through 2010

Source: Employment Security Department/LMEA, Unemployment Insurance Wage File

	2006		2007		2008		2009		2010	
	Current	Inflation-adjusted								
<b>Average hourly before-tax earnings</b>										
Vineyard workers, all grapes	\$12.99	\$12.08	\$13.26	\$11.63	\$14.17	\$11.71	\$14.48	\$11.65	\$14.95	\$14.95
Winery workers	\$19.01	\$17.69	\$19.62	\$17.19	\$20.93	\$17.29	\$20.39	\$16.40	\$19.72	\$19.72
<b>Median hourly before-tax earnings</b>										
Vineyard workers, all grapes	\$9.47	\$8.82	\$9.64	\$8.45	\$10.01	\$8.28	\$10.47	\$8.42	\$10.55	\$10.55
Winery workers	\$13.49	\$12.55	\$14.44	\$12.65	\$15.42	\$12.75	\$15.88	\$12.77	\$15.64	\$15.64

*Vineyard workers earn less per hour than do winery workers.*

## Wage and industry trends – wineries and vineyards

### Average and median before-tax hourly earnings

Figure 4-14 displays average and median before-tax hourly earnings for vineyard and winery workers. The data are shown for both current and inflation-adjusted dollars. The median hourly earnings are lower than the average hourly earnings for 2006 through 2010. This indicates there are a large number of workers receiving relatively lower average hourly earnings and a smaller number receiving much higher hourly earnings.

In current dollars for 2006 average hourly before-tax earnings, winery workers earned \$6.02 more per hour than vineyard workers. In median dollars for 2006, the difference was \$4.02 per hour. By 2010 the picture changed somewhat. In current-dollar terms, winery workers earned \$4.77 more in average hourly earnings; for median hourly earnings, the differential was \$5.09.

## Industry trends

Figure 4-15 shows a set of indices that describe the trends in Washington's winery and vineyard industries for selected production characteristics. The data extend from 2006 through 2010, with 2010 as the index base year. For these two related industries – vineyards and wineries – we see that proportionately, the number of winery establishments shows the greatest relative growth.

The second largest in relative growth has been winery employment. Wine-grape tonnage follows with the third highest relative increase over the five-year period. Wine-grape tonnage has increased relatively more than wine-grape acreage, suggesting increasing productivity in the production of wine-grape tonnage per acre. Wine-grape price in terms of inflation-adjusted dollars has declined slightly over time. This could be due to the mix of wine grapes being produced, overall changes in supply relative to demand, other factors not listed here, or combinations of all these factors.

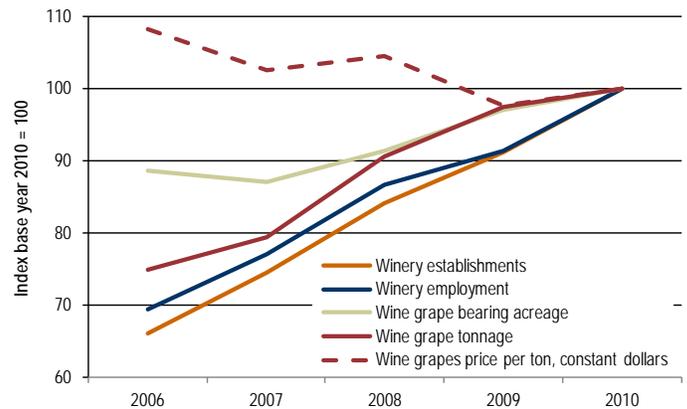
Finally, a major characteristic of Washington vineyard production is the high concentration of vineyards in the relatively dry eastern part of the state. Land suitable for vineyard production includes irrigated land currently producing higher value tree fruit and other crops, as well as land previously devoted to the production of dry-land crops, such as wheat, lentils and dry edible peas.

An estimated 35,000 acres were dedicated to wine-grape production in 2010 – almost 55 square miles. The state comprises an area of 70,700 square miles, more than half of which is in the eastern part of the state where the optimal wine-grape acreage is located.

**Figure 4-15.** Comparison of indices of winery establishments, winery employment, bearing acreage, production quantity and price per ton, base year 2010 = 100

Washington state, 2006 through 2010

Source: U.S. Department of Labor, Bureau of Labor Statistics, Quarterly Census of Employment and Wages (QCEW); U.S. Department of Agriculture, National Agricultural Statistics Service, 2011 Washington Annual Agriculture Bulletin



With the exception of the average price of wine grapes per ton, growth in the Washington winery industry has been consistent over the period 2006 through 2010.

## Washington hops

Washington state is the largest hop producer in the United States. Washington hop revenues were \$141,097,000 in 2011, in current dollars. The Yakima Valley contains all of the hop-growing acreage in Washington state. In 2011, Washington state produced 51,308,100 pounds of hops, 79.2 percent of the United States total and 23,320 acres were harvested, 78.3 percent of the United States total.<sup>41</sup> In terms of value, hops were the 12th most valuable crop in Washington state in 2010.<sup>42</sup>

<sup>41</sup>Hop Growers of America, 2011 Statistical Report, January 2012.

<sup>42</sup>U.S. Department of Agriculture, National Agricultural Statistics Service (NASS), 2011 Washington Annual Agriculture Bulletin.

## Growth in hop production

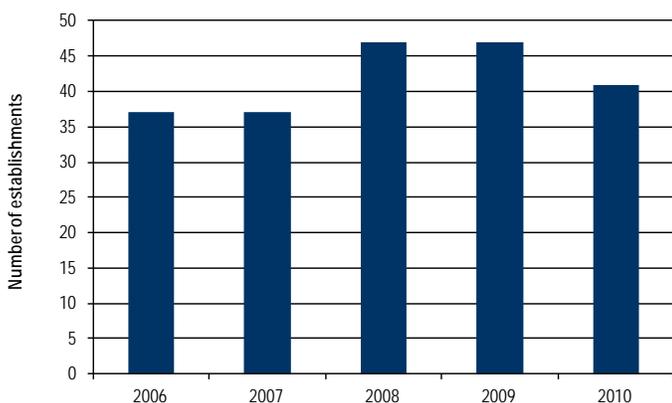
In recent years the hop industry has been characterized by considerable volatility in year-to-year pricing in the world market. From 2009 to 2011, the total value of production in current dollars dropped from \$265,330,000 to \$141,097,000 – a decrease of 46.8 percent. The following quote sums up the state of the industry as of the current period:

“...However, things are currently so volatile that growers can no longer count on being able to amortize the cost of planting along with a new trellis and drip irrigation system over more than a few years. Under the current situation, some growers who thought they had a 5-year contract to amortize establishment costs are being asked to give up those contracts in as little as two years.”<sup>43</sup>

## Hop-producing establishments

The number of establishments producing hops has varied somewhat in the period from 2006 through 2010. There were 37 firms in 2006, rising to 47 in 2009 and declining to 41 in 2010 (*Figure 4-16*).

**Figure 4-16.** Hop establishments for firms with covered employment Washington State, 2006 through 2010  
Source: Washington Hop Commission



*The numbers of hop producers has averaged 42 from 2006 through 2010.*

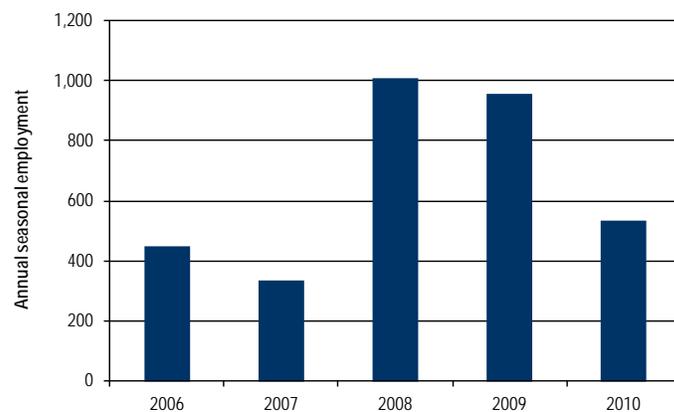
## Hop average annual seasonal employment

*Figure 4-17* shows the rise and decline in annual seasonal employment in the hop industry in recent years. Seasonal employment numbers are collected from a monthly survey of growers. Total employment for hop production is not captured in the Quarterly Census of Employment and Wages,

because hop production is not classified as a distinct industry. Although the absolute number of seasonal workers is not large relative to the annual surge in seasonal agricultural employment for the state overall, the percentage changes for hops are large.

In 2008, average annual seasonal employment increased to 1,008 workers – an increase of 200 percent compared to 2007 seasonal employment. Then, as growers met demand and even oversupplied, employment dropped back to 534 annual seasonal workers in 2010 – a decrease of 89 percent relative to 2008.

**Figure 4-17.** Average annual seasonal employment in hop establishments with covered employment Washington state, 2006 through 2010  
Source: Employment Security Department/LMEA, Agricultural Labor Employment and Wages survey



*Annual seasonal employment in hops has dropped since 2008 and exhibits considerable short-run volatility.*

## Average annual before-tax earnings in hop establishments

Average and median before-tax hourly earnings are shown in *Figure 4-18*. Given the sharp increase in production in 2007, one would expect average hourly earnings to rise sharply, other things equal, to meet the increased demand for seasonal labor. This did not happen. Current-dollar average before-tax hourly earnings were an estimated \$11.01 per hour in 2007. In 2008, they dropped to \$10.83; average hourly earnings then rose to \$11.81 in 2009 and topped out at \$12.33 in 2010. The Great Recession hit Washington state in the second and third quarters of 2008, which could partly explain the drop in average hourly earnings from 2007 to 2008.

<sup>43</sup>Galinato Suzette, Ann George and Herbert Hinman, *2010 Estimated Cost of Producing hops in the Yakima Valley, Washington State*, undated.

**Figure 4-18.** Hop workers, average and median hourly before-tax earnings, current and inflation-adjusted dollars, CPI-W 2010 = 100  
Washington state, 2006 through 2010

Source: Employment Security Department/LMEA, Unemployment Insurance Wage File

Earnings	2006		2007		2008		2009		2010	
	Current	Inflation-adjusted								
Average hourly before-tax earnings	\$10.75	\$11.67	\$11.01	\$11.62	\$10.83	\$10.98	\$11.81	\$12.06	\$12.33	\$12.33
Median hourly before-tax earnings	\$9.79	\$10.63	\$10.16	\$10.72	\$10.71	\$10.86	\$11.49	\$11.73	\$12.28	\$12.28

Even though there was a sharp increase in hop production from 2007 to 2008, average hourly before-tax earnings fell in 2008 compared to 2007, likely due to unemployment during the Great Recession.

## Hop production

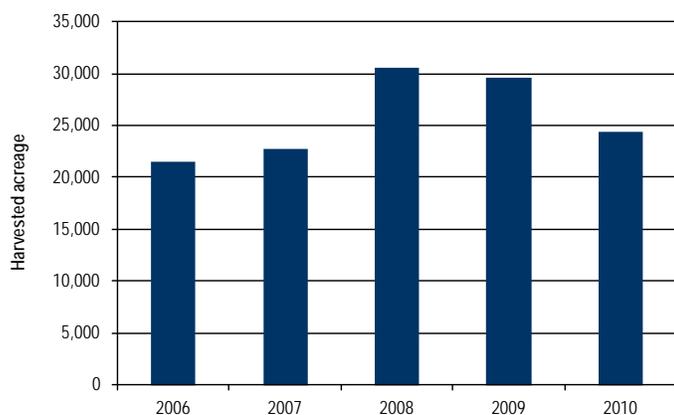
### Hop-bearing acres

Figure 4-19 shows the changes in harvested acreage over the 2006 through 2010 period. The peak acreage period, 2008, showed 30,575 acres in hop production in the Yakima Valley. Planted acreage then dropped to 24,336 acres in 2010 as inventories of hops built up internationally. As of 2011, 23,368 acres were strung for harvest.

**Figure 4-19.** Hop-bearing acreage

Washington state, 2006 through 2010

Source: U.S. Department of Agriculture, National Agricultural Statistics Service, 2011 Washington Annual Agriculture Bulletin



There have been sharp swings in the amount of harvested hop acreage during the period from 2006 through 2010.

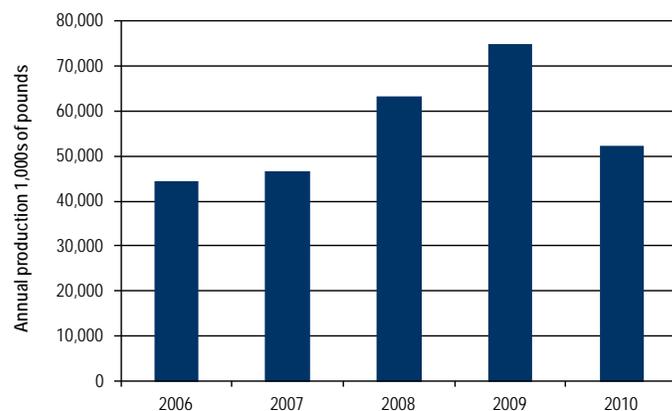
### Hop annual production

Figure 4-20 shows the annual production of hops in 1,000s of pounds for Washington state. It follows the pattern of acreage in production closely.

**Figure 4-20.** Hop annual production in 1,000s of pounds

Washington state, 2006 through 2010

Source: U.S. Department of Agriculture, National Agricultural Statistics Service, 2011 Washington Annual Agriculture Bulletin

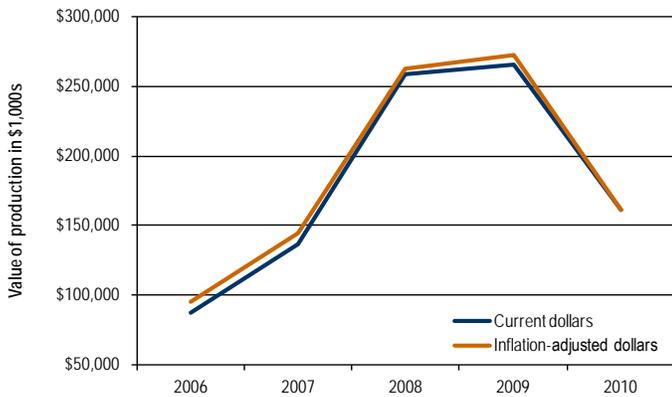


From 2006 to 2009, hop production rose by 69.1 percent, but then dropped off in 2010.

### Total value of hop production

The total value of production for hops is shown in Figure 4-21 from 2006 through 2010. In 2006, the total value in inflation-adjusted dollars was \$95,248,000. Total value more than doubled in 2009 to \$272,465,000 – an increase of 186 percent in just four years – but then declined by 40.9 percent to \$160,937,000. These values of production figures highlight the volatility in hop production for Washington state.

**Figure 4-21.** Hops, value of production in \$1,000s, current and inflation-adjusted dollars, Index = Agricultural prices received by farmers, other crops, 2010 = 100 Washington state, 2006 through 2010  
Source: U.S. Department of Agriculture, National Agricultural Statistics Service, 2011 Washington Annual Bulletin



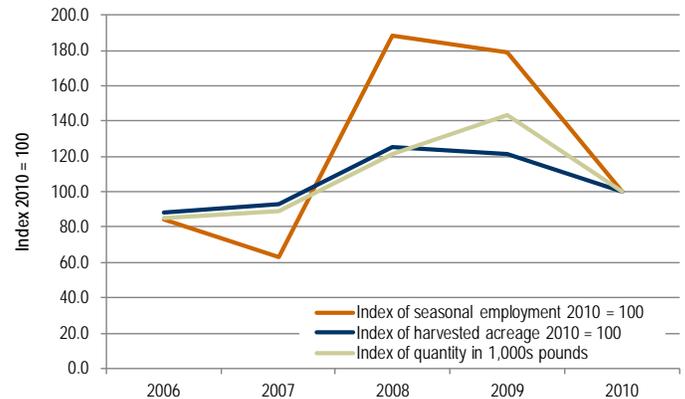
The value of production figures highlight the uncertainty and volatility of the production process for hops in Washington state.

## Hop employment and industry trends

### Employment and harvest

The volatility of the hop industry is illustrated in Figures 4-22 and 4-23. Using 2010 as an index base year, Figure 4-22 compares seasonal employment, harvested acreage and quantity of harvest in 1,000s of pounds. In 2007, there was a perceived shortage of hops internationally, which led to an increase in production and employment that overshot demand. The result of overproduction in 2009 led to a sharp decrease in production in 2010.

**Figure 4-22.** Comparison of indices for hops of seasonal employment, harvested acreage and production quantity in 1,000s of pounds, 2010 = 100 Washington state, 2006 through 2010  
Source: U.S. Department of Agriculture, National Agricultural Statistics Service, 2011 Washington Annual Agriculture Bulletin

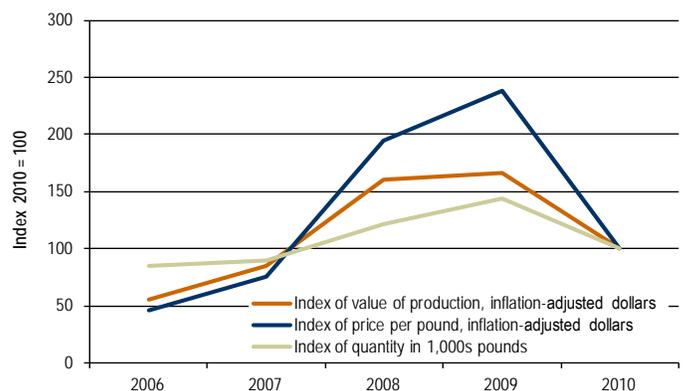


Seasonal employment in hop production dropped sharply from 2008 to 2010.

### Production value and demand for hops

Figure 4-23 shows the basic effect of the perceived shortage of hops in 2007. Production rose sharply in 2008 and 2009, dropping down in 2010 as increased supply met and then exceeded demand. Both price per pound and quantity of production rose and then dropped in response to the initial perceived shortage of hops in 2007 and then the overproduction of hops in 2008 and 2009 relative to demand.

**Figure 4-23.** Comparison of indices for hops of quantity of production in 1,000s of pounds, inflation-adjusted price per pound and inflation-adjusted value of production, 2010 = 100 Washington State, 2006 through 2010  
Source: U.S. Department of Agriculture, National Agricultural Statistics Service, 2011 Washington Annual Agriculture Bulletin, Prices Received by Farmers, other crops



Price per pound and value of production were relatively stable until the perceived shortage of hops in 2007.

## Summary

- The wine and vineyard industries are big business in Washington.
- Land suitable for vineyard production is in the eastern, dry land area of the state.
- The number of wineries covered by the unemployment-insurance program has grown to 239, compared to only 158 in 2006, an increase of 51.3 percent in just five years.
- The number of vineyards covered by the unemployment-insurance program has been decreasing over time.
- The wine industry in the state is highly concentrated, with a few firms producing the lion's share of wine in the state.
- Vineyard and winery establishment employment has been increasing over time, totaling 5,270 jobs in 2010.
- Winery workers earn more in average hourly before-tax earnings compared to vineyard workers.
- Washington state is the focal point of hop production in the United States.
- Production in the hop industry is volatile from year to year.
- Hop seasonal workers earn less than vineyard and winery workers. In current dollars, average hourly before-tax earnings in 2010 for hop workers, vineyard workers and winery workers were \$12.33, \$14.95 and \$19.72, respectively.



# Chapter 5: Wheat, vegetables except potatoes, potatoes, nurseries and floriculture and hay

This chapter focuses on several crops in the list of top forty agricultural commodities for Washington state from 2006 through 2010. The current-dollar value of production for the top forty agricultural products was \$7,605,940,000 in 2010. Wheat ranked third in production value (after apples and milk), yielding \$925,265,000. Vegetables, which excludes potatoes, production value was \$483,443,000. This included five commodities in the top forty, as well as other fresh and processed vegetables. Potatoes ranked fourth, yielding \$654,456,000. Nursery and greenhouse products ranked eighth, yielding \$300,002,000. All hay ranked sixth, yielding \$508,680,000.

Figure 5-1 displays the number of establishments and employees covered by the unemployment-insurance program in Washington state for this group of crops. As of 2010, this group of crops represents 1,824 establishments. These establishments employed 11,382 employees during 2010. The total number of establishments and the number of employees has remained stable over the past five years.

**Figure 5-1.** Establishments and employment for firms with covered employment, for wheat, vegetable, potato, nursery and floriculture, and hay industries Washington state, 2006 through 2010  
Source: U.S. Department of Labor, Bureau of Labor Statistics, Quarterly Census of Employment and Wages

Industry	2006		2007		2008		2009		2010	
	Firms	Employment								
Wheat	893	1,427	866	1,425	844	1,479	843	1,522	827	1,503
Vegetables except potatoes	248	2,570	230	2,732	229	2,625	229	2,712	228	2,717
Potatoes	115	1,591	123	1,615	114	1,459	115	1,448	115	1,542
Nurseries and floriculture	351	4,812	341	4,847	336	4,771	329	4,518	331	4,382
Hay	306	984	327	1,069	321	1,111	325	1,192	323	1,238
<b>Total</b>	<b>1,913</b>	<b>11,384</b>	<b>1,887</b>	<b>11,688</b>	<b>1,844</b>	<b>11,445</b>	<b>1,841</b>	<b>11,392</b>	<b>1,824</b>	<b>11,382</b>

The total number of establishments and employment has remained stable for all of these crops since 2006.

<sup>44</sup>See: U.S. Department of Agriculture, National Agricultural Statistics Service (NASS), 2011 Washington Annual Agriculture Bulletin, 2011, page 29.

## Production by crop

### Wheat

From 2006 through 2010, the number of establishments producing wheat decreased from 893 to 827. The number of covered employees ranged from 1,425 to 1,522. Average harvested acreage has increased by 2.7 percent since 2006, while average production increased by 7.0 percent (Figure 5-2). The total value of production in current dollars increased by 50 percent from 2006 through 2010.<sup>44</sup>

**Figure 5-2.** Harvested acreage, production and value of production, wheat, in current dollars Washington state, 2006 through 2010  
Source: U.S. Department of Agriculture, National Agricultural Statistics Service, 2011 Washington Annual Agriculture Bulletin

Year	Wheat		
	Harvested acreage	Production (1,000s of bushels)	Value of production in \$1,000s
2006	2,225,000	138,250	\$617,865
2007	2,137,000	125,342	\$949,132
2008	2,255,000	118,790	\$745,163
2009	2,225,000	123,085	\$594,267
2010	2,285,000	147,890	\$925,265

Wheat production and values fluctuated during this period.

## Vegetables except potatoes

The data on vegetables includes asparagus, carrots for processing, green peas for processing, non-storage onions, storage onions, fresh sweet corn, processed sweet corn, other fresh vegetables and other processed vegetables. From 2006 through 2010, the number of establishments producing vegetables gradually declined from 248 in 2006 to 228 in 2010. The number of covered employees ranged from 2,570 to 2,732 and averaged 2,671. Harvested acreage declined 6.8 percent from 2006 through 2010 (*Figure 5-3*). Production declined by 10.6 percent and the total value of production declined by 9.8 percent to \$483,443,000 for 2010.<sup>45</sup>

**Figure 5-3.** Harvested acreage, production and value of production, vegetables except potatoes, in current dollars  
Washington state, 2006 through 2010  
Source: U.S. Department of Agriculture, National Agricultural Statistics Service, 2011 Washington Annual Agriculture Bulletin

Vegetables except potatoes			
Year	Harvested acreage	Production (1,000 Cwt.)	Value of production in \$1,000s
2006	172,800	38,863	\$495,204
2007	182,625	43,322	\$328,123
2008	163,200	32,481	\$473,862
2009	180,900	37,704	\$563,791
2010	161,100	34,762	\$483,443

*Production and values have declined slightly.*

## Potatoes

The number of establishments producing potatoes was 115 in 2006 and in 2010. Covered employment ranged from a low of 1,448 workers in 2009 to a high of 1,615 in 2007 (*Figure 5-1*). Harvested acreage dropped by 8.6 percent from 2006 through 2010, to 134,000 acres (*Figure 5-4*). Total production also showed a drop of 1.6 percent, but the value of production rose 16.5 percent, to \$654,456,000 in 2010.<sup>46</sup>

**Figure 5-4.** Harvested acreage, production and value of production, potatoes, in current dollars  
Washington state, 2006 through 2010  
Source: U.S. Department of Agriculture, National Agricultural Statistics Service, 2011 Washington Annual Agriculture Bulletin

Potatoes			
Year	Harvested acreage	Production (1,000 Cwt.)	Value of production in \$1,000s
2006	155,000	89,900	\$561,875
2007	160,000	100,800	\$675,360
2008	155,000	93,000	\$692,850
2009	143,000	87,230	\$645,502
2010	134,000	88,440	\$654,456

*Harvested acreage has declined more than the value of production.*

## Nurseries and floriculture

The number of nursery and floriculture establishments has declined over time. There were 351 establishments in 2006, falling to 331 in 2010. Covered employment also trended down from 4,812 workers in 2006 to 4,382 workers in 2010. The value of floriculture wholesale crops was \$123,723,000 in 2006, rising to \$162,702,000 in 2010 (*Figure 5-5*).<sup>47</sup> These industries are not classified by harvested acres or volume of production, so the value of production is shown in *Figure 5-5*.

**Figure 5-5.** Value of production, nursery and floriculture, in current dollars  
Washington state, 2006 through 2010  
Source: U.S. Department of Agriculture, National Agricultural Statistics Service 2011 Washington Annual Agriculture Bulletin

Nurseries and floriculture	
Year	Value of production in \$1,000s
2006	\$451,271
2007	\$368,678
2008	\$372,006
2009	\$343,218
2010	\$342,752

*Production value has declined since 2006.*

<sup>45</sup>See: U.S. Department of Agriculture, National Agricultural Statistics Service, 2011 Washington Annual Agriculture Bulletin, 2011, page 70.

<sup>46</sup>U.S. Department of Agriculture, National Agricultural Statistics Service, 2011 Washington Annual Agriculture Bulletin, 2011, page 50.

<sup>47</sup>U.S. Department of Agriculture, National Agricultural Statistics Service, 2011 Washington Annual Agriculture Bulletin, 2011, page 25. Note acreage and production statistics are not given for these industries.

## Hay

The number of hay producers varied from 306 to 327 during these five years. Covered employment increased steadily from 984 workers in 2006 to 1,238 workers in 2010, a 25.8 percent increase. All hay (*Figure 5-6*) is classified as alfalfa hay and other hay. Alfalfa can be harvested twice per year, compared to once for other hay, making its yield per acre much higher, although its price per ton is somewhat lower.

**Figure 5-6.** Harvested acreage, production and value of production, all hay, in current dollars

Washington state, 2006 through 2010

Source: U.S. Department of Agriculture, National Agricultural Statistics Service 2011 Washington Annual Agriculture Bulletin

All hay			
Year	Harvested acreage	Production (1,000s of tons)	Value of production in \$1,000s
2006	770,000	3,113	\$400,609
2007	790,000	3,338	\$498,224
2008	710,000	2,614	\$581,302
2009	810,000	3,297	\$452,410
2010	840,000	3,420	\$508,680

*Production values for hay have increased from 2006 to 2010.*

## Alfalfa

From 2006 through 2010, the number of harvested alfalfa acres increased by 2.3 percent from an average of 440,000 acres to 450,000 acres (*Figure 5-7*). Production also rose by 4.4 percent. The value of production in 2010 was \$299,250,000, an 11.1 percent increase over 2006.

**Figure 5-7.** Harvested acreage, production and value of production, alfalfa, in current dollars

Washington state, 2006 through 2010

Source: U.S. Department of Agriculture, National Agricultural Statistics Service, 2011 Washington Annual Agriculture Bulletin

Alfalfa			
Year	Harvested acreage	Production (1,000s of tons)	Value of production in \$1,000s
2006	440,000	2,156	\$269,500
2007	440,000	2,288	\$338,624
2008	410,000	1,804	\$402,292
2009	490,000	2,401	\$292,922
2010	450,000	2,250	\$299,250

*Acreage and production have remained steady, but values have fluctuated.*

## Other hay

From 2006 through 2010, the number of harvested other hay acres increased by 18.2 percent from an average of 330,000 acres to 390,000 acres (*Figure 5-8*). Production also rose by 22.3 percent. The value of production in 2010 was \$209,430,000, a 59.7 percent increase over 2006.<sup>48</sup>

**Figure 5-8.** Harvested acreage, production and value of production, other hay, in current dollars

Washington state, 2006 through 2010

Source: U.S. Department of Agriculture, National Agricultural Statistics Service, 2011 Washington Annual Agriculture Bulletin

Other hay			
Year	Harvested acreage	Production (1,000s of tons)	Value of production in \$1,000s
2006	330,000	957	\$131,109
2007	350,000	1,050	\$159,600
2008	300,000	810	\$179,010
2009	320,000	596	\$159,488
2010	390,000	1,170	\$209,430

*Production and the value of production varied substantially.*

<sup>48</sup>U.S. Department of Agriculture, National Agricultural Statistics Service, 2011 Washington Annual Agriculture Bulletin, 2011, page 59 ff.

## Wage trends – average and median before-tax hourly earnings

Median and average hourly before-tax earnings for workers in firms covered by the unemployment-insurance program, in current dollars, are shown in *Figure 5-9*. For every crop, earnings increased over the period 2006 through 2010. The largest increase in current dollars over this five-year period was for potato workers, at 16 percent. Wheat workers have the next highest increase at 15.8 percent.

### Inflation-adjusted hourly earnings

Inflation-adjusted earnings are shown in *Figure 5-10*. The base year for this adjustment is 2010, which equals 100. As with current-dollar earnings, each crop shows an increase over the five-year period. The highest increases were again for potato and wheat workers, at 6.9 and 6.7 percent.

## Industry trends, employment and earnings

### Wheat

*Figures 5-11* through *5-15* show the indexed pattern, that is, relative change, of average annual employment and current and inflation-adjusted average hourly before-tax earnings for farmworkers over the 2006 through 2010 period. The data are indexed to base year 2010 = 100. Thus, proportional change over time, relative to the period 2010, is shown for each of the three variables in the figures.

*Figure 5-11* shows a slow upward trend in average annual employment for covered workers in wheat production. It also shows the trend lines in average hourly earnings and inflation-adjusted hourly earnings. We see a slow upward trend in all three during this period.

**Figure 5-9.** Median and average hourly before-tax earnings for firms with covered employment, for wheat, vegetable except potato, potato, nursery and floriculture, and hay industries, in current dollars

Washington state, 2006 through 2010

Source: Employment Security Department/LMEA, Unemployment Insurance Wage File

Industry	2006		2007		2008		2009		2010	
	Median	Average								
Wheat	\$12.29	\$12.70	\$12.96	\$13.26	\$13.76	\$13.87	\$13.95	\$14.19	\$14.38	\$14.71
Vegetables except potatoes	\$9.95	\$11.81	\$10.05	\$12.53	\$10.69	\$12.96	\$10.93	\$13.16	\$10.95	\$13.32
Potatoes	\$11.81	\$12.85	\$12.41	\$13.73	\$13.27	\$14.38	\$13.46	\$14.83	\$13.65	\$14.91
Nurseries and floriculture	\$10.16	\$11.68	\$10.27	\$12.34	\$10.85	\$12.79	\$11.13	\$13.03	\$11.06	\$13.18
Hay	\$11.57	\$12.08	\$11.97	\$12.88	\$12.56	\$13.64	\$12.99	\$13.90	\$12.72	\$13.61

For every crop reported, current-dollar average before-taxes hourly earnings increased over the period from 2006 through 2010.

**Figure 5-10.** Median and average hourly before-tax earnings for firms with covered employment, for wheat, vegetable except potato, potato, nursery and floriculture, and hay industries, in inflation-adjusted dollars, CPI-W 2010 = 100

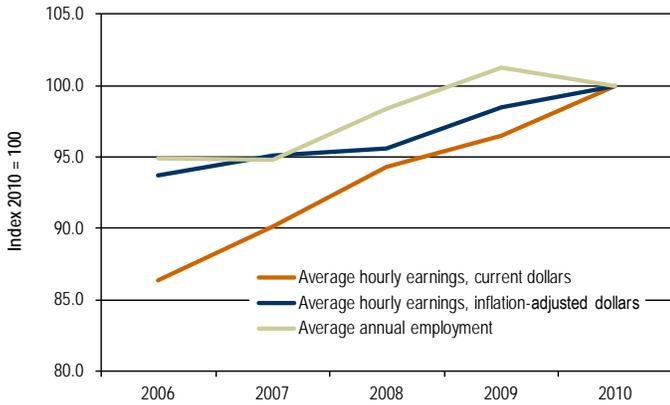
Washington state, 2006 through 2010

Source: Employment Security Department/LMEA, Unemployment Insurance Wage File

Industry	2006		2007		2008		2009		2010	
	Median	Average								
Wheat	\$13.34	\$13.79	\$13.68	\$13.99	\$13.95	\$14.06	\$14.24	\$14.48	\$14.38	\$14.71
Vegetables except potatoes	\$10.80	\$12.82	\$10.61	\$13.22	\$10.84	\$13.14	\$11.16	\$13.43	\$10.95	\$13.32
Potatoes	\$12.82	\$13.95	\$13.10	\$14.49	\$13.45	\$14.58	\$13.74	\$15.14	\$13.65	\$14.91
Nurseries and floriculture	\$11.03	\$12.68	\$10.84	\$13.02	\$11.00	\$12.97	\$11.36	\$13.30	\$11.06	\$13.18
Hay	\$12.56	\$13.11	\$12.63	\$13.59	\$12.73	\$13.83	\$13.26	\$14.19	\$12.72	\$13.61

In terms of inflation-adjusted dollars, potato and wheat workers had the highest percentage of average hourly wage increases.

**Figure 5-11.** Index of average annual employment and average before-tax hourly earnings for wheat workers, in current and inflation-adjusted dollars, CPI-W 2010 = 100  
Washington state, 2006 through 2010  
Source: Employment Security Department/LMEA, Unemployment Insurance Wage File; U.S. Department of Labor, Bureau of Labor Statistics, Quarterly Census of Employment and Wages

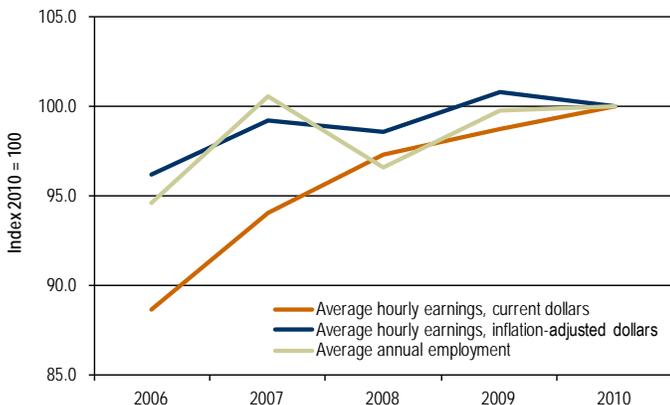


*Inflation-adjusted average hourly earnings rose from 2009 to 2010.*

### Vegetables except potatoes

Average annual employment has trended up slightly over the five-year period of 2006 through 2010, as shown in *Figure 5-12*. There has been a steady increase in both average hourly earnings and inflation-adjusted hourly earnings for workers in vegetables, except potatoes, over this five-year period.

**Figure 5-12.** Index of average annual employment and average before-tax hourly earnings for vegetables except potatoes workers, in current and inflation-adjusted dollars, CPI-W 2010 = 100  
Washington state, 2006 through 2010  
Source: Employment Security Department/LMEA, Unemployment Insurance Wage File; U.S. Department of Labor, Bureau of Labor Statistics, Quarterly Census of Employment and Wages

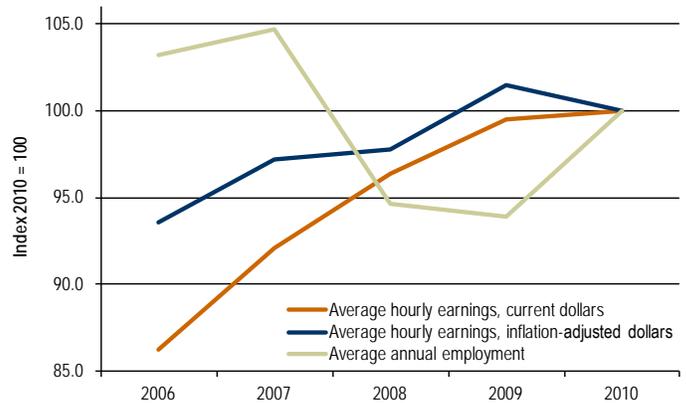


*There has been an increase in average hourly before-tax earnings for this group of workers.*

### Potatoes

Average annual employment of covered workers in potatoes declined after 2007, but then made a small recovery from 2009 to 2010, as shown in *Figure 5-13*. There has been an annual increase in both average hourly earnings and inflation-adjusted hourly earnings for workers in potatoes over this five-year period.

**Figure 5-13.** Index of average annual employment and average before-tax hourly earnings for potato workers, in current and inflation-adjusted dollars, CPI-W 2010 = 100  
Washington state, 2006 through 2010  
Source: Employment Security Department/LMEA, Unemployment Insurance Wage File; U.S. Department of Labor, Bureau of Labor Statistics, Quarterly Census of Employment and Wages



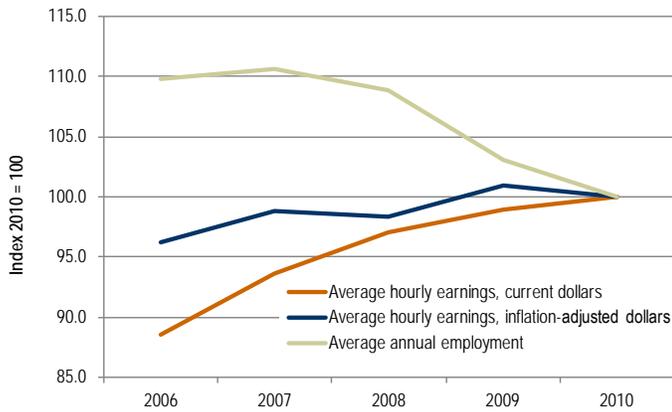
*Average hourly earnings of potato workers show a steady increase.*

### Nurseries and floriculture

Average annual employment has decreased over the period 2006 through 2010, as shown in *Figure 5-14*. Average hourly before-tax earnings in current and inflation-adjusted dollars show a gradual increase during this period.

**Figure 5-14.** Index of average annual employment and average before-tax hourly earnings for nursery and floriculture workers, in current and inflation-adjusted dollars, CPI-W 2010 = 100 Washington state, 2006 through 2010

Source: Employment Security Department/LMEA, Unemployment Insurance Wage File; U.S. Department of Labor, Bureau of Labor Statistics, Quarterly Census of Employment and Wages



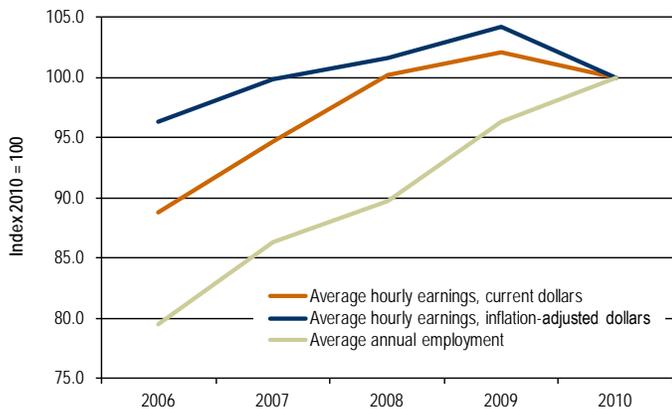
*Inflation-adjusted average hourly earnings increased over from 2008 through 2010.*

## Hay

Figure 5-15 reveals that average annual employment of covered hay workers increased from 2006 through 2010. In current and inflation-adjusted dollar terms, average hourly before-tax earnings increased from 2006 through 2009.

**Figure 5-15.** Index of average annual employment and average before-tax hourly earnings for hay workers, in current and inflation-adjusted dollars, CPI-W 2010 = 100 Washington state, 2006 through 2010

Source: Employment Security Department/LMEA, Unemployment Insurance Wage File; U.S. Department of Labor, Bureau of Labor Statistics, Quarterly Census of Employment and Wages



*Average hourly earnings for hay peaked in 2009.*

## Summary

Over the time period from 2006 through 2010, wheat, vegetables except potatoes, potatoes, nurseries and floriculture, and hay have each fared somewhat differently in terms of number of establishments operating, number of workers employed, average annual hours worked per worker and current and inflation-adjusted average hourly before-tax earnings:

- Number of firms/establishments:
  - Wheat – The annual number of producing establishments has shown a downward trend with 893 establishments operating in 2006 compared to 827 in 2010.
  - Vegetables (except potatoes) – The number of establishments shows a slight downward trend over the five-year period, starting at 248 establishments in 2006 and ending with 228 in 2010.
  - Potatoes – The number of establishments held steady over the five-year period, starting at 115 establishments in 2006 and ending with 115 in 2010.
  - Nurseries and floriculture – The number of establishments shows a downward trend over the five-year period, starting at 351 establishments in 2006 and ending with 331 in 2010.
  - Hay – The number of establishments shows an upward trend over the five-year period, starting at 306 establishments in 2006 and ending with 323 in 2010.
- Number of workers employed:
  - For all industries combined, the general picture is one of a small decline in employment since 2007.
- Current and inflation-adjusted average hourly before-tax earnings:
  - For all crops reported, there is a slow upward trend in inflation-adjusted hourly earnings, with wheat and potato workers showing the largest increases.



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# Appendices

## Appendix Figure 1-1. Value of agricultural production and government payments, in \$1,000s, current dollars

Washington state, 2001 through 2010

Source: U.S. Department of Agriculture, National Agricultural Statistics Service, 2011 Washington Annual Agriculture Bulletin, page 3

Year	Field crops	Fruits and nuts	Commercial vegetables	Berry crops	Total crops	Specialty products <sup>1</sup>	Livestock and products	Total value of production	Government payments	Total value <sup>2</sup>
2001	\$1,750,181	\$1,315,186	\$310,235	\$61,534	\$3,437,136	\$389,386	\$1,604,115	\$5,430,637	\$299,021	\$5,729,658
2002	\$1,798,986	\$1,450,719	\$361,775	\$62,378	\$3,673,858	\$400,334	\$1,396,461	\$5,470,653	\$215,912	\$5,686,565
2003	\$1,732,339	\$1,467,682	\$322,026	\$66,164	\$3,588,211	\$408,751	\$1,449,091	\$5,446,053	\$265,398	\$5,711,451
2004	\$1,814,623	\$1,265,784	\$264,957	\$77,620	\$3,422,984	\$424,951	\$1,678,175	\$5,526,110	\$196,974	\$5,723,084
2005	\$1,797,042	\$1,671,172	\$339,939	\$76,238	\$3,884,391	\$418,912	\$1,749,286	\$6,052,589	\$239,909	\$6,292,498
2006	\$2,067,154	\$2,012,920	\$495,204	\$68,104	\$4,643,382	\$402,676	\$1,560,454	\$6,606,512	\$196,466	\$6,802,978
2007	\$2,810,960	\$2,486,567	\$328,123	\$97,159	\$5,722,809	\$420,962	\$2,021,377	\$8,165,148	\$185,104	\$8,350,252
2008	\$2,795,746	\$1,976,392	\$473,862	\$153,244	\$5,399,244	\$423,423	\$1,914,244	\$7,736,891	\$200,928	\$7,937,819
2009	\$2,510,918	\$2,032,781	\$563,791	\$106,898	\$5,214,388	\$380,191	\$1,519,260	\$7,113,839	\$189,356	\$7,303,195
2010	\$2,830,592	\$2,231,625	\$483,443	\$120,237	\$5,665,897	\$371,421	\$1,897,165	\$7,934,483	\$314,685	\$8,249,168

<sup>1</sup>Includes forest products, Christmas trees, floriculture, nursery and other horticultural products, and agaricus and other (shitake, oyster, etc.) mushrooms.

<sup>2</sup>Includes government payments.

**Appendix Figure 1-2.** Value added to the U.S. economy by the agricultural sector via the production of goods and services, current dollars, in \$1,000s<sup>1</sup>

Washington state, 2001 through 2010

Source: U.S. Department of Agriculture, Economic Research Service, Data Sets, Farm Income

<b>Cash receipts:</b>	<b>2001</b>	<b>2002</b>	<b>2003</b>	<b>2004</b>	<b>2005</b>	<b>2006</b>	<b>2007</b>	<b>2008</b>	<b>2009</b>	<b>2010</b>
Crops (final crop output)	\$3,401,646	\$3,765,788	\$4,007,189	\$4,017,751	\$4,110,705	\$4,556,694	\$5,199,102	\$5,949,781	\$5,008,521	\$5,460,314
Livestock (final animal output)	\$1,711,091	\$1,526,930	\$1,540,989	\$1,733,329	\$1,832,722	\$1,622,952	\$2,173,913	\$2,022,017	\$1,645,965	\$1,988,056
Machine hire and custom work	\$59,205	\$57,605	\$88,552	\$47,249	\$30,360	\$66,988	\$104,969	\$49,474	\$76,174	\$50,717
Forest products sold	\$25,000	\$25,000	\$120,000	\$140,000	\$25,000	\$30,000	\$30,000	\$30,000	\$15,000	\$8,000
Other farm income	\$210,224	\$131,077	\$185,718	\$176,407	\$195,107	\$235,929	\$238,174	\$278,693	\$413,239	\$271,111
Gross imputed rental value of farm dwellings	\$254,640	\$269,218	\$279,284	\$293,063	\$292,184	\$305,631	\$335,750	\$349,008	\$343,350	\$373,995
<b>Final agricultural-sector output</b>	<b>\$5,661,806</b>	<b>\$5,775,619</b>	<b>\$6,221,732</b>	<b>\$6,407,799</b>	<b>\$6,486,078</b>	<b>\$6,815,972</b>	<b>\$8,082,908</b>	<b>\$8,678,973</b>	<b>\$7,502,249</b>	<b>\$8,152,193</b>
<b>Less: intermediate consumption outlays:</b>										
Farm origin	\$814,805	\$834,937	\$769,987	\$698,188	\$824,754	\$852,575	\$898,640	\$1,064,915	\$920,630	\$1,059,857
Manufactured inputs	\$759,829	\$685,737	\$647,287	\$787,766	\$911,298	\$983,331	\$1,088,864	\$1,119,920	\$1,107,852	\$1,149,986
<b>Other intermediate expenses:</b>										
Repair and maintenance of capital items	\$271,690	\$265,167	\$223,369	\$279,137	\$235,862	\$339,013	\$376,900	\$301,010	\$420,897	\$363,509
Machine hire and custom work	\$102,441	\$177,527	\$98,740	\$85,189	\$92,679	\$84,463	\$78,153	\$79,399	\$92,031	\$79,954
Marketing, storage and transportation expense	\$423,538	\$379,833	\$483,963	\$421,559	\$623,857	\$624,789	\$913,178	\$1,104,879	\$829,086	\$723,693
Contract labor	\$54,892	\$47,585	\$40,285	\$34,207	\$23,828	\$25,094	\$44,243	\$26,135	\$40,128	\$34,793
Miscellaneous expenses	\$549,968	\$549,776	\$457,699	\$523,096	\$643,454	\$646,439	\$575,046	\$801,555	\$617,674	\$598,416
<b>Total intermediate consumption outlays</b>	<b>\$2,977,163</b>	<b>\$2,940,562</b>	<b>\$2,721,330</b>	<b>\$2,829,142</b>	<b>\$3,355,732</b>	<b>\$3,555,704</b>	<b>\$3,975,024</b>	<b>\$4,497,183</b>	<b>\$4,028,028</b>	<b>\$4,010,208</b>
<b>Government transactions:</b>										
Plus direct government payments	\$299,021	\$215,912	\$265,398	\$196,974	\$239,909	\$196,466	\$185,104	\$200,928	\$189,356	\$314,685
Less motor vehicle registration and license fees	\$19,416	\$13,105	\$10,812	\$11,001	\$7,711	\$12,206	\$11,171	\$11,575	\$13,619	\$11,963
Less property taxes	\$165,226	\$142,699	\$160,000	\$170,000	\$190,000	\$230,000	\$240,000	\$320,000	\$240,000	\$250,000
Gross value added	\$2,799,021	\$2,895,164	\$3,594,989	\$3,594,630	\$3,172,544	\$3,214,528	\$4,041,817	\$4,051,143	\$3,409,958	\$4,194,707
Less: capital consumption	\$408,174	\$413,478	\$414,986	\$438,397	\$463,078	\$475,135	\$501,427	\$537,697	\$563,003	\$573,258
Net value added	\$2,390,847	\$2,481,686	\$3,180,003	\$3,156,233	\$2,709,466	\$2,741,615	\$3,540,390	\$3,513,466	\$2,846,955	\$3,621,449
<b>Less factor payments:</b>										
Employee compensation (total hired labor)	\$1,134,115	\$1,073,301	\$1,117,324	\$1,076,391	\$1,252,389	\$1,234,424	\$1,232,587	\$1,529,941	\$1,503,417	\$1,384,935
Net rent received by nonoperating landlords	\$170,956	\$189,460	\$145,412	\$170,790	\$141,960	\$91,623	\$131,475	\$159,822	\$103,029	\$222,297
Real estate and non-real estate interest	\$260,571	\$246,452	\$211,253	\$204,306	\$240,877	\$274,690	\$287,062	\$291,898	\$287,149	\$273,270
Net farm income	\$825,205	\$972,473	\$1,705,704	\$1,704,746	\$1,074,240	\$1,140,878	\$1,889,266	\$1,531,785	\$953,360	\$1,740,947

<sup>1</sup>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. Many of the values in this exhibit change when different editions of this annual report are compared. These changes represent edits to values calculated for previous years.

**Appendix Figure 1-3.** Price indices, Consumer Price Index for urban wage earners and clerical workers, seasonally adjusted, CPI-W 1982-1984 = 100, and prices received by farmers, all farm products, 1990 to 1992 = 100  
United States, 2001 through 2010

Source: U.S. Bureau of Labor Statistics, Consumer Price Index; U.S. Department of Agriculture, National Agricultural Statistics Service

Year	CPI-W		All farm products	
	1982 to 1984 = 100	2010 = 100	1990 to 1992 = 100	2010 = 100
2010	212.57	100	145	100
2009	205.7	96.77	131	90.34
2008	206.74	97.26	149	102.76
2007	197.56	92.94	136	93.79
2006	194	91.26	115	79.31
2005	186.3	87.64	114	78.62
2004	180.9	85.1	119	82.07
2003	177.7	83.6	106	73.1
2002	173.2	81.48	98	67.59
2001	171.7	80.77	102	70.34

**Appendix Figure 2-1.** Total agricultural employment\* (number of jobs) by month and annual average, statewide, by county, Metropolitan Division (MD), and Metropolitan Statistical Area (MSA)

Washington state, 2011 (benchmark: September 2011)

Source: Employment Security Department/LMEA; U.S. Department of Labor, Bureau of Labor Statistics, Local Area Unemployment Statistics

Area	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Average
<b>Washington</b>	<b>70,750</b>	<b>77,440</b>	<b>81,160</b>	<b>86,120</b>	<b>88,220</b>	<b>108,580</b>	<b>153,180</b>	<b>129,660</b>	<b>127,410</b>	<b>120,920</b>	<b>80,820</b>	<b>68,870</b>	<b>99,430</b>
Bellingham MSA	2,500	2,830	3,070	3,050	3,210	3,530	5,340	6,550	4,570	2,950	2,630	2,580	3,570
Bremerton MSA	320	350	380	420	440	470	450	420	390	390	370	340	400
Olympia MSA	1,320	1,380	1,430	1,540	1,650	1,750	1,750	1,730	1,620	1,470	1,400	1,390	1,540
Kennewick-Pasco-Richland MSA	7,990	8,780	9,170	9,860	10,610	14,300	18,500	14,310	14,960	14,230	10,380	7,790	11,740
Seattle-Bellevue-Everett MD	2,730	2,890	3,030	3,560	3,790	3,970	4,270	4,200	3,860	3,830	3,320	3,070	3,540
Spokane MSA	1,140	1,320	1,480	1,620	1,770	1,850	1,880	1,730	1,690	1,500	1,280	1,180	1,540
Tacoma MD	1,150	1,240	1,460	1,370	1,390	1,440	1,550	1,470	1,370	1,220	1,020	1,060	1,310
Wenatchee MSA	9,000	9,770	9,700	9,730	9,220	13,080	24,380	19,590	17,170	16,230	9,420	8,220	12,960
Yakima MSA	18,870	20,910	20,870	21,160	22,280	27,590	42,210	33,020	35,210	33,920	19,760	17,580	26,110
Adams	1,190	1,380	1,580	2,060	1,900	2,360	2,890	2,840	2,820	2,590	1,370	1,230	2,020
Asotin	120	140	150	170	180	180	190	170	160	150	140	130	160
Clallam	270	290	320	340	360	390	450	430	390	320	300	280	340
Clark	990	1,090	1,210	1,260	1,420	1,740	1,950	1,680	1,360	1,140	1,060	1,030	1,330
Columbia	210	230	240	260	280	290	330	390	340	270	210	200	270
Cowlitz	370	430	460	580	600	550	910	830	640	390	360	360	540
Ferry	80	90	100	110	130	130	140	120	120	100	90	80	110
Garfield	120	140	150	150	170	190	190	220	200	170	140	130	160
Grant	6,780	7,370	7,700	8,870	8,710	10,920	13,550	11,320	13,230	13,010	8,410	6,460	9,690
Grays Harbor	400	510	590	550	580	620	610	550	510	510	420	400	520
Island	280	300	320	340	370	380	370	360	370	310	290	290	330
Jefferson	120	130	140	150	170	200	200	180	160	130	130	120	150
Kittitas	840	970	1,070	1,830	1,120	1,300	1,430	1,430	1,380	1,480	1,180	690	1,230
Klickitat	1,140	1,340	1,410	1,570	1,610	2,020	2,890	2,360	2,190	1,950	1,270	1,220	1,750
Lewis	950	1,030	1,130	1,210	1,290	1,340	1,380	1,530	1,380	1,190	1,130	1,000	1,210
Lincoln	580	630	680	650	700	740	780	900	810	710	630	610	700
Mason	340	370	390	400	430	450	460	460	420	610	590	550	460
Okanogan	3,750	3,840	4,130	4,580	4,900	5,870	11,280	9,560	8,690	9,000	4,280	3,720	6,130
Pacific	290	310	320	360	380	400	420	400	370	370	310	280	350
Pend Oreille	110	130	140	150	160	170	170	160	150	130	120	110	140
San Juan	140	140	160	180	190	200	200	190	180	170	140	130	170
Skagit	2,400	2,600	3,100	3,100	3,050	3,000	4,000	3,990	3,730	3,560	2,640	2,420	3,130
Skamania	80	90	100	110	120	110	130	130	130	100	70	50	100
Stevens	480	540	610	690	760	810	820	750	690	590	540	500	650
Wahkiakum	50	50	60	60	60	70	70	60	60	50	50	50	60
Walla Walla	2,790	2,910	3,310	3,060	3,100	5,000	5,800	4,310	4,710	5,150	4,520	2,750	3,950
Whitman	830	910	1,000	1,010	1,100	1,170	1,240	1,310	1,370	1,030	890	850	1,060

\*Total agricultural employment includes covered and non-covered employment, not adjusted for multiple jobholders.

**Appendix Figure 2-2.** Employment of covered seasonal agricultural workers by crop and agricultural reporting areas Washington state, 2011

Source: Employment Security Department/LMEA, Agricultural Labor Employment and Wages Survey

Activity	Washington State												
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Average
<b>State totals,** all activities</b>	<b>17,845</b>	<b>20,689</b>	<b>21,176</b>	<b>23,984</b>	<b>24,719</b>	<b>43,323</b>	<b>86,026</b>	<b>66,002</b>	<b>64,605</b>	<b>66,519</b>	<b>33,144</b>	<b>15,356</b>	<b>40,282</b>
Apples, total	10,653	10,908	9,420	9,269	11,363	18,244	23,618	23,890	37,767	47,793	23,707	9,325	19,663
Apple pruning	9,593	9,544	6,694	2,879	2,187	603	510	1,158	219	0	245	4,841	3,206
Apple thinning	121	139	548	1,460	4,016	14,240	19,798	14,211	673	0	0	231	4,620
Apple harvester	0	0	0	0	0	89	317	4,716	32,053	43,892	16,235	284	8,132
Apple sort, grade, pack	342	473	335	76	49	0	0	657	1,577	1,500	1,273	1,591	656
Other apple activities	597	752	1,843	4,854	5,111	3,312	2,993	3,148	3,245	2,401	5,954	2,378	3,049
Cherries, total	1,931	1,741	2,179	2,278	807	9,537	40,626	18,820	678	109	489	1,025	6,685
Cherry pruning	1,847	1,457	1,137	556	171	85	*	27	64	0	134	720	518
Cherry harvester	0	0	0	0	0	6,041	31,331	13,917	393	37	0	0	4,310
Other cherry activities	84	284	1,042	1,722	636	3,411	9,282	4,876	221	72	355	305	1,858
Pears, total	964	952	489	443	362	1,117	644	1,818	7,400	3,652	229	648	1,560
Pear pruning	830	687	386	229	82	92	91	38	97	0	47	371	246
Pear thinning	0	0	0	0	*	805	417	240	39	0	*	0	127
Pear harvester	0	0	0	0	0	0	44	1,222	6,643	3,387	71	0	947
Other pear activities	134	265	103	214	268	220	92	318	621	265	105	277	240
Other tree fruit workers	217	232	180	271	451	119	589	914	1,001	611	0	0	382
Grape workers	615	2,014	2,018	2,193	1,591	2,225	2,968	2,077	1,257	1,289	1,006	299	1,629
Blueberry workers	455	447	418	364	453	462	22	2,315	2,100	968	401	301	726
Raspberry workers	146	526	267	211	151	845	2,318	2,852	610	743	487	866	835
Strawberry workers	*	*	*	98	88	125	2,890	629	29	116	0	0	335
Bulb workers <sup>1</sup>	0	0	0	0	0	0	0	0	0	0	0	0	0
Hop workers	217	555	941	1,081	310	797	936	835	2,384	1,143	697	231	844
Nursery workers	390	623	1,508	1,822	1,723	1,331	1,134	1,082	579	281	709	423	967
Wheat/grain workers	86	50	124	132	417	364	633	1,550	969	405	132	103	414
Asparagus workers	21	0	142	510	1,598	1,382	154	27	42	*	*	0	323
Cucumber workers	0	0	0	0	*	25	0	149	222	115	0	0	43
Onion workers	430	451	364	605	722	979	893	669	2,458	1,559	735	109	831
Potato workers	803	890	1,347	1,754	1,315	1,469	1,055	1,894	2,656	3,855	1,238	644	1,577
Miscellaneous vegetable workers	92	162	222	287	649	539	1,002	1,597	1,083	927	1,319	253	678
Other seasonal workers	813	1,121	1,546	2,666	2,710	3,763	6,544	4,884	3,370	2,951	1,992	1,129	2,791

<sup>1</sup>The 2007 conversion from SIC to NAICS industry codes placed bulb growers into the nursery sector.

\*Monthly and annual estimates that are less than 20 workers are not reported due to insufficient information.

\*\*Totals do not add up to sum of detail breakouts due to screening out of monthly and annual estimates to ensure employer confidentiality.

**Appendix Figure 2-2. (continued)**

Activity	Western Area 1												
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Average
<b>Total**</b>	<b>1,669</b>	<b>1,986</b>	<b>2,782</b>	<b>2,727</b>	<b>2,660</b>	<b>2,679</b>	<b>7,906</b>	<b>7,433</b>	<b>4,909</b>	<b>4,736</b>	<b>2,268</b>	<b>1,885</b>	<b>3,596</b>
Blueberry workers	294	346	336	131	82	188	105	2,556	1,660	1,023	392	224	590
Raspberry workers	454	324	427	411	360	491	3,418	1,786	237	492	679	733	803
Strawberry workers	0	0	*	*	63	215	1,739	*	*	0	0	0	180
Bulb workers <sup>1</sup>	0	0	0	*	22	28	*	47	33	*	0	0	*
Cucumber workers	0	0	0	0	0	*	*	219	153	83	0	0	39
Potato workers	359	292	312	118	144	65	50	83	94	418	267	175	185
Miscellaneous vegetable workers	101	189	229	337	376	386	739	942	917	1,123	396	248	495
Nursery workers	266	549	1,228	1,129	970	741	803	624	532	250	195	374	641
Rhubarb workers	46	68	*	36	127	64	117	74	41	0	0	0	49
Other seasonal workers	149	218	235	550	516	491	898	1,089	1,239	1,331	339	129	599

<sup>1</sup>The 2007 conversion from SIC to NAICS industry codes placed bulb growers into the nursery sector.

\*Monthly and annual estimates that are less than 20 workers are not reported due to insufficient information.

\*\*Totals do not add up to sum of detail breakouts due to screening out of monthly and annual estimates to ensure employer confidentiality.

## Appendix Figure 2-2. (continued)

Activity	South Central Area 2												
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Average
<b>Total**</b>	<b>6,026</b>	<b>6,479</b>	<b>6,232</b>	<b>6,839</b>	<b>7,739</b>	<b>15,159</b>	<b>24,482</b>	<b>16,955</b>	<b>19,107</b>	<b>19,117</b>	<b>10,747</b>	<b>3,529</b>	<b>11,943</b>
Apples, total	4,299	3,921	3,018	3,015	2,411	6,571	6,678	6,631	13,948	15,976	9,384	2,662	6,466
Apple pruning	3,924	3,239	2,512	839	673	60	0	53	0	0	136	1,496	956
Apple thinning	0	0	0	664	736	5,791	5,727	5,216	0	0	0	181	1,655
Apple harvester	0	0	0	0	0	0	0	958	13,193	15,005	7,101	0	2,954
Apple sort, grade, pack	199	218	66	97	180	245	0	0	501	633	1,218	525	312
Other apple activities	177	463	440	1,415	822	476	951	405	254	338	929	460	589
Cherries, total	232	352	197	273	1,011	4,640	12,856	1,523	26	29	99	65	1,903
Cherry pruning	171	208	180	71	37	*	0	0	0	0	*	31	54
Cherry harvester	0	0	0	0	0	1,844	6,884	825	0	*	0	0	849
Other cherry activity	61	145	*	202	974	2,790	5,972	697	26	23	82	33	1,000
Pears, total	315	283	172	96	149	306	133	2,798	841	641	134	124	484
Pear pruning	315	237	172	29	34	*	0	0	0	0	134	124	78
Pear thinning	0	*	0	45	80	249	109	21	0	0	0	0	50
Pear harvester	0	0	0	0	0	0	23	2,594	841	641	0	0	329
Other pear activities	0	32	0	23	34	45	0	184	0	0	0	0	27
Other tree fruit, total	0	0	4	69	51	94	655	1,614	134	127	0	0	225
Other tree fruit pruner	0	0	0	69	0	0	0	0	0	0	0	0	*
Other tree fruit harvester	0	0	0	0	0	22	584	1,429	131	127	0	0	186
Other tree fruit activities	0	0	*	0	51	72	71	185	*	0	0	0	34
Grapes, total	347	1,087	1,141	821	646	456	917	750	894	479	119	124	635
Grape pruning	212	1,071	992	168	*	0	0	0	0	0	0	31	183
Grape harvester	0	0	0	0	0	0	158	61	729	365	52	24	116
Other grape activity	135	*	148	653	634	456	760	689	165	114	68	69	336
Asparagus workers	0	0	59	261	833	668	60	*	0	0	0	0	183
Hops, total	82	300	833	766	1,163	877	835	851	1,941	539	695	180	776
Hop twining and training	0	0	87	370	70	357	0	0	0	58	0	0	86
Hop harvester	0	0	0	0	0	0	0	431	1,867	0	0	0	197
Other hop activity	82	300	746	397	1,093	520	835	420	74	481	695	180	493
Onion workers	0	77	136	163	161	107	216	413	215	63	0	0	130
Potato workers	0	40	36	113	86	92	456	738	0	93	0	0	137
Miscellaneous vegetable workers	43	194	95	220	235	372	839	186	215	528	0	*	250
Other seasonal workers	707	225	542	1,041	993	976	837	1,435	893	641	316	359	754

\*Monthly and annual estimates that are less than 20 workers are not reported due to insufficient information.

\*\*Totals do not add up to sum of detail breakouts due to screening out of monthly and annual estimates to ensure employer confidentiality.

**Appendix Figure 2-2. (continued)**

Activity	North Central Area 3												
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Average
<b>Total**</b>	<b>3,282</b>	<b>3,866</b>	<b>3,896</b>	<b>4,379</b>	<b>4,031</b>	<b>8,949</b>	<b>27,235</b>	<b>21,318</b>	<b>17,299</b>	<b>17,484</b>	<b>7,908</b>	<b>4,403</b>	<b>10,290</b>
Apples, total	2,038	2,445	2,473	3,394	2,419	4,355	3,005	4,357	13,667	16,098	6,250	3,297	5,237
Apple pruning	1,265	1,817	1,695	1,365	588	*	0	59	92	84	895	1,789	727
Apple thinning	*	*	0	40	628	3,353	2,232	1,681	684	*	0	0	806
Apple harvester	0	0	0	0	0	27	250	640	12,161	15,472	4,142	229	2,677
Apple sort, grade, pack	621	602	279	141	138	*	295	0	515	0	542	976	312
Other apple activities	148	17	499	1,848	1,065	969	227	1,977	215	538	671	302	715
Cherries, total	500	643	557	376	774	2,392	21,027	15,243	987	326	630	434	3,664
Cherry pruning	464	638	501	203	284	32	0	0	0	0	475	288	221
Cherry harvester	0	0	0	0	0	1,091	19,290	14,756	622	0	0	0	2,974
Other cherry activity	36	*	55	173	491	1,268	1,737	487	365	326	155	146	469
Pears, total	445	361	296	156	269	652	483	580	2,097	588	430	529	574
Pear pruning	435	314	249	152	22	*	35	0	0	30	330	256	137
Pear thinning	0	46	43	0	214	615	256	36	0	0	0	0	118
Pear harvester	0	0	0	0	0	0	0	336	1,831	512	100	0	234
Other pear activities	*	0	*	*	32	24	192	207	267	46	0	273	85
Other tree fruit workers	0	*	*	0	37	46	119	92	0	0	0	0	27
Other seasonal workers	299	414	565	453	532	1,505	2,601	1,047	548	472	598	144	789

\*Monthly and annual estimates that are less than 20 workers are not reported due to insufficient information.

\*\*Totals do not add up to sum of detail breakouts due to screening out of monthly and annual estimates to ensure employer confidentiality.

**Appendix Figure 2-2. (continued)**

Activity	Columbia Basin Area 4												
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Average
<b>Total**</b>	<b>2,922</b>	<b>3,834</b>	<b>3,352</b>	<b>5,259</b>	<b>4,736</b>	<b>6,991</b>	<b>11,151</b>	<b>9,870</b>	<b>12,104</b>	<b>12,468</b>	<b>6,208</b>	<b>3,398</b>	<b>6,832</b>
Apple pruning	2,013	2,150	1,541	768	241	0	0	606	24	0	77	1,487	654
Apple thinning	0	0	0	978	583	3,941	3,015	2,974	0	0	0	0	1,048
Apple harvester	0	0	0	0	0	0	0	598	8,981	8,869	3,767	51	1,821
Other apple activities	61	34	225	1,035	1,413	241	488	1,135	618	757	654	812	619
Cherries, total	132	150	60	162	228	1,066	4,891	1,713	51	83	129	305	766
Cherry harvester	0	0	0	0	0	985	4,474	1,535	0	0	0	0	607
Other cherry activity	0	0	25	156	228	81	417	31	0	0	129	29	95
Pear workers	0	0	0	0	0	22	0	0	*	*	0	0	*
Mint workers	0	0	0	0	0	0	519	132	*	148	0	0	67
Asparagus workers	0	0	0	175	222	196	0	0	0	0	0	0	56
Potatoes, total	236	404	64	513	302	187	139	103	545	768	200	351	306
Potato sort, grade, pack	47	75	20	333	235	154	66	56	250	409	0	294	159
Miscellaneous vegetable workers	0	*	37	*	94	39	294	183	394	458	*	0	127
Other seasonal workers	282	836	1,123	995	1,155	624	1,086	1,481	949	1,019	806	291	877

\*Monthly and annual estimates that are less than 20 workers are not reported due to insufficient information.

\*\*Totals do not add up to sum of detail breakouts due to screening out of monthly and annual estimates to ensure employer confidentiality.

Appendix Figure 2-2. (continued)

Activity	South Eastern Area 5												Average
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
<b>Total**</b>	<b>3,756</b>	<b>4,364</b>	<b>4,773</b>	<b>4,587</b>	<b>5,317</b>	<b>9,186</b>	<b>14,527</b>	<b>9,420</b>	<b>10,401</b>	<b>12,169</b>	<b>5,870</b>	<b>2,017</b>	<b>7,237</b>
Apples, total	1,995	2,482	2,440	2,296	2,529	1,838	4,972	3,736	6,811	9,331	5,003	1,356	3,652
Apple thinning	0	0	0	876	1,408	1,277	4,639	2,311	401	0	0	0	953
Other apple activities	352	173	541	891	789	560	333	898	497	50	383	827	520
Cherries, total	842	209	274	104	224	5,066	4,650	133	*	0	0	108	1,085
Cherry pruning	842	204	215	58	63	*	0	*	0	0	0	44	107
Cherry harvester	0	0	0	0	0	4,815	4,635	0	0	0	0	0	912
Other cherry activity	0	5	59	46	162	242	*	129	*	0	0	65	67
Other tree fruit workers	*	0	*	92	121	104	0	108	0	0	0	0	40
Grape workers	262	866	1,096	863	470	504	828	435	499	1,059	306	187	600
Asparagus workers	0	0	0	54	520	392	23	40	0	0	0	0	101
Hop workers	0	0	0	91	60	87	0	0	0	0	0	0	22
Onion workers	188	211	159	343	449	384	475	775	681	277	225	74	357
Potatoes, total	195	*	278	424	317	319	64	603	816	1,008	134	139	357
Potato harvester	0	0	0	0	0	0	0	168	190	292	91	51	63
Potato sort, grade, pack	190	0	208	331	267	270	0	314	*	*	0	84	144
Other potato activities	*	*	70	93	51	49	64	121	615	703	43	*	151
Miscellaneous vegetable workers	*	*	20	61	109	23	378	1,188	283	34	0	*	174
Wheat/grain workers	0	*	91	70	68	56	114	323	137	51	27	40	82
Nursery workers	0	0	0	0	0	0	0	0	41	0	0	0	*
Strawberry workers	0	0	0	0	0	0	0	*	0	0	0	0	*
Other seasonal workers	261	570	412	188	449	413	3,023	2,064	1,126	409	175	108	763
Strawberry workers	0	*	0	0	0	0	0	0	0	0	0	0	*
Other seasonal workers	269	180	230	265	336	523	2,512	862	472	227	152	100	497

\*Monthly and annual estimates that are less than 20 workers are not reported due to insufficient information.

\*\*Totals do not add up to sum of detail breakouts due to screening out of monthly and annual estimates to ensure employer confidentiality.

Activity	Eastern Area 6												Average
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
<b>Total**</b>	<b>190</b>	<b>160</b>	<b>141</b>	<b>195</b>	<b>237</b>	<b>360</b>	<b>725</b>	<b>1,006</b>	<b>785</b>	<b>545</b>	<b>143</b>	<b>124</b>	<b>384</b>
Wheat/grain, total	29	26	26	64	92	126	190	646	320	220	95	58	157
Wheat/grain harvester	0	0	0	0	0	32	30	343	184	48	*	*	54
Wheat/grain equipment operator	0	0	0	37	39	*	*	219	84	68	39	26	45
Other wheat/grain activity	29	26	26	27	52	79	141	84	52	105	48	26	58
Nursery workers	30	31	*	78	61	*	32	*	*	*	*	24	27
Other seasonal workers	131	103	106	53	84	217	503	339	453	318	37	42	200

\*Monthly and annual estimates that are less than 20 workers are not reported due to insufficient information.

\*\*Totals do not add up to sum of detail breakouts due to screening out of monthly and annual estimates to ensure employer confidentiality.

**Appendix Figure 2-3.** Average hourly before-tax earnings, apples, cherries and pears, current and inflation-adjusted dollars, CPI-W 2010 = 100  
 Washington state, 2000 through 2011  
 Source: Employment Security Department/LMEA, Unemployment Insurance Wage File

Year	Apples, current dollars	Apples, inflation-adjusted dollars	Cherries, current dollars	Cherries, inflation-adjusted dollars	Pears, current dollars	Pears, inflation-adjusted dollars
2000	\$9.73	\$12.33	\$10.97	\$13.90	\$8.96	\$11.35
2001	\$9.64	\$11.89	\$9.85	\$12.15	\$9.37	\$11.56
2002	\$9.83	\$11.96	\$10.79	\$13.13	\$9.47	\$11.52
2003	\$9.75	\$11.60	\$11.58	\$13.78	\$9.99	\$11.89
2004	\$10.06	\$11.67	\$11.33	\$13.14	\$9.83	\$11.40
2005	\$10.31	\$11.55	\$11.68	\$13.08	\$10.49	\$11.75
2006	\$11.42	\$12.40	\$14.32	\$15.55	\$11.02	\$11.96
2007	\$12.22	\$12.90	\$16.88	\$17.81	\$14.27	\$15.06
2008	\$12.19	\$12.36	\$16.48	\$16.71	\$13.45	\$13.64
2009	\$12.14	\$12.39	\$16.07	\$16.40	\$12.47	\$12.73
2010	\$11.90	\$11.90	\$13.17	\$13.17	\$11.91	\$11.91
2011	\$12.45	\$12.02	\$14.44	\$13.94	\$12.26	\$11.84

**Appendix Figure 2-4.** Change in average hourly before-tax earnings, apples, cherries and pears, current and inflation-adjusted dollars, CPI-W 2010 = 100  
 Washington state, 2001 through 2011  
 Source: Employment Security Department/LMEA, Unemployment Insurance Wage File

Year	Apples, current dollars	Apples, inflation-adjusted dollars	Cherries, current dollars	Cherries, inflation-adjusted dollars	Pears, current dollars	Pears, inflation-adjusted dollars
2001	-0.9%	-3.6%	-10.2%	-12.6%	4.6%	1.8%
2002	2.0%	0.6%	9.5%	8.1%	1.1%	-0.3%
2003	-0.8%	-3.0%	7.3%	5.0%	5.5%	3.2%
2004	3.2%	0.6%	-2.2%	-4.6%	-1.6%	-4.1%
2005	2.5%	-1.0%	3.1%	-0.5%	6.7%	3.1%
2006	10.8%	7.3%	22.6%	18.9%	5.1%	1.8%
2007	7.0%	4.0%	17.9%	14.6%	29.5%	25.9%
2008	-0.2%	-4.1%	-2.4%	-6.1%	-5.7%	-9.4%
2009	-0.4%	0.2%	-2.5%	-1.9%	-7.3%	-6.7%
2010	-2.0%	-4.0%	-18.0%	-19.7%	-4.5%	-6.4%
2011	4.6%	1.0%	9.6%	5.8%	2.9%	-0.6%

**Appendix Figure 2-5.** Average hourly before-tax earnings for apples, cherries and pears contrasted with the state minimum wage, inflation-adjusted dollars, CPI-W 2010 = 100  
 Washington state, 2000 through 2011  
 Source: Employment Security Department/LMEA, Unemployment Insurance Wage File

Year	Minimum wage	Fourth quarter harvest	Third quarter harvest	Third quarter harvest
		Apple average hourly earnings	Cherry average hourly earnings	Pear average hourly earnings
2000	\$10.44	\$12.33	\$13.90	\$11.35
2001	\$10.22	\$11.89	\$12.15	\$11.56
2002	\$10.21	\$11.96	\$13.13	\$11.52
2003	\$9.93	\$11.60	\$13.78	\$11.89
2004	\$9.63	\$11.67	\$13.14	\$11.40
2005	\$9.23	\$11.55	\$13.08	\$11.75
2006	\$8.99	\$12.40	\$15.55	\$11.96
2007	\$8.83	\$12.89	\$17.81	\$15.06
2008	\$8.30	\$12.36	\$16.71	\$13.64
2009	\$8.91	\$12.39	\$16.40	\$12.73
2010	\$8.55	\$11.90	\$13.17	\$11.91
2011	\$8.09	\$12.02	\$13.94	\$11.84

**Appendix Figure 3-1.** Agriculture continued claims for unemployment benefits, by month

Washington state, 2007 through 2011

Source: Employment Security Department/LMEA, Unemployment Insurance Data Warehouse, Continued Claims Table

Month	2007	2008	2009	2010	2011
January	5,494	5,044	5,851	8,127	7,179
February	4,006	4,197	4,462	6,533	5,338
March	3,398	3,131	4,468	5,590	4,993
April	3,447	3,465	3,984	5,544	4,600
May	2,987	3,230	3,755	5,366	4,555
June	2,259	3,202	3,062	4,458	3,960
July	1,760	2,012	2,210	3,259	2,243
August	2,821	3,396	4,840	4,891	3,766
September	1,127	1,637	2,747	2,624	3,232
October	1,479	1,282	3,010	2,438	2,181
November	3,965	4,150	6,465	5,952	5,410
December	4,970	5,672	7,816	7,063	6,278
<b>Monthly average</b>	<b>3,143</b>	<b>3,368</b>	<b>4,389</b>	<b>5,154</b>	<b>4,478</b>

**Appendix Figure 3-2.** Nonfarm continued claims for unemployment benefits, by month

Washington state, 2007 through 2011

Source: Employment Security Department/LMEA, Unemployment Insurance Data Warehouse, Continued Claims Table

Month	2007	2008	2009	2010	2011
January	85,703	89,849	171,486	191,984	144,219
February	73,846	86,655	171,748	173,604	127,292
March	70,304	84,569	188,022	168,366	123,409
April	67,874	77,977	184,829	154,799	115,246
May	56,967	73,064	182,311	141,985	110,937
June	53,476	74,692	177,174	131,723	102,015
July	56,791	72,126	170,993	120,642	100,165
August	51,418	74,081	169,205	116,973	93,341
September	51,392	77,627	157,879	108,591	92,136
October	56,085	89,053	158,101	110,847	98,261
November	64,981	112,982	175,212	121,010	107,625
December	82,568	149,278	182,488	131,802	114,779
<b>Monthly average</b>	<b>64,284</b>	<b>88,496</b>	<b>174,121</b>	<b>139,361</b>	<b>110,785</b>

**Appendix Figure 4-1.** Historical review of Washington state's wine-grape bearing acreage, yield per acre, production, average price per ton, value of utilized production and wine grape utilization

Washington state, 1995 through 2010

Source: U.S. Department of Agriculture, National Agricultural Statistics Service (NASS), Washington Annual Agriculture Bulletin, selected issues, Agricultural Prices, Prices Received by Farmers, Fruits and Nuts

Year	Bearing acreage	Yield per acre in tons	Current dollars	Inflation-adjusted dollars <sup>2</sup>	Current dollars	Inflation-adjusted dollars <sup>2</sup>	Quantity in tons <sup>1</sup>	Current dollars	Inflation-adjusted dollars <sup>2</sup>
1995	-	-	-	-	\$39,240	\$56,048	60,000	\$654	\$934
1996	-	-	-	-	\$33,180	\$46,070	35,000	\$948	\$1,316
1997	13,000	4.77	\$4,636	\$6,294	\$60,264	\$81,818	62,000	\$972	\$1,320
1998	15,000	4.67	\$4,303	\$5,765	\$64,540	\$86,471	70,000	\$922	\$1,235
1999	19,000	3.68	\$3,353	\$4,396	\$63,700	\$83,515	70,000	\$910	\$1,193
2000	24,000	3.75	\$3,371	\$4,270	\$80,910	\$102,499	90,000	\$899	\$1,139
2001	27,000	3.70	\$3,322	\$4,097	\$89,700	\$110,622	100,000	\$897	\$1,106
2002	27,000	4.26	\$3,740	\$4,549	\$100,970	\$122,821	115,000	\$878	\$1,068
2003	27,000	4.15	\$3,816	\$4,541	\$103,040	\$122,620	112,000	\$920	\$1,095
2004	27,000	3.96	\$3,666	\$5,855	\$98,975	\$158,076	107,000	\$925	\$1,477
2005	28,000	3.93	\$3,654	\$4,093	\$102,300	\$114,601	110,000	\$930	\$1,042
2006	31,000	4.07	\$3,832	\$4,160	\$113,040	\$122,714	120,000	\$948	\$1,029
2007	30,500	4.16	\$3,972	\$4,191	\$121,158	\$127,850	127,000	\$954	\$1,007
2008	32,000	4.53	\$4,667	\$4,731	\$149,350	\$151,412	145,000	\$1,030	\$1,044
2009	34,000	4.59	\$4,538	\$4,632	\$154,284	\$157,476	156,000	\$989	\$1,009
2010	35,000	4.57	\$4,754	\$4,754	\$166,400	\$166,400	160,000	\$1,040	\$1,040

<sup>1</sup>Total production and production utilized are the same.

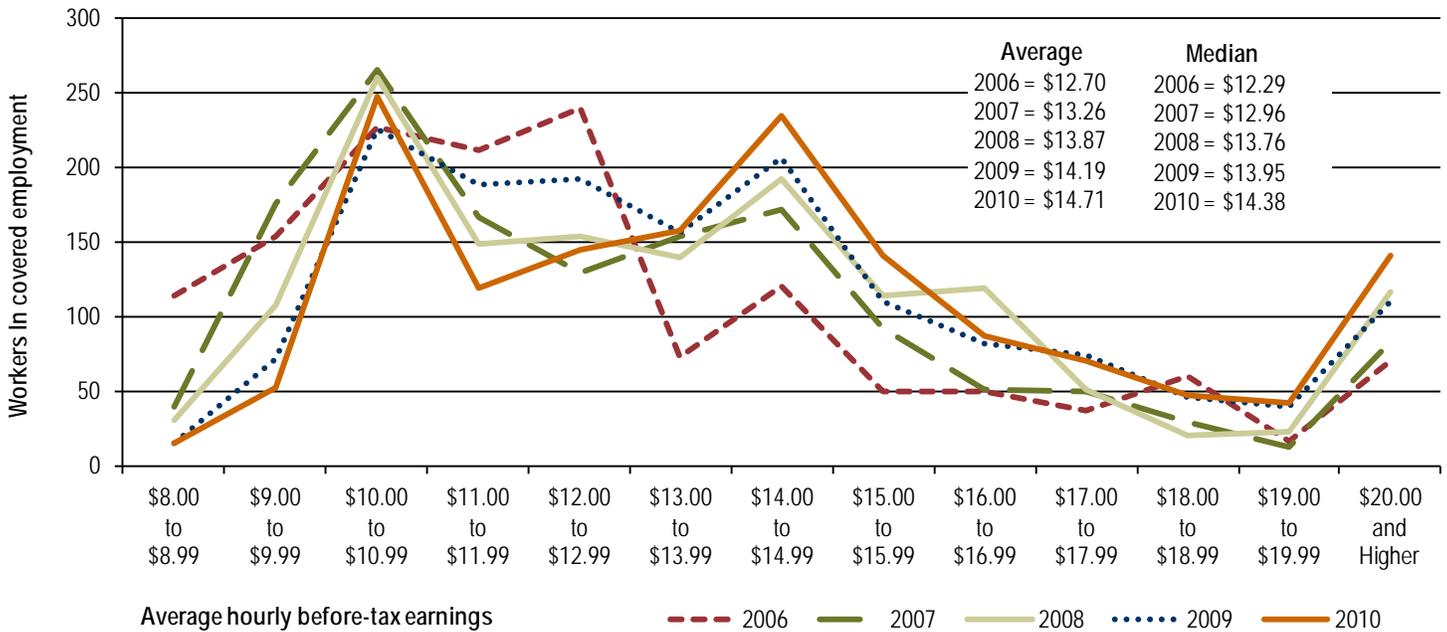
<sup>2</sup>We use the price index for all "Fruits and Nuts" as the best approximation of price change for wine grapes in Washington state.

**Appendix Figure 4-2.** Production, prices and revenues for hop production  
Washington state, 1994 through 2010

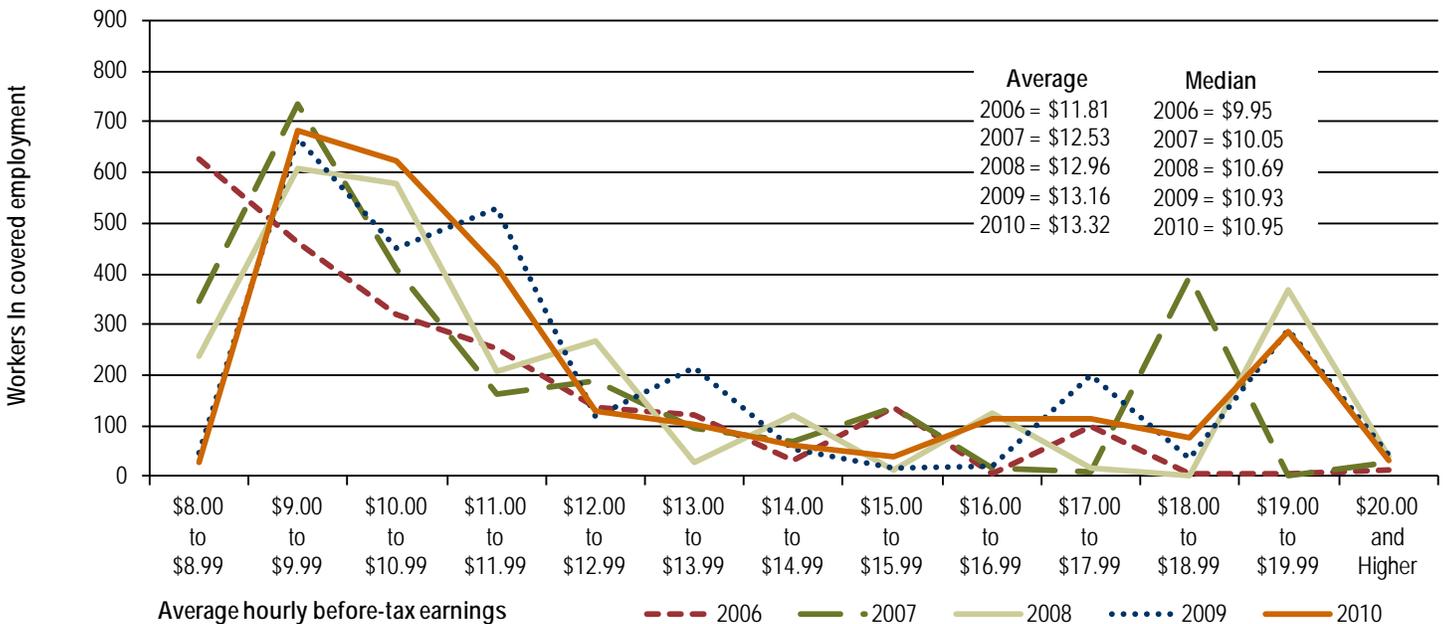
Source: Employment Security Department/LMEA, Agricultural Labor Employment and Wages survey; U.S. Department of Agriculture, National Agricultural Statistics Service, 2011 Washington Annual Agriculture Bulletin and other editions

Year	Average seasonal employment	Harvested acreage	Quantity in 1000's pounds	Price per pound, current dollars	Price per pound, Inflation-adjusted dollars, 2010 = 100	Value of production, current dollars	Value of production, Inflation-adjusted dollars, 2010 = 100	Price index, other crops, 1990 to 1992 = 100	Price index, other crops, 2010 = 100
1994	1,385	30,375	54,675	\$1.77	\$2.60	\$96,775,000	\$142,216,088	154	1.234
1995	1,607	30,621	59,101	\$1.68	\$2.40	\$99,290,000	\$141,820,971	151	1.211
1996	1,624	31,678	57,640	\$1.63	\$2.26	\$93,953,000	\$130,453,177	150	1.200
1997	1,476	31,080	55,816	\$1.60	\$2.17	\$89,306,000	\$121,247,095	147	1.173
1998	831	26,573	44,791	\$1.64	\$2.20	\$73,457,000	\$98,418,129	145	1.158
1999	749	25,076	49,650	\$1.63	\$2.14	\$80,930,000	\$106,105,057	142	1.133
2000	531	26,980	52,260	\$1.81	\$2.29	\$94,591,000	\$119,830,433	139	1.115
2001	670	26,339	50,780	\$1.81	\$2.23	\$91,911,000	\$113,348,230	138	1.105
2002	579	20,333	43,379	\$1.92	\$2.34	\$83,288,000	\$101,312,606	139	1.109
2003	329	19,492	39,951	\$1.79	\$2.13	\$71,513,000	\$85,102,472	134	1.076
2004	310	19,382	41,427	\$1.83	\$2.92	\$75,811,000	\$121,080,022	180	1.444
2005	300	21,013	39,470	\$1.86	\$2.08	\$73,413,000	\$82,240,620	127	1.013
2006	448	21,532	44,313	\$1.98	\$2.15	\$87,740,000	\$95,248,438	126	1.007
2007	336	22,745	46,605	\$2.94	\$3.10	\$137,020,000	\$144,588,437	125	0.996
2008	1,008	30,595	63,393	\$4.08	\$4.14	\$258,642,000	\$262,213,070	125	0.998
2009	957	29,588	74,952	\$3.54	\$3.61	\$263,831,000	\$269,289,400	127	1.013
2010	534	24,366	52,252	\$3.08	\$3.08	\$160,937,000	\$160,937,000	125	1.000

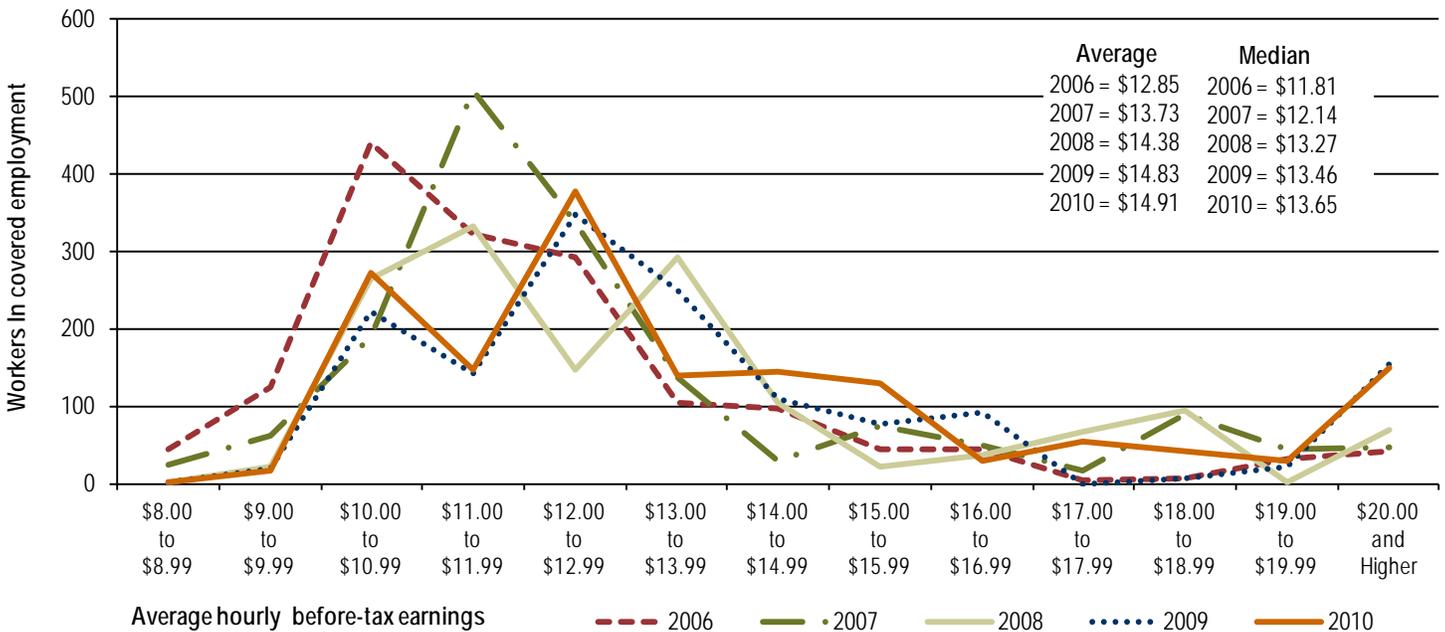
**Appendix Figure 5-1.** Distribution of average hourly before-tax earnings for wheat workers (NAICS 111140), in current dollars  
 Washington state, 2006 through 2010  
 Source: Employment Security Department/LMEA, Unemployment Insurance Wage File



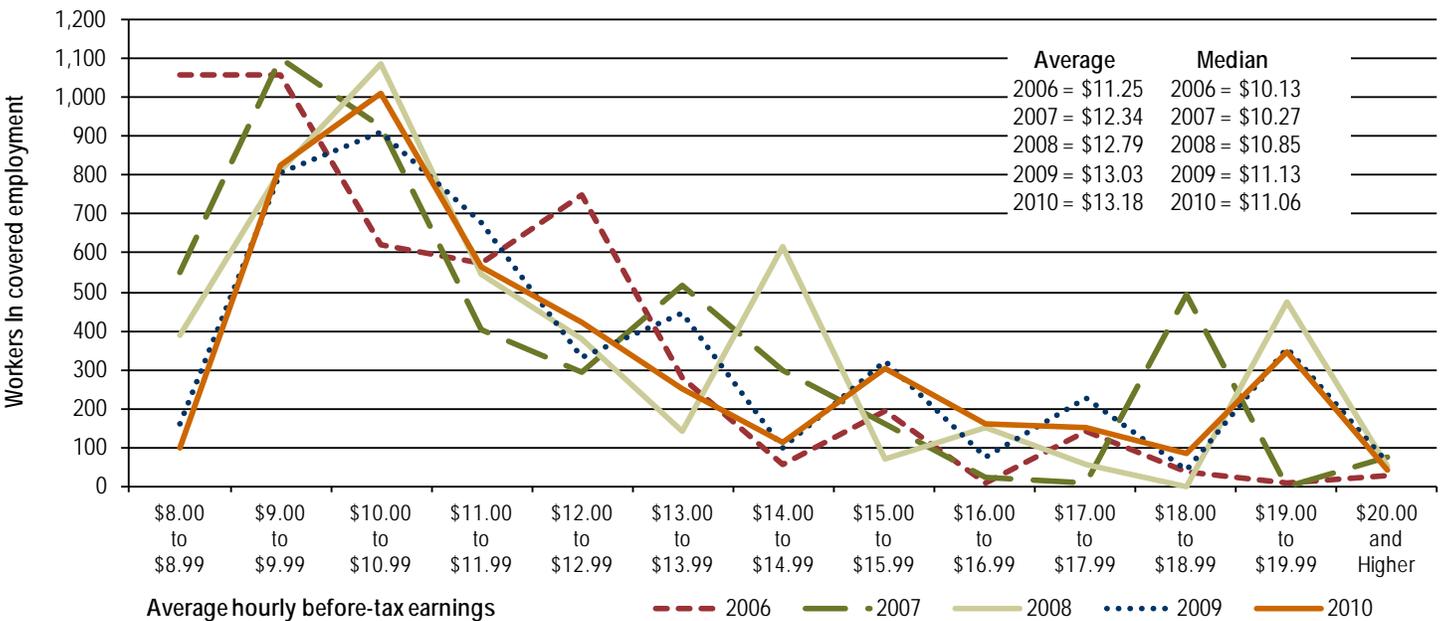
**Appendix Figure 5-2.** Distribution of average hourly before-tax earnings for vegetables except potatoes workers (NAICS 111219), in current dollars  
 Washington state, 2006 through 2010  
 Source: Employment Security Department/LMEA, Unemployment Insurance Wage File



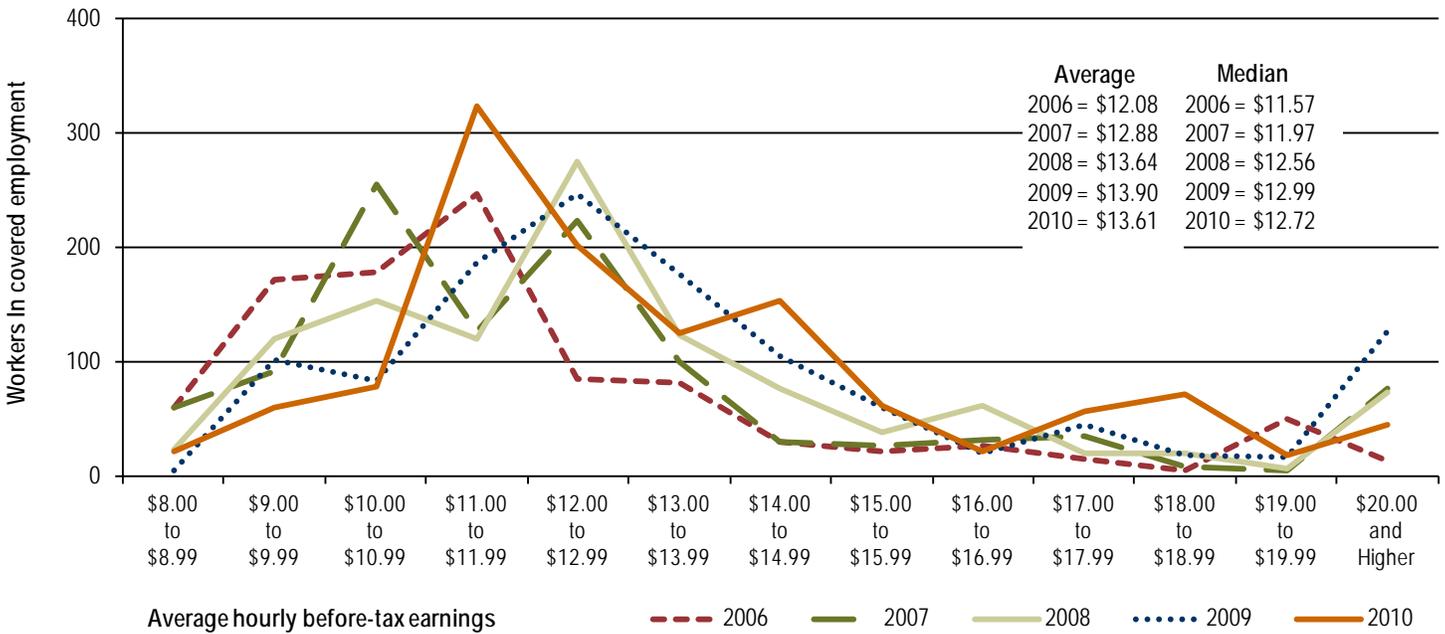
**Appendix Figure 5-3.** Distribution of average hourly before-tax earnings for potato workers (NAICS 111211), in current dollars  
 Washington state, 2006 through 2010  
 Source: Employment Security Department/LMEA, Unemployment Insurance Wage File



**Appendix Figure 5-4.** Distribution of average hourly before-tax earnings for nursery and floriculture workers (NAICS 111421 and 111422), in current dollars  
 Washington state, 2006 through 2010  
 Source: Employment Security Department/LMEA, Unemployment Insurance Wage File



**Appendix Figure 5-5.** Distribution of average hourly before-tax earnings for hay workers (NAICS 111940), in current dollars Washington state, 2006 through 2010  
 Source: Employment Security Department/LMEA, Unemployment Insurance Wage File



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# Glossary

We direct the reader to the 2008, 2009 and 2010 studies of the Agricultural Workforce in Washington State for additional glossaries of economic and other technical terms that crop up in discussions of the economics of agriculture and international trade. These studies can be accessed at [www.esd.wa.gov/Employmentdata](http://www.esd.wa.gov/Employmentdata), the website address for the Labor Market and Economic Analysis branch of the Employment Security Department.

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

**Inflation-adjusted dollars or prices** – The adjustment of the dollar value or price of a good or service to compensate for general inflation in the economy over time. Inflation adjustment of a good or service relative to some base year of comparison allows one to observe changes in what is termed the real value of that good or service over time.

**Current dollars or prices** – The dollar value or price of a good or service that is not adjusted for inflation in the economy. In general, when there is a continuous increase in the general price level over time it is not correct to compare the dollar value of goods or services between time periods in current-dollar prices, especially as the time interval increases.

**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.

**Foreign exchange rate** – This is the price of one international currency in terms of another. This is also termed the exchange rate.

**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.

**NAICS** – The North American Industry Classification System, developed using a production-oriented conceptual framework, groups establishments into industries based on the activity in which they are primarily engaged. Establishments using similar raw material inputs, similar capital equipment and similar labor are classified in the same industry. In other words, establishments that do similar things in similar ways are classified together. See: <http://www.bls.gov/bls/naics.htm>.

**Not seasonally adjusted** - This term is used to describe data series that have not been subjected to the seasonal-adjustment process. In other words, the effects of regular or seasonal patterns have not been removed from these series.

**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 previously listed for migrant agricultural worker apply here.

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

**Shortage of labor** – There is no official definition of a labor shortage. Empirically, a shortage 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 market wage rate – the wage rate that exactly balances the quantity supplied and the quantity demanded. The shortage 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. Increasing the wage rate will tend to eliminate the shortage.

**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 since these inputs are purchased from other

producers. However inputs provided directly by the producer or grower, such as the labor of the agricultural producer and any labor hired by him or her, is a contribution to value added.