2005
Agricultural Workforce in Washington State

Labor Market and
Economic Analysis Branch
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Washington State
Employment Security Department
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Employment Security Department
WASHINGTON STATE

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Published July 2006

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This report has been prepared in accordance with RCW 50.38.060

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ACKNOWLEDGMENT

I would like to acknowledge the significant support and advice I have received in writing this report.

Felix D'Allesandro, Ivars Graudins, Jennie Piott, and Evelina Tainer gave clarifying guidance to many of the issues discussed in this report, both with respect to economic and policy concerns and with respect to understanding the complexities of the data used in the study.

John Wines provided a year's worth of media clippings that documented the concerns of the agricultural industry throughout Washington during 2005. He updated many tables in the study and conceived the comparisons of the state minimum wage with wage rates for selected tree fruits. John Wines also supplied his monthly series of "Agricultural Labor and Employment Trends" based on the ESD monthly survey of 600 agricultural employers.

Jim Dickerson provided the study with updated information on the Unemployment Insurance Program. Randy Bachman conducted a specialized data analysis on the experiences of the WorkSource Centers. Chey Kyarky conducted specialized analysis of the "UI Wage File" database. Dave Wallace and Rick Lockhart also provided analysis of selected issues in the study. Alexander Roubinchtein provided agricultural labor force projections and helped clarify the input-output analysis. In addition, Dave Wallace has read the entire study and his suggestions have improved it considerably.

Most of these colleagues read and provided comments on at least one chapter in the study. Ivars Graudins commented on all of them.

It is important to note the help from all of the growers' associations in the state. Each was contacted and each quickly assisted with information and data sources for their industry sectors. Finally, individuals at both the federal and state offices of the USDA National Agricultural Statistics Service provided data sources and guidance on interpreting data.

Sandra K. Jones artistically designed the printed version of the study. In addition, Sandra K. Jones and Bonnie Dalebout provided additional editing and critical reading of the various drafts. Finally, they did yeoman work in formatting information from a variety of electronic sources into the study.

My thanks to all.

Of course, I am responsible for any remaining errors that may be in the study.

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FOREWORD

The Employment Security Department (ESD) collects data on agricultural employment, wage rates, and earnings to assist Washington's agricultural industry in the recruitment of farm workers and the management of the industry. A shortage of farm workers at harvest time can result in a significant financial loss to farmers and the state economy. Conversely, a surplus of workers can be costly to the public if workers and their families are stranded without jobs or funds to support themselves. As the seasons change annually, and the vagaries of weather assert themselves, it is important to estimate how many workers will be needed in the state and the Northwest region. It is equally important to gain some idea of the wage rates that will have to be paid to these workers for different jobs.

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

However, the UI tax records do not include information on employment in specific activities such as grape vine or apple tree pruning as well as the corresponding wage rates for these activities. To obtain these data, the ESD conducts a monthly survey – the In-Season Farm Labor Survey – in which approximately 600 growers participate. This monthly survey provides estimates of the number of seasonal employees working in specific jobs each month, such as asparagus cutting in South Central Washington, as well as their corresponding wage rates. This measure provides a count of the number of workers in jobs over the period of the survey month.

The next primary source for the data contained in this report is the Washington Annual Statistical Bulletin and supporting data from the national website of the USDA National Agricultural Statistics Service – a very comprehensive information source. To count agricultural employment, the NASS uses records from the Quarterly Census of Employment and Wages (QCEW). This is a point estimate of workers in jobs on the 12th of the month.

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

It is important to note that final, official, or even preliminary data are not always available for the 2005 calendar or fiscal year. In such a case, typically data for 2003 or 2004 are the latest figures available. This is the case in particular for the Washington Annual Statistical Bulletin, compiled and published by the Washington Field Office of the USDA/National Agricultural Statistics Service.

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

Chapter 1

Agriculture's Role in the State Economy: Conceptual and Policy Considerations

Introduction

This chapter discusses the important role that agriculture plays in the economy of Washington state. It discusses the economic factors and policy measures that influence agricultural production, employment, and exports in our state. It places the discussion in the context of the issues faced by the agriculture sector during 2005 and sets the context for analyzing the agricultural labor force in the state during that year.

The Place of Agriculture in the State Economy and World Trade

Over $197 million of government payments were received by agricultural producers in 2004.

The Industry at a Glance.[1] For 2004, the most recent year of complete data, the final agricultural sector output is estimated at $6.559 billion – primary agriculture is a six billion dollar industry. Gross value added – net new production due directly to agriculture – from this quantity is estimated at $3.854 billion. Net farm income – income to farm owners and operators – is $1.787 billion. In addition, over $197 million of government payments were received by agricultural producers in 2004, the overwhelming proportion of which went to agricultural producers other than fruits and vegetables.

Over 73,000 workers covered under the Unemployment Insurance Program worked in direct agricultural production and earned an annual average of $17,439 in 2004.

Workers and Wages.[2] Over 73,000 workers covered under the Unemployment Insurance Program worked in direct agricultural production and earned an annual average of $17,439 in 2004. In addition, over 37,700 covered workers in value-added agricultural manufacturing received annual average earnings of about $35,738. Total hired labor involved in direct agricultural production in the state received payments of about $1.274 billion in 2004. For the same period, average annual statewide earnings for all workers were $39,351. Average annual earnings were $38,793 for the United States labor force overall.

Interactions of Agriculture with the Rest of the Washington Economy

The agricultural economy is complex. The total impact of agriculture extends well beyond the initial stage of direct production of basic agricultural outputs.

[1] U.S. Department of Agriculture. National Agricultural Statistics Service. *2005 Washington Annual Statistical Bulletin*. According to NASS staff in Washington, D.C., the data for 2004 as shown in this report are preliminary. All data are in nominal dollars; that is, they are not adjusted for inflation over time.

[2] These data are from ESD/LMEA Unemployment Insurance Tax Records (the "UI Wage File"). These statistics differ somewhat from NASS data due to differences in data sources and accounting assumptions. For example, NASS reports $1.169 billion in Employee Compensation (total hired labor) compared to the ESD/LMEA estimate of $1.274 billion. See the *Foreword*.

Chapter 1

The agriculture sector buys inputs from other sectors in the economy, such as seed, tools, gasoline, water, and fertilizer. It combines these with domestic and migrant labor, land, and existing capital to create primary agricultural products. These products are then sold to various processors to create final products for delivery to consumers.

Figure 1
Agricultural Exports: Total Value of Output Created or Induced
Washington State, 2000
Source: Joydeep Ghosh and David W. Holland

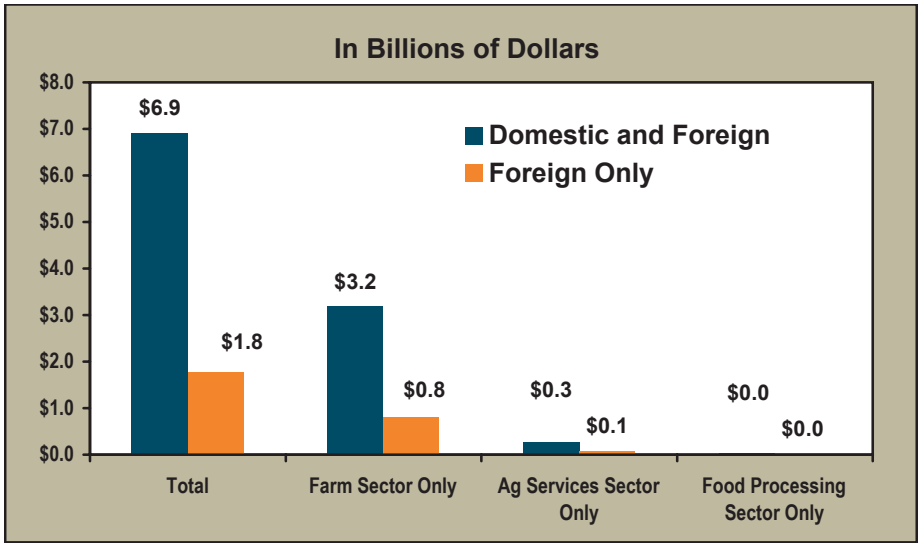
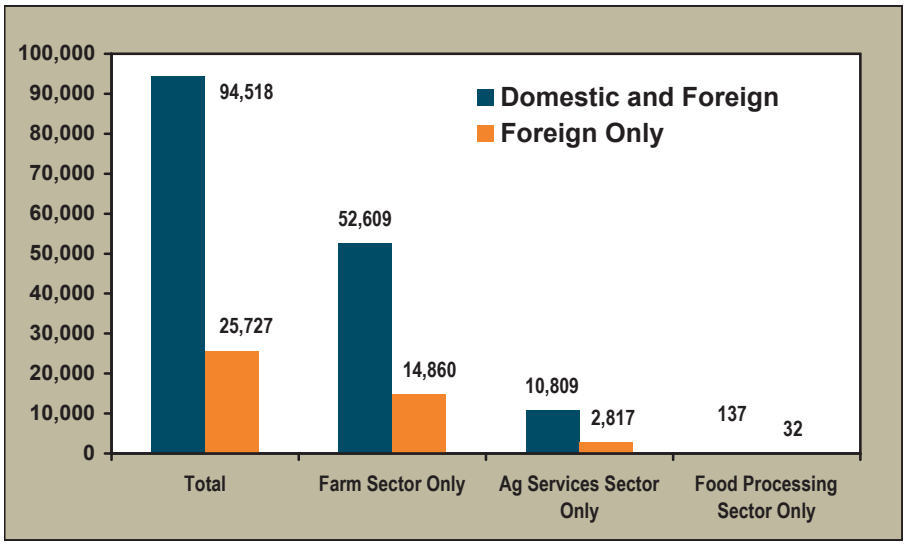


Figure 2
Agricultural Exports: Total Jobs Created or Supported
Washington State, 2000
Source: Joydeep Ghosh and David W. Holland



Note:

▫The *Total* is the sum of *Direct*, *Indirect*, and *Induced* effects with respect to productive activity for a given sector. The *Direct* effect measures the value of initial agricultural production, such as dollar value of total hops produced in the state. The *Indirect* effect measures the change in the dollar value of output of the industries that supply inputs to agriculture and food processing, such as fertilizer sold to farmers. The *Induced* effect measures the change in household income and household consumption as a result in the change in payrolls to labor engaged in direct and indirect production.

Source: Joydeep Ghosh and David W. Holland. "The Role of Agriculture and Food Processing in the Washington Economy: An Input-Output Perspective." TWP-2004-114. Department of Agricultural and Resource Economics. College of Agriculture. Washington State University. August 2004.

Figure 3
Processed Food Exports: Total Value of Output Created or Induced
Washington State, 2000
Source: Joydeep Ghosh and David W. Holland

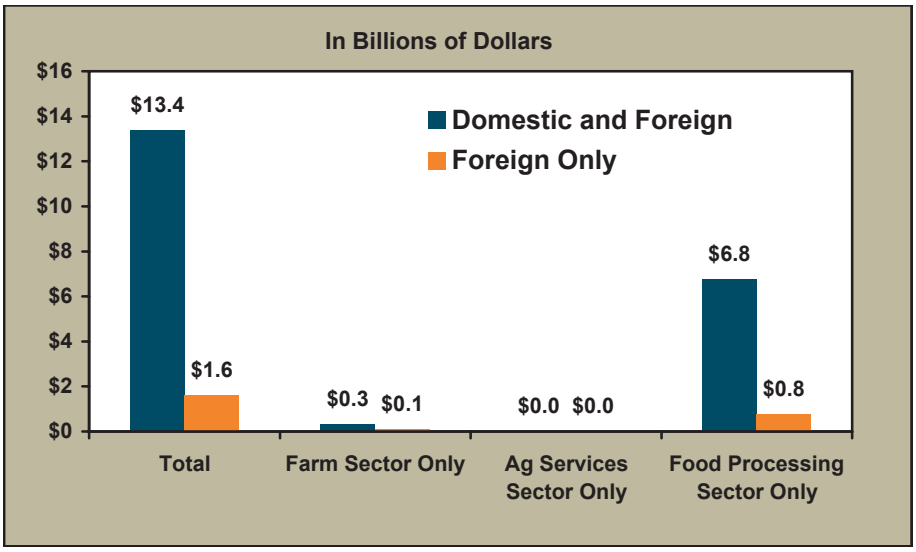
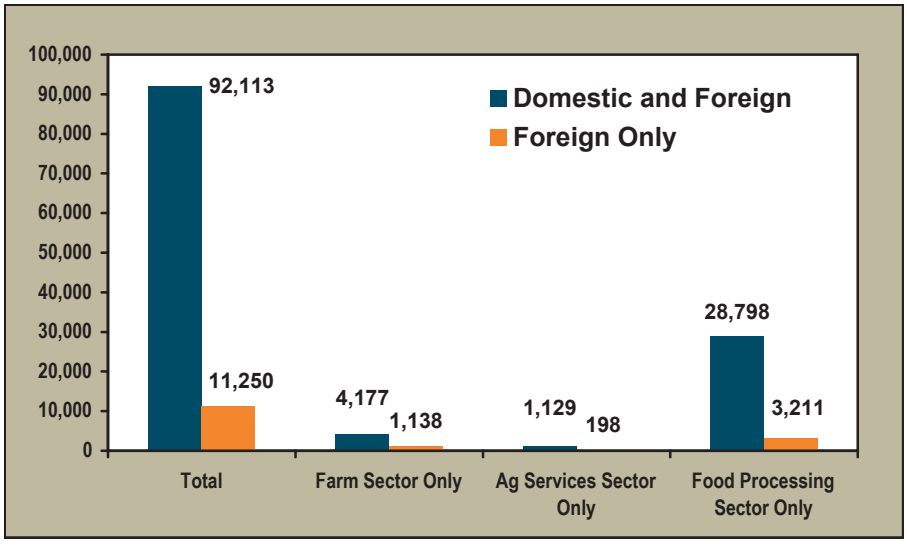


Figure 4
Processed Food Exports: Total Jobs Created or Supported
Washington State, 2000
Source: Joydeep Ghosh and David W. Holland



Consumers then buy the final products. A very large number of markets – hundreds if not several thousand – for labor and other productive inputs and for final products and services, are interrelated and coordinated as the process of economic production and exchange works its way over time through the economy and its seasons.

Chapter 1

The technique for organizing this complex interaction is a method called the input-output table (I-O). In its accounting form, an input-output table is an extension of the double-entry bookkeeping system kept by a financially prudent farm operator. The I-O table shows all of the goods and services a particular sector buys, individually, from all other sectors in the economy. Next, it shows where that same sector sells its products or services to each of the other sectors in the economy. This accounting framework is repeated for all productive sectors in the state economy.

The food processing sector created about $37 million. Forty-six other sectors created the remainder.

Appendix Table 1 sets forth a summary of these relationships for the year 2000, the most recent year for which this analysis has been performed for the Washington state economy. The bar charts on pages 2 and 3 summarize the data in this table. For agricultural exports, domestic and foreign combined, a total of about $6.9 billion ($6,899,980,821) of output was created or induced. The farm sector created about $3.2 billion of this total. The agricultural services sector created about $273 million. The food processing sector created about $37 million. Forty-six other sectors created the remainder.[3]

The most interesting statistic is the *Overall Multiplier*. This multiplier tells us that one dollar's worth of agricultural exports to the rest of the U.S. and to foreign countries combined, through the process of re-spending through the economy, creates or induces approximately $1.70 worth of total sales in the Washington economy, including the agricultural sector. In terms of employment for the Washington economy, one job in agriculture creates or supports about 1.62 jobs overall, including agriculture.[4] Note that the employment multipliers for processed food exports are considerably larger. For the foreign export market, one additional job for the processed food sector creates or supports 2.58 jobs throughout the Washington economy, including the processed foods sector.[5]

"Agriculture and food exports triggered roughly 186,000 jobs in Washington, or 5.2 percent of the total state employment."

In summary, agriculture holds its own as an extremely important industrial sector in the state. In all, for 2000, "agriculture and food exports created or supported roughly 186,000 jobs in Washington, or 5.2 percent of the total state employment."[6]

[3] Joydeep Ghosh and David W. Holland. "The Role of Agriculture and Food Processing in the Washington Economy: An Input-Output Perspective." August 2004.

[4] Multiplier estimates vary somewhat, depending on study assumptions and the time period analyzed. *The 1997 Washington Input-Output Model* estimated by the Washington State Office of Financial Management (2004) suggests that a million dollars worth of direct output in field crops, fruits, and vegetables directly generates about 30 jobs. Viewing the picture another way, overall, about 1.6 jobs are created in the economy for each job created in the field crops, fruits, and vegetables sector. Overall, for each dollar of direct output in the above sector, about $1.93 of net, new, final output is generated in the state economy. In 2004, for agriculture, forestry, fishing and hunting, combined, the U.S. Department of Commerce estimates the employment multiplier to be 2.14. Source: U.S. Department of Commerce. Bureau of Economic Analysis. *Industry Economic Accounts*.

[5] These multipliers are a snapshot of the economy's interactions at a point in time. They will change over time as the structure of prices change, technology changes, and the physical supply and demand of goods, services, and factor inputs, such as migrant labor, change.

[6] Ghosh and Holland. (2004). Page 16.

Factors That Affect the Demand for and Supply of Agricultural Labor

The agricultural sector and the agricultural labor force and labor market are not special cases of industry sectors and markets in general. However, the agricultural sector is conditioned by a number of economic and policy issues. The most important economic and policy issues to affect Washington agriculture and agricultural labor during 2005 are:

- Less than proportionate increase in household consumption demand for food as household income rises by a given proportion,
- Crop-specific seasonality due to differential planting, growing, and harvesting cycles,
- Volatility in planning, output, and employment due to variations in weather and weather-induced variations in the water supply – both local and worldwide,
- Foreign exchange rates,
- The comparative advantage of Washington agriculture relative to other agricultural regions in the United States and worldwide,
- Competitive restrictions in international trade, including sanitary and phytosanitary (e.g., plant sanitary) requirements, and
- The interaction of international trade with the economic and policy issue of employing foreign agricultural workers, whether documented or not.[7]

The agricultural sector is conditioned by a number of economic and policy issues.

These issues are discussed in the remainder of this chapter.

The Special Case of Agriculture in Household Consumption. The demand for labor is a derived demand. That is, no agricultural employer or producer will employ a worker unless, at market wage rates, the worker can produce a product that can be sold at a profit. Selling at a profit means that all costs of production are covered, including the employer's implicit wage rate, plus a profit.[8] So, the demand for agricultural labor is driven by the demand for agricultural products.

No agricultural employer or producer will employ a worker unless, at market wage rates, the worker can produce a product that can be sold at a profit.

In America, the demand for agricultural products – food – is income-inelastic. That is, as the household incomes of Americans rise by a given percent – say, 10 percent – these households demand proportionately smaller amounts of food in dollar terms – one estimate for the United States is 1.4 percent. In contrast, the income elasticity of demand for food is about twice as high in Japan and about five times higher in India. For India, a 10 percent increase in income is estimated to increase the demand for food by about 7 percent.[9]

[7] This interaction appears to be a major issue for the state in its negotiations with Mexico to reduce tariffs on imports of Washington apples to Mexico.

[8] As this chapter emphasizes, agricultural producers operate in an uncertain world. It is entirely feasible that a farm operator will have to sell his or her crop at below the cost of production – say, if there is a bumper crop and the crop is relatively perishable. Under these conditions, it is reasonable to sell the crop at any price that covers direct operating costs and at least some fixed cost. This will minimize the losses that the producer may suffer.

[9] The website source for these estimates is: ***www.ers.usda.gov***

Chapter 1

There is a counter trend to this food demand situation in America. This counter trend is the dramatic growth in food processing and food preparation. Here is why: rising worker productivity makes the average person's time more and more valuable. Restaurant meals, both eat-in and take-out, and all other prepared food products and services save a worker's time. Thus, the demand for processed foods, fast foods, take-out, frozen foods, and restaurant meals will continue to increase as the productivity and value of a worker's time increases. Jobs in the food preparation sector will increase even while jobs in primary agriculture may remain constant or perhaps decline as agricultural worker productivity increases.

The demand for processed foods, fast foods, take-out, frozen foods, and restaurant meals will continue to increase.

Foreign Consumption. Foreign consumption of Washington agricultural products via international trade and agricultural exports has become increasingly important for agriculture in our state. In the 35 years from 1960 to 1995, "exports measured in1995 dollars, nearly quadrupled, growing at an annual average rate of 3.8 percent."[10] Continuing the comparison with 1995, exports grew by about 35.4 percent from 1996 through 2004 – an annual average of about 4.26 percent. By contrast, exports at the national level grew at an annual rate of about 3.4 percent over the 1996-2004 period.

As developing nations grow, they increase their demand for agricultural products, particularly the high quality agricultural products that characterize production in Washington, most notably exemplified by fresh apples and cherries. Economic growth rates in India and China in the neighborhood of 8 to10 percent a year imply increased demand for Washington agricultural products. Exports of Washington apples to India were nonexistent seven years ago. As of July 17, 2005, 780,000 boxes of apples had been shipped to India – 3 percent of the state's total apple exports for this season. "A growing Indian middle class is demanding higher quality fruit. . .an affordable luxury item."[11] Recall the discussion above for the income elasticity of demand for food in India.

For Washington's agricultural products to penetrate these new markets, it is important that the export markets remain relatively free of trade barriers such as tariffs and quotas.

For Washington's agricultural products to penetrate these new markets, it is important that the export markets remain relatively free of trade barriers such as tariffs and quotas. It is important, also, that sanitary and phytosanitary requirements remain scientifically based and not be used as political screens for protectionism. Otherwise, these health and safety standards are more likely to be used to inappropriately restrict imports of Washington agricultural products. During 2005, the apple fire blight issue and Mad Cow disease issue with Japan come immediately to mind.[12]

[10] Richard S. Conway, Jr. *Foreign Exports and the Washington State Economy*. 1997.

[11] *Yakima Herald-Republic*. July 25, 2005. Page 3B.

[12] The use and misuse of these requirements, using the example of Japan, is discussed further. The technique is applied aggressively by Japan to protect its apple industry, but Washington red cherries, which do not compete with an important fruit sector in Japan, have made significant market penetration in Japan and are not constrained by the abuse of such rules.

The Yakima Basin was hard hit by drought. As of June 2005, precipitation was 65.1 to 70.0 percent of normal in parts of Benton-Franklin, Klickitat, Yakima, parts of Kittitas, and parts of Chelan and Douglas counties.

Uncertainty: Weather, Water, and the Demand for Seasonal Labor

A recurrent theme of this chapter is that agriculture is a very risky business. Weather, both locally and worldwide, is perhaps the major factor in creating risk and uncertainty for farmers. (Trade barriers, and, more recently, the undocumented worker issue, are perhaps the other two.)

Weather During 2005. 2005 was a difficult year for Washington state agriculture. As the precipitation map of the state shows, (*See Figure 6*) the Yakima Basin was hard hit by drought. As of June 2005, precipitation was 65.1 to 70.0 percent of normal in parts of Benton-Franklin, Klickitat, Yakima, parts of Kittitas, and parts of Chelan and Douglas counties. Neighboring locations had precipitation that was only 70.1 to 75.0 percent of normal. Of course, this central region is the prime producer of fresh fruits and vegetables in the state.

Data from the U.S. Department of Agriculture, Economic Research Service, indicate that the counties in the worst drought-affected area are among the top producers in agricultural sales. Newspaper accounts in mid-year projected agricultural losses of $300 million[13] to $1 billion,[14] with a mid-range estimate of $590 million statewide.[15] It is not possible to judge what actually happened in 2005, since the 2005 estimates on the value of agricultural production are just now being assembled by the USDA National Agricultural Statistical Service. However, the USDA Economic Research Service forecast the following for apple production in September 2005:

> "This year's (estimated) smaller crop, especially in Washington, points to reduced fresh-market production during the 2005/2006 season. About three-quarters of Washington's crop goes to the fresh-market each year, and over the past three marketing seasons it has supplied nearly 70 percent of all U.S. fresh-use apples. Based on a 3-year average proportion of U.S. apple production sold for fresh use, the 2005/2006 market crop is projected to be down about 6 percent from the 6.6 billion pounds produced (nationally) in 2004/2005." [Perez and Pollock. (2005) page 5.] Clarification provided in parentheses.

Negative Weather Impacts. The year 2005 was officially declared a statewide drought emergency by Governor Gregoire on March 10, 2005. As noted above, at June's end in 2005, the *Capital Press Agricultural Weekly* reported a drop estimated as high as $590 million in total economic impact on the state economy. The same article reported

[13] *Yakima-Herald Republic*. Wednesday, June 15, 2005.
[14] *Capital Press*. March 25, 2005.
[15] *Morning News*. Employment Security Department. Office of Communications. June 28, 2005.

the possibility of a drop in agricultural employment of 3,500 to 5,400 jobs.[16] *Figure 5* clearly shows the pattern of covered seasonal agricultural worker employment in 2004 and 2005. There were about 373,784 worker/months[17] of seasonal farm labor in 2004. This dropped to 358,108 worker/months for 2005 – a difference of 15,676 worker/months – 4.2 percent in terms of workers/months.

Figure 5
Monthly Seasonal Employment: Covered Seasonal Agricultural Workers
Washington State, 2004 and 2005
Source: Appendix Table 2

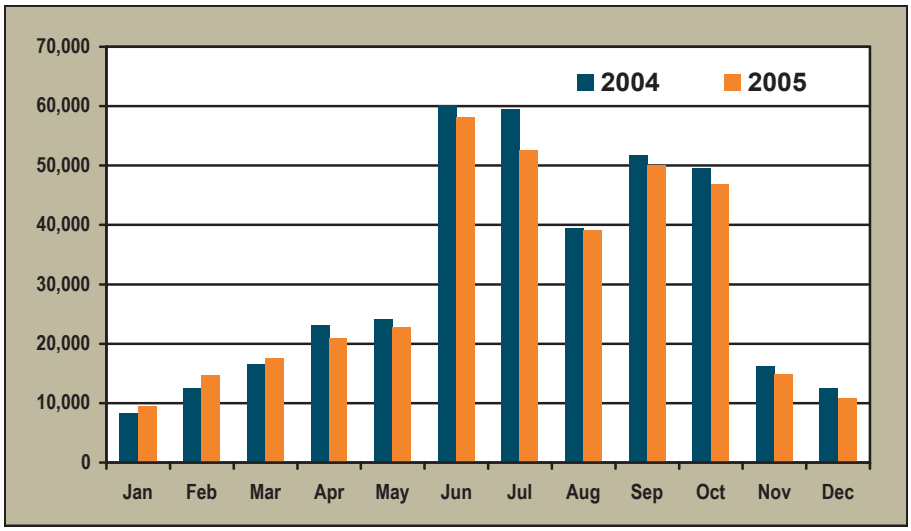
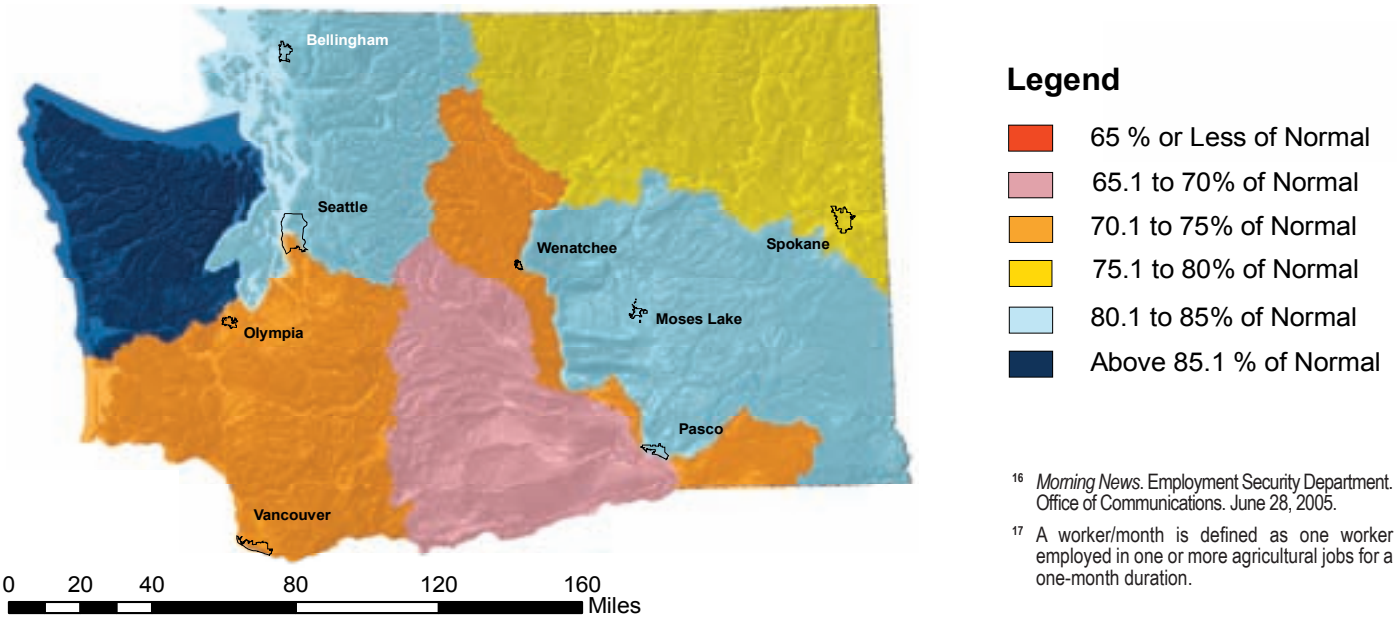


Figure 6
Departures From Normal Precipitation
Washington State, October 2004 to June 2005
Source: U.S. Department of Agriculture - NRCS



[16] *Morning News*. Employment Security Department. Office of Communications. June 28, 2005.

[17] A worker/month is defined as one worker employed in one or more agricultural jobs for a one-month duration.

Most of the impact came in reduced demand for seasonal labor in apple and cherry production and harvest; crops that dominate overall demand for seasonal agricultural labor.

The estimate of 15,676 worker/months translates into about 1,306 worker/years (15,676/12 = 1,306). While the comparison is not exact, this estimate represents about one-third of the above lower-bound estimate of 3,500 workers. Most of the impact came in reduced demand for seasonal labor in apple and cherry production and harvest, crops that dominate overall demand for seasonal agricultural labor. The year's estimated total drop in worker/months for apples and cherries combined is 15,924, which exceeds the state's 2005 estimated net drop of 15,676. Thus, while net change in seasonal agricultural demand was negative, some agricultural sub-sectors apparently experienced small increases in seasonal labor demand.

Positive Weather Impacts. Drought and other poor weather in other parts of the United States or the rest of the world can result in an increase in demand for Washington agricultural commodities and agricultural labor. For example, the bushel price of "All Wheat" produced in Washington state rose from $2.73 a bushel in 1990 to $3.92, $4.83, and $4.14, in 1994, 1995, and 1996, respectively. This was largely in response to poor rainfall conditions in other wheat-producing regions of the world. By 2000, as weather conditions improved worldwide, the "All Wheat" price fell back to $2.70 a bushel. The value of production ranged from $409,480,000 in 1990 to a high of $755,680,000 in 1996 and back down to $443,369,000 in 2000. First, we see an increase in production value of about 88 percent. Then, the value of output falls just as precipitously by about 70 percent! So, depending on the crop, Washington farmers have to worry not only about their local weather and water supply – this season and next year, but weather conditions in competing regions worldwide – this year and next.

If the cherries in the Okanogan region are ripe, and it is threatening to rain, growers need an adequate supply of knowledgeable workers immediately—not a couple of days after the rain.

Uncertainty and American Workers. Short-term weather patterns create further uncertainty in the exact timing of demand and supply for agricultural labor, particularly seasonal labor. If the cherries in the Okanogan region are ripe, and it is threatening to rain, growers need an adequate supply of knowledgeable workers immediately – not a couple of days after the rain. On a short-term local basis, crop by crop, therefore, labor demand can be very volatile. This uncertainty in demand for labor translates into uncertainty in the lives of agricultural workers. This uncertainty is a cost to both the growers and the workers. It is, perhaps, this uncertainty linked with the seasonality, more than the relatively low wage rates and earnings, that make seasonal agricultural work relatively undesirable to American workers. It is this uncertainty, also, that contributes to the perennial concern of farmers and growers about labor shortages, particularly for high-value perishable crops destined for the fresh produce markets.

It is also this uncertainty that contributes to the high turnover of the agricultural labor force over time. Indirect evidence of the impact of uncertainty exists in the high turnover rate that exists among farm workers. For example, of an estimated 149,650 workers in agriculture in 1995, only 45.2 percent of those returned to agriculture in 1997.

> "There is no clear motive for workers to return to farm operations if hourly earnings are similar (in non-farm occupations), and no long-term (non-seasonal) farm employment prospects are available." (Clarifying words provided in parentheses.) Thilmany. (2001) page 5.

Indirect evidence of the impact of uncertainty exists in the high turnover rate that exists among farm workers.

It is common in Washington for workers to work in farm and non-farm jobs during a given year, as we discuss in *Chapter 3*. In short, to summarize this discussion, workers, both permanent and seasonal, domestic and foreign migrant, are interested in at least three key aspects of a job:

- The likelihood of being employed at all,
- The wage rate earned per unit of time or effort, and
- The duration and permanency of the employment period.

Washington State Agriculture and the World Economy

Washington represents a large share of overall United States agricultural exports, and, in some markets like Mexico, exports are crucial to the health of the industry. To illustrate, over the past seven years, according to the Washington Apple Commission, Washington's crop of fresh apples has averaged about 90 million boxes. The Commission estimates that 65 million boxes are exported domestically to other states. This leaves 25 million boxes, about 27.8 percent to be exported overseas.[18] In 2004, 8.5 million boxes of apples were shipped to Mexico – given the above average numbers, this represents 30.6 percent of the foreign export crop!

Washington represents a large share of overall United States agricultural exports, and, in some markets like Mexico, exports are crucial to the health of the industry.

United States Agricultural Exports. For the nation as a whole, total exports grew by about 8.45 percent from 2002 to 2004, when they totaled $43,516.8 million.

Total agricultural exports for the United States in 2003 were $41,202.2 million. For this year, the top ten export destinations for United States agricultural products are:[19]

- Japan – $10.724 billion
- Canada – $10.429 billion
- Mexico – $7.184 billion
- China – $3.826 billion
- South Korea – $2.695 billion
- Taiwan – $1.803 billion
- The Netherlands – $1.199 billion
- Germany – $1.123 billion
- United Kingdom – $1.119 billion
- Spain – $0.969 billion

[18] Yakima Herald-Republic. July 25, 2005. Page 3B.

[19] Source: IMPACT. Washington State University. Pullman, WA. The mix of top trading partners has changed over time. In 1995 the top five trading partners were, in order, Japan, South Korea, Canada, Taiwan, and the United Kingdom. China came in sixth. In 2003 dollars, the top five countries' total trade equaled $17,841.0 million.

Note that a total of $19.048 billion of exports go to just four countries in Asia – about one-half (46.2 percent) of total exports. North American trade totals $17.673 billion – 42.9 percent of the total. Following the previous discussion on Mexico, this nation ranks third overall in receiving U.S. agricultural exports. Finally, the four largest European export destinations total only $4.410 billion – just about three-fifths (61.4 percent) of United States export trade with Mexico. Given the patterns of trade that are developing, as well as the network of trade agreements the United States has made and is making with various nations in Central and South America, it appears that the future of United States agricultural exports lies in Asia, North America, and Central and South America.

Given the patterns of trade that are developing, it appears that the future of United States agricultural exports lies in Asia, North America, and Central and South America.

Washington State Agricultural Exports. Overall, Washington is the most trade-dependent state in the nation. Washington agriculture reflects this dependence on foreign markets. Washington's agricultural sector is the second most trade-dependent sector in the state economy.

In 2004, about $1.887 billion of Washington-produced agricultural products went directly into foreign export markets. This represents about 32 percent of Washington's total production for 2004! It comprises about 3 percent (3.07 percent) of total United States exports during 2004. Primary agricultural production in the state is very dependent on maintaining open markets for its exports. The top three export categories, comprising about three-fourths (73.2 percent) of all exports, are:

- Fruit and fruit products – $533.0 million[20]
- Vegetables and products – $522.3 million
- Wheat and products – $325.5 million

Live animals and products took a precipitous drop from 2003 to 2004 by a factor of 2.63 – falling from $97.7 million to $37.1 million, due to issues surrounding Bovine Spongiform Encephalopathy – BSE or "Mad Cow" disease.

Foreign trade is a two-way street. For a nation to buy Washington state agricultural products, it must acquire U.S. dollars.

Foreign Trade Examined

Trade Agreements. Foreign trade is a two-way street. For a nation to buy Washington state agricultural products, it must acquire U.S. dollars. It gets these dollars either directly from its exports to America, or indirectly, by buying American dollars which must also be purchased from the proceeds of its exports to other foreign nations. Or, it borrows American dollars from banks and other financial institutions.

[20] *2005 Washington Annual Statistical Bulletin*. Page 29. Fruit and fruit products comprise apples, apple juice, and apple products as well as other miscellaneous fruits assumed to equal the previous year. Current (2005) production data have not yet been released.

Chapter 1

The United States foreign trade policy has an important impact on the demand for Washington agricultural products. This trade policy can even affect the location of production and processing of primary agricultural products within the United States and between trading partners. U.S. trade policy directly affecting Washington agriculture is characterized by a network of trade agreements. The most notable are:

U.S. trade policy directly affecting Washington agriculture is characterized by a network of trade agreements.

- The North America Free Trade Agreement (NAFTA),
- The Chilean Free Trade Agreement,
- The Andean Trade Preferences Act of 1991 (ATPA), renamed and renewed in 2002 as the Andean Trade Promotion and Drug Eradication Act (ATPDEA), and
- The United States-Central America-Dominican Republic Free Trade Agreement (CAFTA).[21]

To illustrate the importance of these agreements, below we discuss ATPDEA as it has affected the fresh and processed asparagus sector and asparagus processing in Washington prior to and including 2005.

The Role of Foreign Exchange. Before dealing with the more "complex" issues of these multi-lateral trade agreements, a discussion of foreign currency exchange rates is useful. The foreign currency exchange rate can be looked at from two directions. If, for example, America is importing oil from Mexico, the exchange rate is the number of pesos a dollar can buy, since we must pay for Mexican oil with pesos. If, on the other hand, Mexico is importing Washington apples, the exchange rate is the number of pesos it takes to buy one U.S. dollar. Other things equal, the more pesos one can buy with a dollar, the cheaper are Mexican goods to the American consumer.

Foreign currency exchange rates between the United States and countries with which we trade should reflect basic economic conditions between trading partners rather than reflect internal policy agendas of nation-states.

Foreign currency exchange rates between the United States and countries with which we trade should reflect basic economic conditions between trading partners rather than reflect internal policy agendas of nation-states. Note, for example, in *Table 1* – if Mexico has a 5 percent tariff on a given agricultural product, the depreciation (e.g., cheapening) of the foreign exchange rate – the number of pesos it takes to buy a dollar – cancels out the tariff. Looking at it another way, American products, including agricultural products, over the 2005 period, have become 5.24 percent more expensive to Mexican consumers. A quantity of fresh apples that used to cost one U.S. dollar now costs $1.05 (See *Table 1*).

The United States government has been pressuring the Peoples Republic of China to devalue its currency, the yuan, relative to the dollar. As *Table 1* shows, China has nominally complied with about a 2.5 percent devaluation during 2005. With respect to this issue, as far as Washington agriculture is concerned, several broad facts stand out.

[21] CAFTA includes Costa Rica, The Dominican Republic, El Salvador, Guatemala, Honduras, and Nicaragua along with the United States. ATPDEA includes Chile, Colombia, Ecuador, and Peru.

Table 1

Change in Value of the U.S. Dollar in Terms of Currencies of Key Trading Partners Having High Current and Potential Future Demand for U.S. Agricultural Products United States, January 3, 2005 to December 30, 2005

Source: Federal Reserve Bank of New York. The exact web site is:
http://www.ny.frb.org/markets/fxrates/historical/home.cfm

Value of the U.S. Dollar in Terms of Foreign Currency

Country and Currency:	Date 1-03-05	Date 12-30-05	American Goods and Services: Cheaper or More Expensive	
Mexican Peso	10.6275	11.2150	More Expensive by	5.24%
Canada Dollar	1.1656	1.2108	More Expensive by	4.74%
Hong Kong Dollar	7.7533	7.7775	More Expensive by	0.42%
European Monetary Union Euro	1.1842	1.3475	More Expensive by	12.12%
People's Republic of China Yuan	8.0702	8.2765	More Expensive by	2.50%
India Rupee	44.950	43.350	Cheaper by	3.69%
Japan Yen	117.88	106.17	Cheaper by	11.02%
Taiwan New Taiwan Dollar	32.800	31.710	Cheaper by	3.43%
Australian Dollar	0.7342	0.7790	More Expensive by	5.76%

Key trading partners have current and potential future demand for U.S. Agricultural Products.

First, in 2005, China has a $201.7 billion dollar trade surplus with America. China holds considerable unspent purchasing power in terms of American dollars. Ultimately, China must either spend these dollars on U.S. goods and services, loan these dollars back to America, or sell these dollars for other foreign currencies. One way or another, the U.S. dollars must end up back in America if they are spent rather than held as foreign exchange reserves.

With all this purchasing power, in 2005, the People's Republic of China imports less agricultural products from America than does Mexico both in terms of total value consumed and in value consumed per capita.

Per capita consumption of American agricultural products among major Asian nations in 2005 is as follows:

- P.R. China, overall – about $3
- P.R. China, counting only the urban population – about $9
- Japan – about $84
- South Korea – about $55
- Taiwan – about $78

Some American policy makers have argued that the yuan should be devalued as much as 20 percent against the U.S. dollar.[22] If this happens, Chinese goods would cost Washington citizens 20 percent more and Washington agricultural goods would cost the Chinese 20 percent less. Given past history, in particular the fact that China is still evolving into a market economy, the Chinese are not likely to comply with this level of revaluation of the yuan against the U.S. dollar any time soon.

[22] Brian Bremner. "A Slow Boat to Yuan Devaluation." *Business Week on Line*. February 15, 2005.

Chapter 1

Tariffs and Other Trade Weapons. Countries intent on protecting one or more of their industries can resort to a variety of techniques, key among which are to:

- impose tariffs,
- set quotas,
- combine tariffs with quotas,
- provide production or export subsidies,
- lodge charges of unfair "dumping", and,
- establish sanitary and phytosanitary (i.e., plant sanitary) standards.

Health and phytosanitary standards and regulations, when science-based, can be legitimate policy tools to protect the health of a nation and the economic and ecological base of a nation's agriculture.

These trade restriction strategies are discussed below, each in the context of how they have recently affected agriculture in Washington state.

Health and phytosanitary standards and regulations, when science-based, can be legitimate policy tools to protect the health of a nation and the economic and ecological base of a nation's agriculture. However, such standards can just as easily become a screen behind which overt protectionist practices attempt to hide. The same aggressive strategy applies to the use of "dumping" charges to restrict or halt trade in a given product between two nations. Dumping charges can be legitimate – based on actual market conditions between two countries – or they can be politically based to defend a sector that is suffering from international competition.

There has been the recent ban by Japan on the importation of American beef. This ban was initiated in December 2003 when a new case of BSE was discovered in Washington state.

In 2005, there have been several major developments in the use of these trade restriction techniques. First, there has been the decades-long ban and negotiation over that ban, of phytosanitary standards imposed on American apples by Japan. There has been the recent ban by Japan on the importation of American beef. This ban was initiated in December 2003 when a new case of BSE was discovered in Washington state. The second major development concerns the charge by Mexico that Washington apple growers have been "dumping" apples on the Mexican market. A third development concerns the reduction in the tariff on asparagus imports to America from Peru. Discussion of these events during 2005 highlights their effects on production and employment issues in Washington state agriculture.

Apple Phytosanitary Standards – Japan, Fire Blight, and the Codling Moth[23]

Japan has long used phytosanitary standards to restrict the importation of apples into its markets. This practice has been due in part to the tastes and preferences of Japanese consumers – they are highly conscious of the sanitary and phytosanitary conditions and

[23] Most of this discussion is taken from Linda Calvin and Barry Krissoff. "Resolution of the U.S.-Japan Apple Dispute". FTS-318-01. Economic Research Service. U.S. Department of Agriculture. October 2005.

characteristics of the foods they consume.[24] In addition, the Japanese consumer prizes very high quality Fuji apples. These are given as gifts and eaten as a gourmet dessert, rather than eaten as a snack "to keep the doctor away," as in America. But, failure of American apples to penetrate the Japanese market has also been due to the effort by the Japanese government to protect the Japanese apple industry. Phytosanitary standards were established both for fire blight and the codling moth.

Japan officially opened its apple market to imports in 1971. Two decades later, after pressure from the U.S. Trade representative, the market was opened to Red and Golden Delicious apples in 1994. In 1995, the U.S. shipped 8,935 metric tons of apples – about 500,000 boxes – to Japan. Due to several factors, including the tastes and preferences of Japanese consumers for very high quality Fuji apples, these imports did not sell well. By 2004, America shipped no apples to Japan. Indeed, in 2004, Japan imported an estimated total of only 18 metric tons of apples from all other sources!

Japan officially opened its apple market to imports in 1971. There were zero imports of U.S. apples in 2004.

Table 2

Japanese Imports of U.S. Apples
1994-2004
Source: Calvin and Krissoff. (2005). Table 1

Year	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
Metric Tons	0	8,935	404	105	0	159	96	278	0	0	0

It has been scientifically established that fire blight cannot be transmitted by mature, symptomless apple fruit. This is the only type of apple fruit that the United States exports.

After failing in a bi-lateral effort to get the Japanese government to modify its phytosanitary restriction on fire blight in 1997, the U.S. took its case to the Dispute Settlement Body of the World Trade Organization (WTO) in 2002. The WTO supported the United States' position that the Japanese fire blight restriction had no scientific basis. Japan appealed in 2003. Finally, after losing its appeal in June 2005, Japan agreed to abide by its WTO agreement on sanitary and phytosanitary standards in August 2005. The resolution on trade restrictions for American apple growers is partial – Japan still retains the codling moth restriction.

The U.S. took its case to the Dispute Settlement Body of the World Trade Organization in 2002.

Yet, the fire blight decision is a victory for U.S. apple growers – largely growers in Washington and Oregon. If Japan sticks to the spirit as well as the letter of the agreement, it may still take as much as a decade for a new trade pattern of apple imports to be

[24] See McCluskey, et al. "BSE in Japan: Consumers' Perceptions and Willingness to Pay for Tested Beef." 2004. "After the first BSE-infected cow was identified in Japan, … the Japanese Ministry of Health, Welfare, and Labor started national testing of all cattle for BSE-infection" Page 4. In America, only a small random sample of beef is being tested. Hence, the Japanese are refusing to import U.S. beef.

established. (Note in the asparagus discussion to follow, the length of time it took for the U.S. tariff elimination on Peruvian asparagus to basically knock out the Washington production of asparagus for processing.)

The WTO supported the United States' position that the Japanese fire blight restriction had no scientific basis.

The adjustment period not withstanding, U.S. Department of Agriculture analysts estimate that the Japanese demand for U.S. apples will now increase by about 5 percent and that the production of apples in Japan will drop by about 10.6 percent over time. The quantities involved will be substantial. It is estimated that in the absence of the fire blight standard, but with the codling moth standard still in place, Japan would have imported an annual average of 190,876 metric tons with a market value of $143.6 million![25] Most, but not all, of this trade would have been in U.S. apples, with a very high proportion from Washington and Oregon.[26]

To show the dramatic effect of this fire blight decision, note that Japan imported an average of only 581 metric tons of apples from all sources over the period 1999-2004. In short, after consumer tastes adjust in Japan and American producers ship higher quality apples to Japan, Washington growers should benefit dramatically. It is estimated that the demand increase will be in the range of 1.5 to 4 million boxes of apples a year.[27]

Clearly, trade restrictions matter and it is critical that sanitary and phytosanitary standards be strictly based on scientific evidence.

It is estimated that in the absence of the fire blight standard, but with the codling moth standard still in place, Japan would have imported an annual average of 190,876 metric tons with a market value of $143.6 million!

Mexico, Dumping, and Tariff Imposition on Apples

The North American Free Trade Act (NAFTA) came into effect on January 1, 1994. Under NAFTA, U.S. apple exports to Mexico were subject to a 15 percent tariff that was to drop two percentage points each year – completely ending the tariff in 2002. As a practical matter, this has not happened, though 13 years of NAFTA have passed. It turns out that agricultural trade between Mexico and the United States has become one of the most sensitive areas of NAFTA.[28] Unlike the story of Peru and asparagus, it appears that Washington state has a distinct comparative advantage in the production of high quality fresh apples, relative to Mexico. Consider the following:

[25] In view of this estimate, the United States government was seeking the authority from the WTO to impose $143.6 million dollars worth of trade sanctions against Japan.

[26] France is the largest exporter of apples in Europe. China is the largest producer. The U.S. has a significant transportation cost advantage over France for imports to Asia. Japan has a large range of phytosanitary standards that block all import of apples from China.

[27] *The Wenatchee World*. June 24, 2005.

[28] *TED Case Studies*. "U.S. Apples Are Not So Red Delicious." ***http://www.american.edu/TED/applemex.htm.***

"Historically, Mexico has been one of the Northwest's major apple export markets. In the 2000-2001 crop year, before the 46.58 percent duty (imposed in 2002), Washington shipped 9.8 million 42-pound boxes of apples to Mexico. In 2002-2003, exports to Mexico fell to 6.2 million boxes, and by 2003-2004, volume dropped to 3.9 million boxes." *Capitol Press*. October 10, 2005.

What is Dumping? The International Trade Administration, U.S. Department of Commerce defines "dumping" as follows:

"Dumping occurs when a foreign producer sells a product in the United States at a price that is below the producer's sales price in the country of origin ("home market"), or at a price that is lower than the cost of production. The difference between the price (or cost) in the foreign market and the price in the U.S. market is called the dumping margin. Unless the conduct falls within the legal definition of dumping as specified in U.S. law, a foreign producer selling imports at prices below those of American products is not dumping."

Washington shipped 9.8 million 42-pound boxes of apples to Mexico in the 2000-2001 crop year.

In the case of the U.S. charge against China for dumping concentrated apple juice, a third criterion of dumping was used: production of the product below the cost in which it is produced in a third country, such as India. The rationale here is that India is a market-based economy, while China is not. Thus, India's cost of production was used to represent the true cost of production in China for purposes of bringing the dumping charge.

Mexico's Initial Dumping Charge. In 1997, based on its charge that U.S. growers were "dumping" apples on the Mexican market, Mexico imposed an anti-dumping tariff of 101.1 percent on the importation of Washington Red and Golden Delicious apples, the varieties that currently dominate imports to Mexico. This tariff was negotiated down to 46.58 percent by 2002. Governor Locke, the Washington State Department of Agriculture, the Washington State Apple Commission, and the Northwest Fruit Exporters of Yakima ultimately negotiated a new agreement with Mexico that was to take effect February 28, 2005. Concessions to Mexico included efforts on the part of the Locke Administration to improve housing for migrant workers and their families in 1999 and schooling for the children of migrant workers in 2003.[29]

Concessions to Mexico included efforts on the part of the Locke Administration to improve housing for migrant workers and their families.

Subsequent Actions by Mexico. The tariff was finally removed in May 2005. However, Mexico has continued to investigate allegations of U.S. "dumping" and, as noted above, reinstituted a 44.67 percent tariff on many apple exporters in the Northwest

[29] See *WSDA News Release*. January 3, 2005. ***http://agr.wa.gov/news/2005/05-01.htm***

region and the rest of the United States, effective September 29, 2005. This charge by Mexico has apparently become relatively intractable, since the action may be, in part, retaliation against American growers of avocados, who have argued for phytosanitary restrictions against the importation of this fruit from Mexico. And, Florida tomato growers have successfully levied a charge of dumping against fresh Mexican tomatoes. In this complex world of international trade, apples in Washington become entangled with avocados in California and tomatoes in Florida.

In any event, from an economic standpoint, Mexico has chosen its target well. The downward responsiveness by Mexican consumers in terms of quantity demanded for these imported apples is proportionately large as the price of apples rises.[30] For the Mexican imported fresh apple market, each one-percentage point increase in the price of imported apples, due to this tariff, has resulted in a more than two percent drop in quantity demanded. The anti-apple tariff takes a very large bite out of the Washington apple export market.

In this complex world of international trade, apples in Washington become entangled with avocados in California and tomatoes in Florida.

The Current Situation in Washington. Currently--May 2006, one Yakima company has been granted tariff-free access to the Mexican market; another has been assigned a 2 percent tariff; a third has been assigned an 11 percent tariff, and five other companies will make special tariff deals with Mexico. All other apple exporters in the Northwest and the remainder of the United States will be subject to the newly imposed 45 percent tariff. *Note that Washington apple growers receive no trade distorting government supports, either state or federal, to assist them in the production of apples.*

Washington's Comparative Advantage in Apple Production vis-à-vis Mexico. Apart from being a possible retaliatory strategy in response to the American phytosanitary restrictions against Mexico for avocado imports to America,[31] the only significant explanation for this decade-long trade conflict is that Northwest growers most likely have a real comparative advantage over Mexican apple growers. Analysis of this issue by the IMPACT Center, an agricultural research organization at Washington State University, indicates that the United States exports apples worldwide to about 40 countries and has maintained its export market position over the period 1991-2000. However, Mexico has exported very, very few fresh apples at the prices world consumers are willing to pay. The index computed by IMPACT suggests that there is no meaningful international market position for fresh Mexican apples.[32]

Mexico has exported very, very few fresh apples at the prices world consumers are willing to pay.

[30] The price elasticity of demand, as this consumer behavior is known as, is apparently above 2.0. This estimate is consistent with that of Devadoss and Sreedharan. (2003). They estimate that U.S. apple exports would almost double in a free-trade – no tariff – world market.

[31] As of this date, the U.S. phytosanitary restriction against Mexican avocados has essentially been removed.

[32] Wahl, Thomas I. "US-China Agricultural Trade: How Competitive are We?" Testimony before the U.S.-China Economic Security Review Commission. January 13, 2005.

If tariffs are reduced such that no region in the world has tariffs higher than 25 percent on apples, U.S. apple exports are estimated to increase by 24 percent over current (2001) export levels.

A final irony, of course, is that Mexican migrant workers, who ship American dollars to Mexico, are a major source of seasonal labor in the Washington apple industry. Of course, the American dollars these workers earn are spent on American produced goods and services.[33]

A Final Word on Apple Tariffs. Researchers at Washington State University's IMPACT Center have recently attempted to measure the impact of trade barriers on the international trade in apples. The objective was to quantify the effect of removing part or all of these tariffs. They estimated two scenarios: One where tariffs on apples worldwide never exceed 25 percent in any given nation, and one where all tariffs have been removed. Overall, U.S. apple exports will increase in the event of general tariff reduction or tariff removal. The results are highly significant for Washington apple growers:

- If tariffs are reduced such that no region in the world has tariffs higher than 25 percent on apples, U.S. apple exports are estimated to increase by 24 percent over current (2001) export levels. America would increase exports to Mexico, Southeast Asia, India, Turkey, and the Middle East.
- In a world situation of no tariffs on apples, America exports even more apples to Turkey, the Middle East, and Mexico. It also replaces some imports of other nations to Europe. However, China's exports of apples replace U.S. exports to Southeast Asia and India.[34]

An unintended consequence of ATPDEA has been to decimate the production of asparagus in Washington and shift the entire Washington asparagus processing sector down to Peru.

Peru, ATPA, ATPDEA, and Tariff Reduction on Asparagus

In 1991 the Andean Trade Preference Act (ATPA) was signed into law. Its fundamental policy focus was to encourage Peruvian farmers to shift from the production of coca, from which cocaine is processed, and into the production of other agricultural products, such as asparagus. American tariffs have been sharply reduced or eliminated on the import of over 6,300 products from Peru, Chile, Colombia, and Ecuador.

An unintended consequence of ATPA, since then renamed and renewed in 2002 as the Andean Trade Promotion and Drug Eradication Act (ATPDEA), has been to decimate the production of asparagus in Washington and shift the entire Washington asparagus processing sector down to Peru. In addition to the estimate that labor represents about one half of the cost of production of asparagus, apparently Peru may have a comparative advantage in so far as the production of asparagus for processing – freezing and canning – is concerned.

[33] For 2003, it is estimated that $13.2 billion was remitted to Mexico by foreign or foreign-born individuals in America. See Manuel Orozco. "The Remittance Marketplace: Prices, Policy, and Financial Institutions." Institute for the Study of International Migration. Georgetown University. Washington, D.C. June 2004.

[34] Devadoss and Sreedharan. "Effect of Trade Barriers on U.S. Apple Exports (and) on Washington Apple Exports." (2003).

Chapter 1

The ultimate impact on Washington state asparagus production and processing has been dramatic, though the process took more than a decade to work itself out. As noted, according to the Washington Asparagus Commission, as of June 2005, all Washington processors have relocated to Peru. At the time ATPA was signed into law, about 2,800 metric tons of Peruvian asparagus were shipped annually to American markets. In 2004, imports exceeded 55,631 metric tons – a change by a factor of 19.87. Over the same period, Peruvian exports of frozen asparagus to America increased from about 175 metric tons to about 4,000 metric tons – a change by a factor of 22.86. (A metric ton is about 2,200 pounds.)

According to the Washington Asparagus Commission, as of June 2005, all Washington processors have relocated to Peru.

Table 3
Employment of Seasonal Workers in Asparagus Production
Washington State, 2000-2004
Source: ESD/LMEA

Year	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec
2000	10	8	570	5,338	7,113	6,096	615	219	90	126	0	0
2004	0	0	14	5,202	6,217	4,080	234	47	11	68	0	0
Difference	-10	-8	-556	-126	-896	-2,016	-381	-172	-79	-58	0	0

The seasonal employment level in asparagus production has changed dramatically, as shown in *Table 3*. Between 2000 and 2004, at the peak of the April-May-June harvest season, the number of June worker/months dropped by 2,016. This is equivalent to 168 worker/years. Over all, between 2000 and 2004, seasonal employment dropped by 4,302 worker/months, or about 358 worker/years. In 2004, the average annual wage earned by a worker in this type of agricultural production was about $5,325. While we cannot translate directly from worker/years lost to annual earnings lost, it is clear that the sum is considerable – approximating $2 million in wages.

Total cash receipts dropped by about 11 percent, from $54,876,000 to $49,420,000.

As of 2000, cash receipts for fresh Washington asparagus totaled $25,956,000 and receipts for asparagus to be processed totaled $28,965,000. In 2004, just four years later, these receipts were $32,956,000 for fresh and $16,464,000 for processed Washington asparagus. Total cash receipts dropped by about 11 percent, from $54,876,000 to $49,420,000 over this period.

The Final Result of ATPA/ATPDEA – The Washington Asparagus Sector Converts to Fresh. Thus, to remain viable, Washington asparagus producers must shift much more heavily into the production of fresh asparagus. It is estimated that

about 90 percent of the Washington crop must now go into the fresh market. This shift is occurring. Washington grew about 31 million pounds of fresh asparagus and 21 million pounds for processing in 2005. In 2006, the state is projected to grow an estimated 41 million pounds of fresh asparagus and 2 million pounds for processing.[35] The conversion to specializing only in fresh asparagus for the market is almost complete.

Comparative Advantage

The economic and international trade viability of Washington agriculture is fundamentally determined by the industry's comparative advantage in the production of its various crops and products. See the glossary for a detailed definition of comparative advantage.

To remain viable, Washington asparagus producers must shift much more heavily into the production of fresh asparagus. It is estimated that about 90 percent of the Washington crop must now go into the fresh market.

Trade occurs between two countries (or two firms, or two people) when each of the parties in a transaction can produce a good relatively cheaper in terms of the real quantities and qualities of resources used, compared to the other trading partner. For example, Mexico exports its relatively cheaper oil and natural gas to America, while America exports its relatively cheaper apples to Mexico.

Comparative Advantage in Apples – Washington State vs. China. The Peruvian asparagus situation and the Mexican apple situation highlight the important role of comparative advantage for Washington's international trade. There are no reliable measures of true comparative advantage for countries and products involved in international trade. Instead, an index of world market penetration for a given product is used as an indicator of comparative advantage. However, this index reflects the trade distortions and restrictions implemented by each nation engaged in trade and therefore, is only suggestive, at best, of true comparative advantage. As stated by Thomas I. Wahl, at IMPACT,

The average agricultural worker in America produces about $70,000 worth of output per year compared to about $3,000 per worker in China.

> "Measures of comparative advantage in international markets vary and are usually complicated. However, basic measures such as arable land per worker, agricultural output per worker, and wage rates for agricultural workers can suggest longer run competitiveness (in international markets)."[36]

The following facts apply, however, in considering the nature of economic production and exchange between America and China:

[35] Employment Security Department. Labor Market and Economic Analysis. *Agricultural Labor Market Employment and Wage Trends*. April 2006.

[36] Thomas I. Wahl, "US-China Agricultural Trade: How Competitive are We?" Testimony before the U.S.-China Economic Security Review Commission. January 13, 2005.

- Agricultural workers in America are much more productive than Chinese agricultural workers. The average agricultural worker in America produces about $70,000 worth of output per year compared to about $3,000 per average worker in China.
- Wage rates are much lower in China, which explains part, but not all, of the difference in measured production. Agricultural workers in America earn an average over $9.00 per hour, while workers in China earn about $0.70 per hour.

- Arable land is scarce in China – each agricultural worker has about 15 acres of land to till, while each agricultural worker in America has about 2,500 acres.
- Water and other environmental resources may be more constrained in China than in America.
- With its very large, low-wage labor supply, China likely has a comparative advantage in producing products that are labor intensive.
- America, with its large agricultural land base, diverse growing climates and relatively abundant water, and large proportions of human and physical capital, likely has a comparative advantage in producing land-intensive and capital-intensive products.

Arable land is scarce in China—each agricultural worker has about 15 acres of land to till, while each agricultural worker in America has about 2,500 acres.

China is the world's largest producer of apples, most of which are consumed domestically. China may have, or, may be able to develop, a comparative advantage in producing apples for fresh consumption. Recent evidence suggests that China is improving its real comparative advantage in fresh apple production. Between 1991 and 2000, China increased its relative penetration of world apple markets by a factor of more than five (5.35).[37] In 2003, China shipped 609,440 metric tons of fresh apples to overseas markets. This rose to 773,899 in 2004 – about a 27 percent increase. Two years does not define a trend, but this information, linked with the IMPACT analysis cited earlier, suggests that China's real comparative advantage in fresh apple production is improving, at least insofar as Washington fresh apples compete head-to-head in Indian, Asian, and Southeast Asian markets. Therefore, Mainland China is the most serious threat to Washington's ability to maintain its penetration of the fresh apple market in Asia.

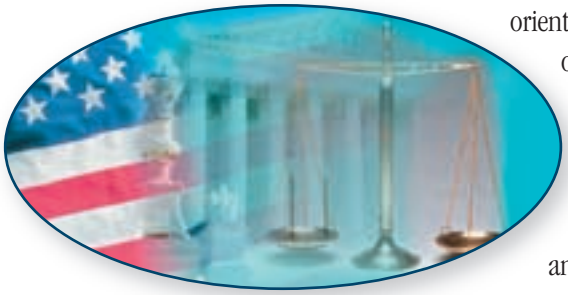
With respect to fresh apple production and production for concentrated apple juice, China is the elephant in the living room.

China, Concentrated Apple Juice, and Dumping. The fresh apple market aside, Washington and the United State's apple industry in general have already suffered significant competitive damage from Mainland China's exports of concentrated apple juice. With respect to fresh apple production and production for concentrated apple juice, China is the elephant in the living room. In 2003, China shipped 417,547 metric tons of concentrated

[37] Thomas I. Wahl. (2005).

apple juice abroad; this increased to 486,416 metric tons in 2004 – about a 16.5 percent increase.[38] In contrast, U.S. production of apple juice is estimated at only 85,000 tons in 2004/2005 and is likely to continue to decline. During this time, imports of concentrated apple juice to America totaled about 302,500 tons, about 78 percent of total demand.

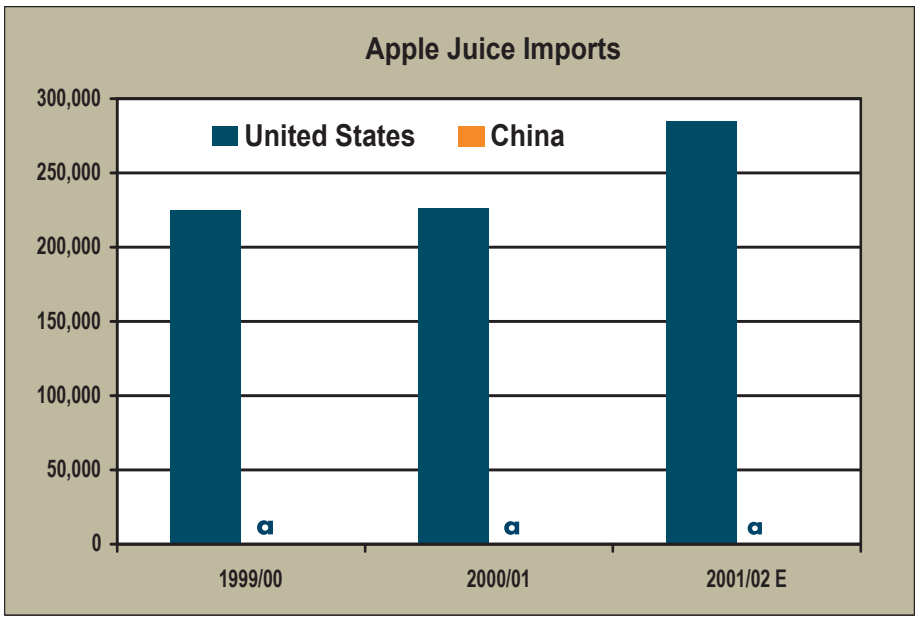
Between 1995 and 1998, Chinese exports of concentrated apple juice to the U.S. increased by more than 13 times – from 3,000 metric tons to 40,000 metric tons. Concentrate prices dropped by 50 percent. The U.S. apple industry filed a dumping complaint against Chinese exports of concentrated apple juice in June 1999. Apparently, this charge is justified – China's production "costs" did not reflect full production costs as determined in a market-oriented economy.[39] In 2000, the Department of Commerce levied a tariff of 54.55 percent on most Chinese apple juice imports.



As of September 2005, the U.S. International Trade Commission reaffirmed the charge of dumping against China.

This dumping issue is yet to be resolved. As of September 2005, the U.S. International Trade Commission reaffirmed the charge of dumping against China. This decision is the last step in the process to extend the U.S. antidumping order for five more years.

Figure 7
Apple Juice Imports in Metric Tons
China and the United States, 1999-2002
Source: United States Department of Agriculture
http://www.fas.usda.gov/htp/Hort_Circular/2002/02-05/Stats/Apple%20Juice%202002%20PSD.xls

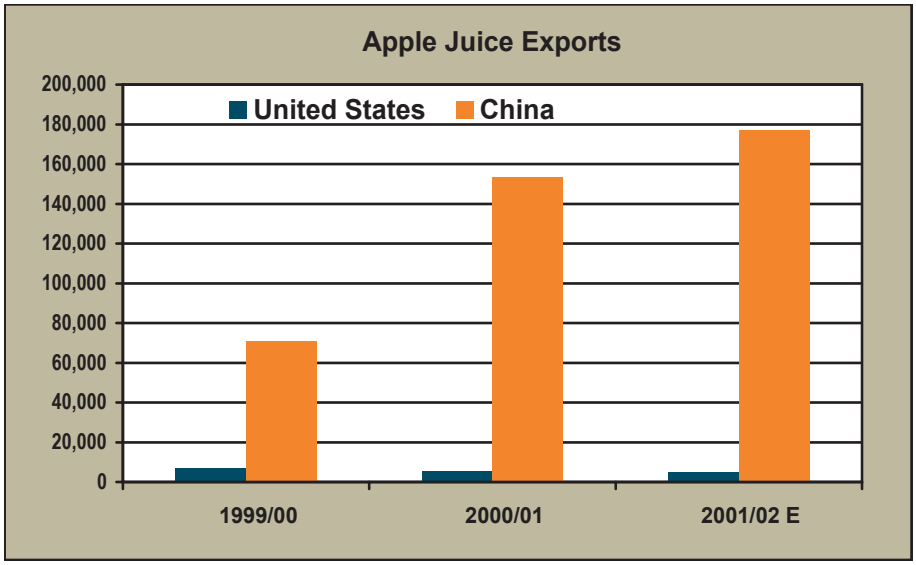


NOTE: [a] For China, apple juice imports, in metric tons, are 681 for 1999/00, 481 for 2000/01, and 594 for 2001/02. E = Estimated.

[38] USDA Foreign Agricultural Service. Global Agricultural Information Network (GAIN). GAIN Report Number CH 6017. April 13, 2006.

[39] Telephone communication with Dr. Thomas Wahl in April 2006 revealed that the older installations in the Chinese juice industry have benefited from loans from the Chinese central bank for which the industry has not repaid interest or principal. Thus, the cost of production of this industry sector does not reflect full economic cost – capital used in production is not being compensated. However, China is restructuring its apple juice sector and has recently imported and installed high-tech juice presses from Germany that may put China's juice industry on a more market-competitive footing as determined by the standards set by the World Trade Organization. Over time, China's entry to the WTO will force it to adhere to market-based costing and pricing standards.

Figure 8
Apple Juice Exports in Metric Tons
China and the United States, 1999-2002
Source: United States Department of Agriculture
http://www.fas.usda.gov/htp/Hort_Circular/2002/02-05/Stats/Apple%20Juice%202002%20PSD.xls



NOTE: E = Estimated.

Undocumented Workers in Washington State

The production and marketing structure of Washington agriculture is such that it relies very heavily on seasonal foreign migrant labor.

Agriculture in Washington is characterized by a wide range of seasonality factors that are crop-specific and weather sensitive in the growing and harvesting cycle. These factors affect planting, maintaining the crop through to harvest by such practices as selective pruning and de-budding, and the harvesting process itself. A further critical factor is that Washington agriculture's major products are destined for the high quality fresh consumption market. Because of the focus on the fresh consumption market for the dominant crops, the production process is highly labor intensive and results in sharp, crop-specific, short-term peaks in labor demand. For example, for 2005, during the cherry harvest, the peak harvest month employment is 708 times larger than during the lowest off-month labor demand. On a different dimension, 67.4 percent of all labor employed in strawberry production is hired during the peak harvest month. This percentage is 58.5 percent for cherries. In contrast, it is only 20.13 percent for apples and 13.21 percent for nursery workers.

Because of the focus on the fresh consumption market for the dominant crops, the production process is highly labor intensive and results in sharp, short-term peaks in labor demand.

About 115,284 seasonal worker/ months of undocumented labor would be devoted to apple production.

Because of these factors, the agricultural industry cannot maintain the employment conditions to sustain a permanent, year-round, local agricultural labor force.[40] Thus, Washington state agriculture, with its strategic focus on the fresh consumption market, is highly dependent on a seasonal migrant labor force. Beginning at about the start of the 20th Century, the Washington agricultural sector began its dependence on a seasonal migrant labor force, most of which is now of Mexican ethnicity.[41]

As *Table 4* shows, the United States Department of Labor estimates that undocumented workers in Oregon and Washington combined comprise about three-fifths of the total seasonal labor force. The proportion of undocumented workers in the United States, California, Oregon, and Washington has risen steadily since the 1989-1990 period such that it is estimated to be four times larger in 2001-2002 than in the beginning of this decade-long period.

About 24,806 seasonal worker/ months of undocumented labor would be devoted to cherry production, though due to the relatively tight harvest-time window, this dependence on undocumented migrant labor may be higher.

If these proportions are true, then during 2005, on average, 229,186 worker/months (358,104 x .64 = 229,186), of the state total of 358,104 worker/months of covered seasonal employment, were supplied by undocumented migrant workers. About 115,284 seasonal worker/months would be devoted to apple production by undocumented workers. About 24,806 seasonal worker/months would be devoted to cherry production by undocumented workers, though due to the relatively tight harvest-time window, this dependence on undocumented migrant labor may be higher.

Table 4

Percent Share of Undocumented Workers in the Agricultural Labor Force
United States, California, and the Pacific Region (Oregon and Washington), 1989-1990 to 2001-2002

Source: U.S. Department of Labor. Employment and Training Administration. Office of Policy Development and Research. Communication with Daniel J. Carroll. April 17, 2006.

Time Period	% All United States	% California	% Pacific Region
1989 – 1990	12	8	15
1991 – 1992	23	26	36
1993 – 1994	40	36	55
1995 – 1996	45	43	47
1997 – 1998	51	47	56
1999 – 2000	55	63	60
2001 – 2002	53	61	64

[40] See Thilmany, Dawn D. "Farm Labor Trends and Management in Washington State." (2001)

[41] At this time, American growers actually went down into Mexico to actively (and illegally) recruit workers, a practice resisted at the time by the Mexican government. See Spender. (2005).

Table 5
H-2A Summary of Certified Employers and Workers
U.S. Totals, Federal Fiscal Years 2004 and 2005
Source: U.S. Department of Labor. Employment and Training Administration. H-2A Regional Summary

Fiscal Year	Certified Employers	Certified Workers
2004	6,691	44,619
2005	6,602	40,366

Administration costs of H-2A are significant, adding to the producer's fixed cost of production.

Table 6
H-2A Adverse Effect Wage Rates (AEWR)
Washington, California, Idaho, and Oregon, 2006
Source: U.S. Department of Labor. Employment and Training Administration. New H-2A On-Line Application Processing System

State	Adverse Effect Wage Rate per Hour
Washington	$9.01
California	$9.00
Idaho	$8.47
Oregon	$9.01

For H-2A workers, the total cost of labor rises due to the Adverse Effect Wage Rates and other employment standards, and time is of the essence, during harvest in particular.

The H-2A Program. Could Washington agriculture function only by using legal migrant labor, based on how the H-2A law is currently constituted? Apparently not. Nationwide, only about 2 percent of seasonal farm workers have H-2A documentation. In contrast, for fiscal year 2001-2002, 78 percent of all crop workers in America were foreign born and 75 percentage points of this number were Mexican – about three out of five crop workers (75.0 percent x 78.0 percent = 58.5 percent).

Farm producers, whether in Washington or elsewhere in the U.S., typically do not use the H-2A program since:[42]

- It is perceived by employers to be time-consuming and costly to use in an industry where labor costs are already a high proportion of total costs:
  - Administration costs of H-2A are significant, adding to the producer's fixed cost of production,
  - The total cost of labor rises due to the Adverse Effect Wage Rates and other employment standards, and
  - Time is of the essence, during harvest in particular.

[42] See Deborah Waller Meyers. "Temporary Worker Programs: A Patchwork Policy Response." Migration Policy Institute. Washington, D.C. January 2006.

- It is perceived as not bureaucratically nimble enough to get legal workers on the job site
  - in large numbers, and
  - on very short notice.

Nationally, in 2005, a total of 40,366 H-2A workers were certified – mostly for work along the East Coast and Florida. About 6,600 agricultural employers were certified in 2005. Significant changes will have to be made in how the current H-2A program is designed and administered to make it nimble enough, and cost-effective enough, to serve as a guest worker program that could replace the current undocumented migrant labor force.

Recent Activity with H-2A Contracting in Washington State

Farm producers, whether in Washington or elsewhere in the U.S., typically do not use the H-2A program since it is perceived by employers to be time-consuming and costly to use in an industry where labor costs are already a high proportion of total costs.

Labor contracting, a labor market hiring process that can possibly accommodate the costs and strictures of the H-2A program, is increasing nationwide. Over the 2001-2002 federal fiscal year, nationwide,

> "Nearly four out of five crop workers (79 percent) were employed directly by growers and packing firms; farm labor contractors employed the remaining 21 percent. The share of workers who were employed by farm labor contractors increased by 50 percent between the periods 1993-1994 and 2001-2002, from 14 percent to 21 percent, respectively."[43]

In 2004 a labor contractor, Global Horizons, operating out of Los Angeles, California, imported 170 Thai workers to the Yakima Valley under the H-2A program. In 2005, there were media accounts citing plans to import up to 1,000 Thai workers. This did not occur.[44] The firm's farm-labor contractor's license was revoked in Washington in May 2005 for failure to correct several state labor and insurance law violations involving thousands of dollars of underpayments of wages to workers and workers' compensation premiums, among other things. In September 2005, the Washington State Labor and Industries Department and the Employment Security Department gave a limited reinstatement to Global Horizons to operate in the state.

[43] *National Agricultural Workers Survey*. Chapter 5: Farm Job Characteristics. U.S. Department of Labor. Employment and Training Administration.

[44] As of March 2006, plans were being re-opened to hire 1,000 H-2A workers for the Yakima region. However, for the crop season, about 30,000 seasonal workers are needed in that region. See the account in the Yakima Herald-Republic, March 19, 2006. The website address is: **www.yakima-herald.com**

Several Yakima Valley employers favor the importation of these Thai workers even though the hourly Adverse Effect Wage Rate to be paid is $9.01 in 2006. In addition, various other worker benefits and firm requirements relative to worker housing, travel, and safety, drive the hourly wage rate even higher to over $12 per hour.[45] Some growers argue that they are willing to pay such increased wages since these particular H-2A workers will remove the burden of hiring undocumented workers, given the current political climate. Also important is the fact that the Thai workers, hired for relatively long duration, are a more stable labor force. Migrant workers, whether they speak English or Spanish, are able to easily move about the state's farms and growing regions in search of higher wages. There are media reports of perishable crops left unpicked in 2005 as a result. Thai workers, thus far, have been tied to given farm operators for specified durations. They do not have the language facility or networks whereby they could move about in search of higher wages.

An important factor in this situation is the United Farm Workers of America. The UFW has dropped its historical stance against the H-2A program since Global Horizons has agreed with the union to a three-year contract. This contract covers any local U.S. worker and those temporary foreign guest workers hired by Global Horizons for the farm operators. An apparent check-off from the workers' hourly wage rate of about 18 cents an hour will go to the union. The union will use these funds to help administer the contractual agreement in the field.

Some growers argue that they are willing to pay such increased wages since particular H-2A workers will remove the burden of hiring undocumented workers, given the current political climate.

It is too soon to determine if this new institutional arrangement for what amounts to a labor contractor/union labor exchange will catch on in the state. In the meantime, three Yakima Valley farm workers are suing Global Horizons and two local growers in federal court. The alleged complaint is that these companies have violated state and federal laws by intentionally displacing them with the Thai workers.

Summary – Two Key Issues Facing Washington Agriculture

Many issues affect the productive health and world competitive position of Washington state agriculture. Due in part to the fresh product markets it serves and its methods of production, Washington state agriculture is affected by two issues in particular:

- International trade in agricultural commodities and the high degree of world protectionism there, and
- The international movement of seasonal labor in an industry where many products are labor intensive in their production.

[45] This hourly figure is the Adverse Effect Hourly Wage Rate. In addition to this hourly rate, the grower using Global's services will pay 45 percent, or $4.05 per hour to cover costs associated with recruiting and housing these workers. Total hourly labor cost is estimated to be $12.74 per hour – $5.11 higher than the 2006 state minimum of $7.63 per hour.

International Trade

Due to the large differences in conditions for agricultural production – climate, soil, water, etc. – in the two regions, Washington state agriculture should benefit.

America has responded to the issue of protectionism in foreign markets and to threats to American agriculture with a series of bilateral and regional trade agreements. Some of these agreements, as with ATPA and ATPDEA, have policy objectives that are outside of the sphere of simply maintaining an economically viable agricultural industry in America. For ATPA and ATPDEA, the policy concern focuses heavily on increasing agricultural and economic development so that these nations will shift from producing coca leaves and into producing agricultural products and other goods. The jury is still out on whether Andean/South American production of illicit drugs has dropped, but the American and Andean agricultural communities have begun significant adjustment in their agricultural production and trade. However, CAFTA involves significant changes in agricultural production and trade with a half dozen Central American and Caribbean nations. Due to the large differences in conditions for agricultural production – climate, soil, water, etc. – in the two regions, Washington state agriculture should benefit from this multi-lateral agreement.

Trade restrictions can be retaliated against and the World Trade Organization can be appealed to for settling disputes among trading partners.

National and state policy makers have been very active in dealing with non-competitive threats to Washington agriculture. Trade restrictions can be retaliated against and the World Trade Organization can be appealed to for settling disputes among trading partners. The fire blight case with Japan is a major victory. Negotiations with China on the concentrated apple juice dumping charge are ongoing.

On a broader front, U.S. trade representatives have been pushing an aggressive set of reforms before the World Trade Organization. As an example of this very detailed and technical effort, the U.S. proposes a three-stage reform:

- ***Initation of Reduction of Trade Distortions.*** In its proposal, the U.S. Trade Representative refers to this as *Stage 1*. This stage involves a five-year phase-in of substantial reductions of trade distorting measures and tariffs. Worldwide, the lowest tariffs would be cut by 55 percent and the highest ones by up to 90 percent. All export subsidies would be eliminated by 2010, for example.
- ***Fallow Period.*** Following *Stage 1*, there would then be a five-year pause while the nations' economies absorbed these changes.
- ***Elimination of All Remaining Trade Distortions.*** Referred to as *Stage 2*, this stage involves an additional five-year phase-in period that would eliminate the remaining trade distorting subsidies and tariffs in world agriculture. (Office of the United States Trade Representative. December 2005. See also USDA Foreign Agricultural Service. "What is U.S. Agricultural Trade Policy?")

As local and regional media reported, these proposals went nowhere at the WTO meetings held in Hong Kong in December 2005. The WTO ministers apparently could not even reach agreement on ground rules on how to proceed in the liberalization of world agricultural markets.

Western U.S. agriculture and Mexican migratory workers have developed a close complementary economic relationship over time.

Thus, the state and nation will continue to rely on bi-lateral negotiations and multi-lateral regional agreements that, in effect, set up customs unions like the European Union (EU). Most recently, these efforts have been highlighted by the visit to Washington state of Premier Hu Jintao of China and President Vincente Fox of Mexico. Mexico and China are two of the largest trading partners of both America and Washington state.

Migrant Workers and "AgJobs"

Western U.S. agriculture and Mexican migratory workers have developed a close complementary economic relationship over time. Along with other factors – climate, technology, infrastructure, and domestic farm operations skills – this relationship has enhanced the evolution of Washington agriculture into the production of high quality fresh products for consumption. This migratory labor contributes to, but does not uniquely determine, a strong comparative advantage for Washington agriculture in the production of many fresh crops, most visibly in apples and cherries.

This relationship has a long and troubled history. The events of September 11, 2001 have complicated this history even further. These complications have resulted in a hue and cry for immigration reform.

This relationship has a long and troubled history. The events of September 11, 2001 have complicated this history even further. These complications have resulted in a hue and cry for immigration reform. A number of revisions to immigration law have been proposed, some of which would have the effect of crimping off the flow of undocumented seasonal workers to the United States. This issue extends well beyond the borders of Washington state. The Pew Hispanic Center, a non-partisan research organization, estimates that 11.5 to 12 million undocumented migrants live in America as of March 2005. Of these, 4.7 million are children. "Some 3.2 million are U.S. citizens by birth, but are living in 'mixed status' families in which some members are unauthorized, usually a parent, while others, usually children, are Americans by birthright." (Pew Hispanic Center. June 12, 2005). About 7.2 million of these migrants are estimated as being employed.

The largest share live in California (from 2.5 to 2.75 million) and Florida (between 1.4 and 1.6 million). Between 200 to 250 thousand live in Washington. Between 125 and 175 thousand live in Oregon.

Senators Larry Craig and Ted Kennedy have proposed the *Agricultural Job Opportunity, Benefits, and Security Act of 2005* (AgJobs) as one of the efforts to bring order back into the seasonal migrant farm labor force. The proposed act has three titles. Title I deals with the "Adjustment of Agricultural Workers to Temporary and Permanent Resident Status." Titles II and III deal with the Reform of the H-2A Temporary Seasonal Agricultural Program.

In the short run, for Washington state, Title I is the most important provision. This title allows undocumented individuals to apply for temporary resident status if they can demonstrate they have worked in America 100 days or more during a 12-consecutive-month period during the 18-month period ending on December 31, 2004. During the period of temporary resident status, the farm worker is authorized to work in America. He or she can move about freely in America, travel abroad, and re-enter the United States.

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Where Matters Stand. In mid-October 2005, Governor Gregoire "urged . . . swift approval of the federal AgJobs immigration bill" (Yakima Herald. October 12, 2005). While provisions of the bill are detailed and complex, a key aspect of the bill for Washington is that it sets up a legal pathway for undocumented migrants to acquire legal residency while continuing to work in the agricultural sector. This is a crucial factor in light of the special nature of agriculture in the state.

Chapter 2

The Agricultural Industry in Washington State

Introduction

This chapter sets forth the broad dimension of agricultural production and value added which then serves as the context for the discussion of employment of agricultural employment in the state: Covered employment over all; the permanent, year-round component of the agricultural labor force; the seasonal component; and the component of migrant workers.

No farm operator will hire an agricultural worker unless the agricultural service or product produced by that worker can be sold at a price that covers costs.

The Total Value of Production[46]

As emphasized in *Chapter 1*, the demand for labor is a derived demand. No farm operator will hire an agricultural worker unless there is a reasonable expectation that the agricultural service or product produced by that worker can be sold at a price that covers the farm operator's costs, including his or her implicit wage rate, and a reasonable profit.[47]

Current Dollars. In current dollars (not adjusted for inflation over time) agriculture has been a $5.5 billion to $6.0 billion industry for the past decade. The total value of production in 2004, the year of latest data, is $5,942,091,000. This is the highest value of production since 1995, when the total value of production was $5,921,555,000 in 1995 current prices. The production value of total crops is $3,728,703,000. Of this total, the value of field crops is $1,798,977,000 and the total value of fruits and nuts is $1,485,034,000. Commercial vegetables yielded $365,930,000 and berry crops yielded $78,762,000. Livestock and products yielded $1,678,414,000 and specialty products[48] yielded $534,974,000. Government payments are only $197,011,000. This is down from $352,503,000 in 2000, but it is higher than the figure for 1995 – $116,062,000.

In constant dollars, the market value of agricultural production in the state has fallen over time.

Constant Dollars.[49] Converting the current dollar value into an inflation-adjusted constant dollar quantity gives a more accurate view of the market value of production over time. As we can see from *Figure 9*, in constant dollars, the market value of agricultural production in the state has fallen over time. Here we see that in the ten-year period from 1995 to 2004, the constant dollar value of production fell from about $5.9 billion to $4.8 billion. Thus, in terms of 1995 dollars

[46] Appendix Tables 3 and 4 display these data. These data are taken from 2005 Washington Annual Statistical Bulletin. 2005 Washington Agricultural Statistics. USDA/National Agricultural Statistics Service. Washington Field Office.

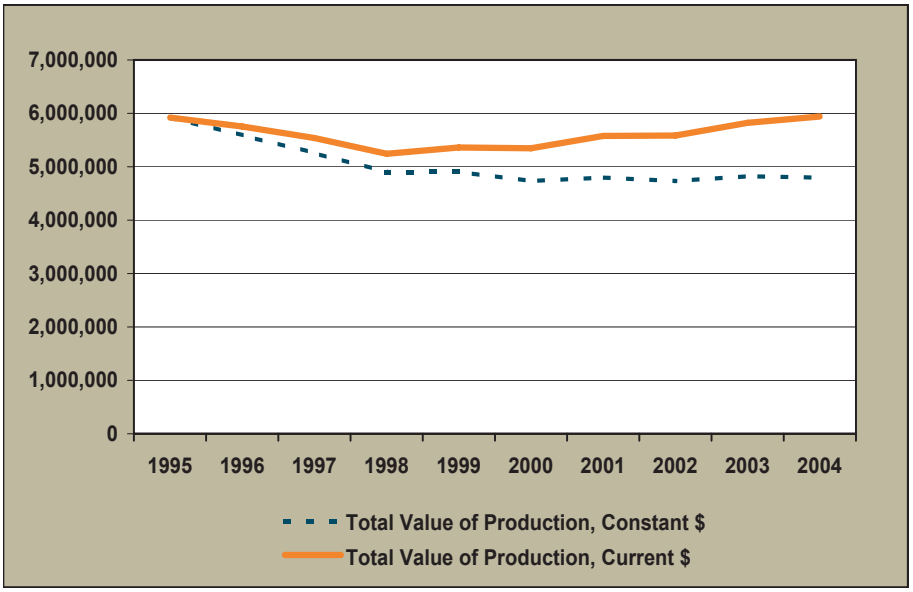
[47] Again, we note that under some unfavorable marketing conditions, a farm producer may sell his or her output at less than the full cost of production plus a profit. In such a case, the farm producer will sell the output as long as his or her direct production costs are covered plus at least some of the fixed costs of operating the agricultural enterprise – e.g., the cost of rented land, interest and principal on any loans.

[48] This category includes forest products, Christmas trees, floriculture, nursery and other horticultural products and agaricus and other mushrooms.

[49] Throughout this chapter and the remaining study, constant dollar prices are all calculated using the CPI Inflation Calculator. "The CPI inflation calculator uses the average CPI for a given calendar year. This data represents changes in prices of all goods and services purchased for consumption by urban households..." The web address for this useful calculator is: ***http://data.bls.gov/cgi-bin/cpicalc.pl.***

(or purchasing power), the real value of state agricultural production has dropped by about 19.0 percent. The constant dollar value of government payments rose over the two time periods from $116.0 million to about $158.9 million. The inflation-adjusted or real value of government payments has increased by 36.9 percent between 1995 and 2004. Thus, the agriculture industry in the state has become somewhat more dependent on government payments. Government support as a percent of total agricultural production revenues has increased, in real terms, from 1.95 percent to 3.31 percent between 1995 and 2004.

Figure 9
Production Value of Washington's Agriculture
of Current (Nominal) and Constant Dollars (Inflation-Adjusted), 1995=100.0
Washington State, 1995-2004
Source: ESD/LMEA



Value Added to the Economy by the Agricultural Sector

Value added is the difference between the total market value of the output sold and the total cost of the agricultural inputs purchased to create that output. *Table 7* on page 35 shows these data for 2004. We see that gross value added is 58.75 percent of the value of final agricultural output. Net value added, which is gross value added minus capital consumption, is 52.32 percent of the value of final agricultural output. One way to look at this picture is to say that farm producers purchase a given set of productive inputs, and by adding their own effort and skills, plus adding the labor and skills of others, double the value of those purchased inputs.

Government support as a percent of total agricultural production revenues has increased, in real terms, from 1.95 percent to 3.31 percent between 1995 and 2004.

2,441,310 individuals work west of the Cascades and 668,610 work east of the Cascades.

Derived Demand for Labor. However, our measure of the value of the derived demand for labor is employee compensation – payments to total hired labor. This sum is $1,168,785,000 – 17.82 percent of the value of final agricultural output and 24.5 percent of the total cost of production.[50] This sum is simultaneously the value added by total hired labor and the cost to the farm operator of the total amount of labor hired. As a measure of the cost of labor to the farm operator, this sum can be considered the annual wage bill for agricultural labor in the state.

Table 7
The Value Composition of Total Agricultural Output, Current Dollars
Washington State, 2004
Source: ESD/LMEA Appendix Table 4

Component of Agricultural Output, 2004	Dollar Value in $1,000s	Percent of Total
Value of Final Agricultural Output	6,558,953	100.00
Total Intermediate Consumption Outlays	2,721,631	41.49
Gross Value Added	3,853,691	58.75
Net Value Added	3,431,342	52.32
Employee Compensation - Total Hired Labor	1,168,785	17.82
Net Farm Income	1,787,298	27.25

Total Employment

For 2005, total employment in the state is estimated at 3,109,900 workers. Of these, an estimated 2,441,310 individuals work west of the Cascades and 668,610 work east of the Cascades, where most state agricultural production takes place.

Table 8
Total Employment and Agricultural Employment
Washington State and Selected Areas, 2005
Source: ESD/LMEA

	Total Employment	Agricultural Employment	% of Total County Employment	% of Total State Agricultural Employment
WASHINGTON	**3,109,900**	**93,186**	**100.0%**	**100.0%**
Western	2,441,310	20,369	78.5%	21.9%
Eastern	668,610	73,676	21.5%	79.1%
AGRICULTURAL AREA				
Columbia Basin	**43,310**	**10,900**	**1.4%**	**11.7%**
Adams	7,720	2,136	0.2%	2.3%
Grant	35,590	8,763	1.1%	9.4%
North Central	**94,040**	**19,400**	**3.0%**	**20.8%**
Chelan & Douglas	56,460	12,732	1.8%	13.7%
Kittitas	18,160	1,066	0.6%	1.1%
Okanogan	19,420	5,602	0.6%	6.0%
South Central	**118,770**	**24,396**	**3.8%**	**26.2%**
Klickitat	8,770	1,495	0.3%	1.6%
Yakima	110,000	22,901	3.5%	24.6%
South Eastern	**136,290**	**14,119**	**4.4%**	**15.2%**
Benton-Franklin	108,700	10,746	3.5%	11.5%
Walla Walla	27,590	3,373	0.9%	3.6%
Eastern	**276,200**	**4,862**	**8.9%**	**5.2%**
Lincoln	4,500	682	0.1%	0.7%
Spokane	215,400	1,532	6.9%	1.6%
Whitman	19,730	1,052	0.6%	1.1%
Asotin	9,620	159	0.3%	0.2%
Other Eastern Areas	26,950	1,436	0.9%	1.5%

[50] In contrast, for United States apple growers, labor represents 40.0 percent of the total costs of production. See Good Fruit Grower Vol. 56. No. 2. January 15, 2005. page 26. Dr. Bruce Barritt, Washington State University conducted the cost study with Jim Du Bruille, Wenatchee Valley College.

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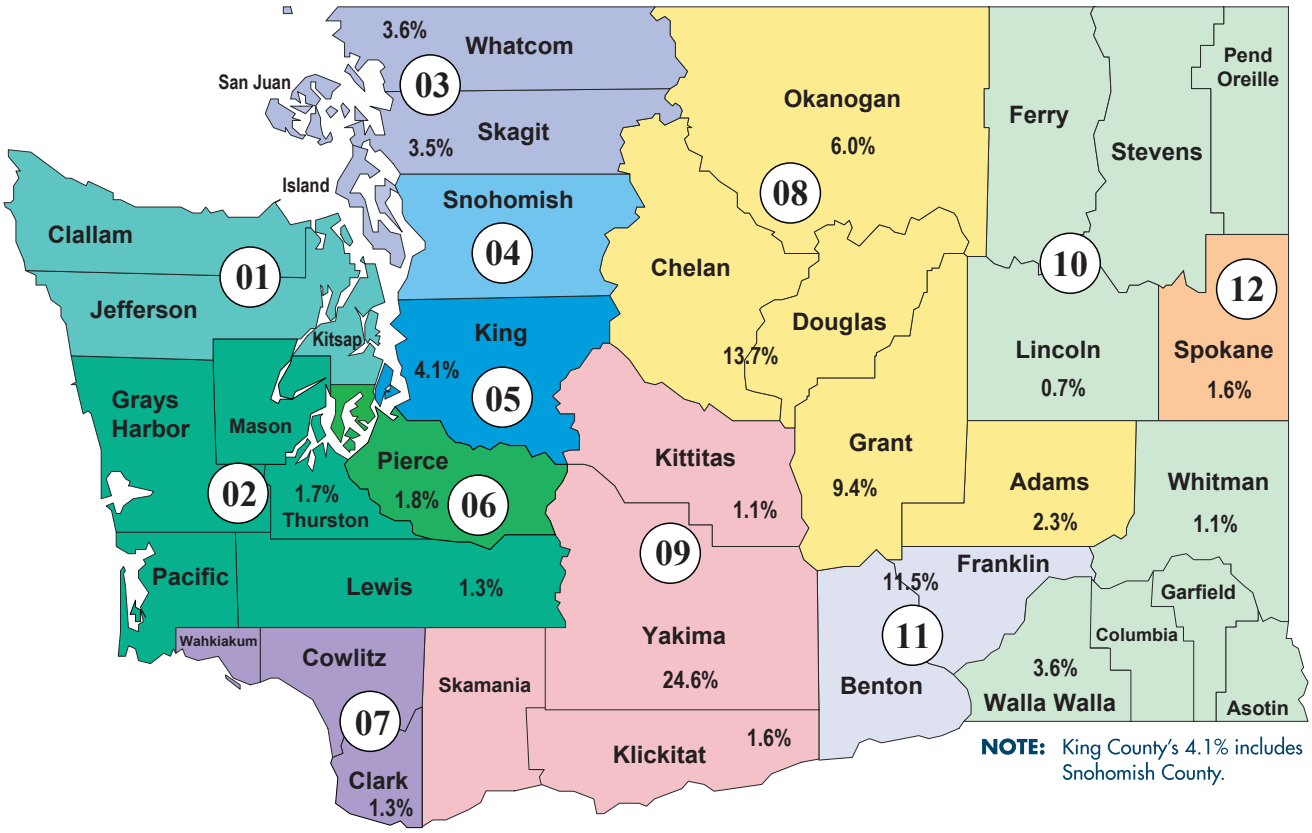
Figure 10
County Percentage of Total Agricultural Employment
Washington State, 2005*
Source: ESD/LMEA, Appendix Table 16



Total agricultural employment, based on the Quarterly Census of Employment and Wages (QCEW) and the non-UI-covered employment based on the 2002 Census of Agriculture, is estimated at 93,186 individuals. Of these, 73,676 are estimated to work east of the Cascades and 20,369 are estimated to work west of the Cascades. These eastern agricultural workers find their jobs concentrated in the central counties that comprise Workforce Development Areas 08, 09, and 11, as shown in *Figure 10*. Indeed, the nine counties that comprise these three regions account for seven-tenths (70.2 percent) of all agricultural employment in the state in 2005. Yakima County alone accounts for about one-fourth (24.6 percent) of all agricultural employment in the state. While they differ somewhat year to year, these patterns have been consistent over the past decade.[51]

Distribution of Employment by Sub-Sector

In 2004, the year for which we have the latest data, there are an estimated 7,059 firms in the direct agricultural production sector providing an estimated 73,076 jobs. This presents a 3.6 percent increase in the number of firms over 2003 and about a 14.2 percent

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

[51] In the Yakima MSA, for April 2004, 2005, and 2006, the percents are 22.6, 23.3, and 23.3, respectively.

The number of firms in total food manufacturing increased by 7.8 percent to 1,039 firms, while the jobs provided decreased by 2.3 percent to 37,203.

percent increase in the number of jobs.[52] During this period, the number of firms in total food manufacturing increased by 7.8 percent to 1,039 firms, while the jobs provided decreased by 2.3 percent to 37,203.

Total Production Agriculture. *Appendix Table 5* displays the breakout of employment (workers in jobs) by four-digit NAICS sub-sectors.[53] The top five sources of employment are:

1. Fruit tree and nut farming – 36,761 or 50.3 percent of the total
2. Support activities for crop production – 11,421 or 15.5 percent
3. Other crop farming – 6,553 or 9.0 percent
4. Greenhouse, nursery, and floriculture – 5,067 or 6.9 percent
5. Vegetable and melon farming – 4,649 or 6.4 percent

For this group of top five sources, except for other crop farming, where the number of jobs fell by 1.3 percent from 2003 to 2004, jobs rose in the remaining four sub-sectors by between 4.2 percent (vegetable and melon farming) and 9.5 percent (support activities for crop production).

Table 9
Comparison of Agricultural Firms and Jobs
Washington State, 2003 Versus 2004
Source: ESD/LMEA, Appendix Table 5

	Number of Firms		Percent Change,	Number of Jobs		Percent Change,
	2004	2003	2003-2004	2004	2003	2003-2004
Total Production Agriculture	7,059	6,812	3.6	73,076	63,987	14.2
Total Food Manufacturing	1,039	964	7.8	37,203	38,083	-2.3

Seafood product preparation and packaging is one of the top five sources of jobs for workers in the total food manufacturing sector.

Total Food Manufacturing. The top five sources of jobs for workers in the total food manufacturing sector are:

1. Fruit and vegetable preserving and specialty – 10,133 or 27.2 percent
2. Seafood product preparation and packaging – 6,465 or 17.4 percent
3. Animal slaughtering and processing – 5,689 or 15.3 percent
4. Bakeries and tortilla manufacturing – 5,128 13.8 percent
5. Beverage manufacturing – 3,541 or 9.5 percent

[52] Note that a worker may be employed at more than one agricultural job during a given production year.
[53] NAICS = North American Industry Classification System.

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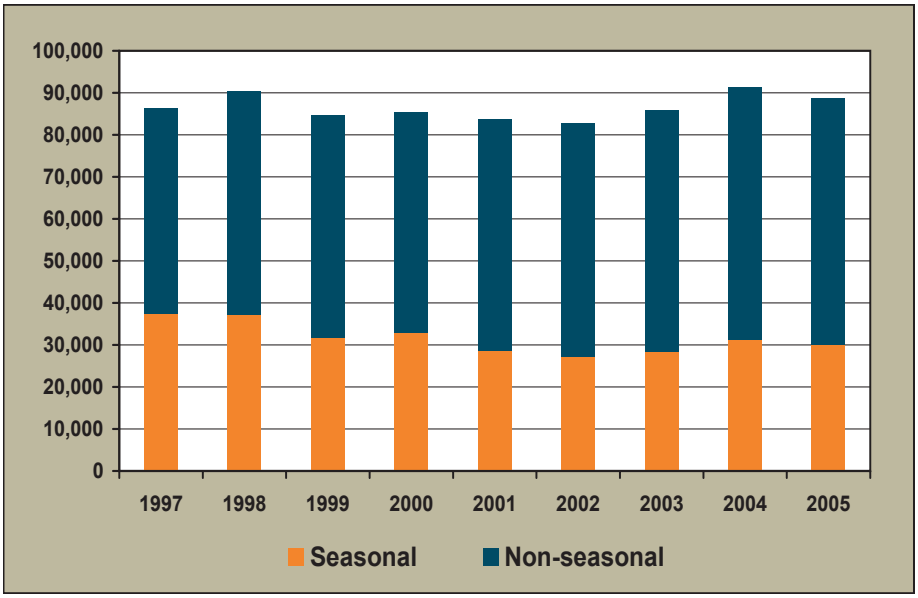
Except for seafood product preparation and packaging, where the jobs increased by about 1.0 percent compared to 2003, jobs in this set of top five job providers fell in the remaining four sub-sectors between 2003 and 2004. The reasons for these decreases have not been determined. In broad terms, they could fall because of an increase in labor productivity – a positive reason – or they could fall due to a decline in demand for the products – a negative reason.

Finally, as one can see, the total food manufacturing sector is not nearly as concentrated in its seasonal demand for labor as is the agricultural production sector. For direct agricultural production, fully half of all seasonal labor is demanded by the fruit tree and nut farming sector. This does, however, have the effect of concentrating more than one-fourth (27.2 percent) of the food manufacturing seasonal labor in the fruit and vegetable preserving and specialty sector.

For direct agricultural production, fully half of all seasonal labor is demanded by the fruit tree and nut farming sector.

Seasonal Employment Patterns

Figure 11
Average Monthly Employment, Seasonal and Non-Seasonal Workers
Washington State, 1997-2005
Source: ESD/LMEA



Permanent Versus Seasonal Employment. *Figure 11* sets forth the average monthly seasonal and non-seasonal employment in the state's agricultural sector for 2005.[54] Two observations are pertinent:

[54] This statistic is calculated by summing the annual monthly employment for the year in question and then dividing by 12.

- First, compared to total agricultural production, over the nine-year period, the proportion of seasonal farm labor has been steadily dropping. In 1997, it represented more than two-fifths (43.4 percent) of average monthly employment. By 2005, it represents about one-third (33.7 percent) of average monthly employment.

- Second, since these numbers represent the annual total of monthly employment divided by a constant, 12, the total annual number of seasonal workers has been dropping steadily over time. At this time, the reasons for this phenomenon are not clear. As suggested above, from the standpoint of the agricultural industry, the reasons may be both positive, such as an increase in labor productivity, or negative, such as a drop in demand for Washington's agricultural production.

The pattern is twin-peaked, with one peak in either June or July, depending mostly on the weather, and the other in September or October, again depending on the weather.

Historical Seasonality. Historical seasonality has changed little in the past decade or so. The pattern is twin-peaked, with one peak in either June or July, depending mostly on the weather, and the other in September or October, again depending on the weather. *Figure 12* shows the pattern quite clearly.

Figure 12
The Twin Peaks of Seasonal Agricultural Work
Washington State, 2004 and 2005
Source: ESD/LMEA

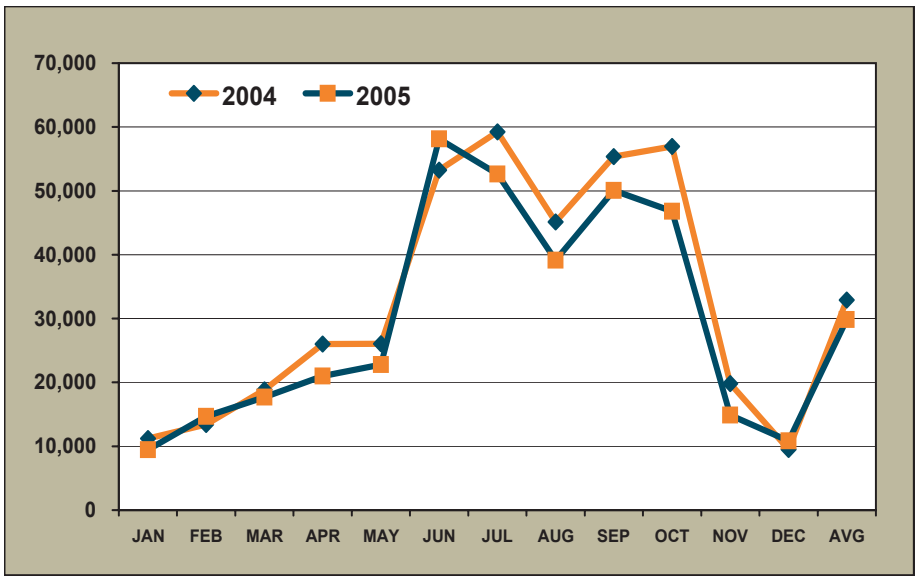
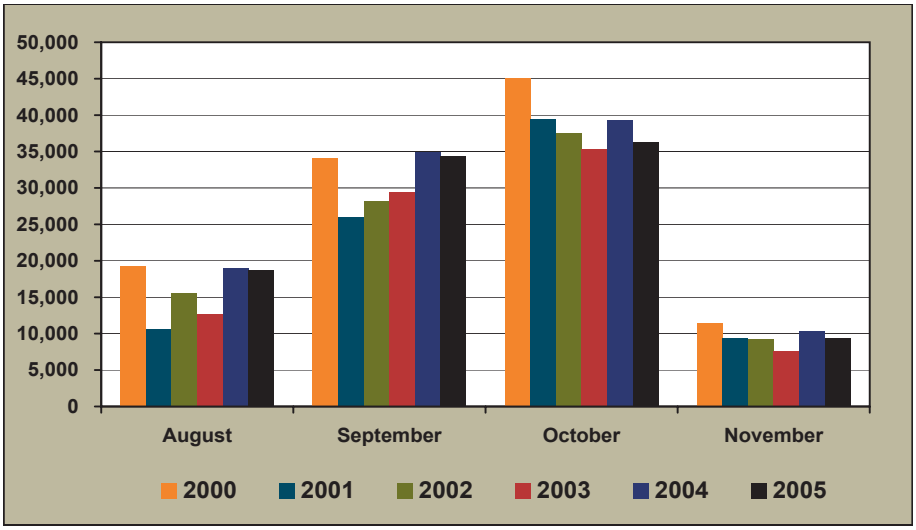


Figure 12 shows the effect of the precipitation shortage in 2005 compared to 2004. From April 2005, on through November, the demand for seasonal employment was lower. Almost all of this pattern was due to weather change, since most of the pattern is driven by apple and cherry production as is shown in *Figure 13*.

Figure 13
Apple Harvest Employment Largely Drives Seasonal Employment Patterns
Washington State, August-November, 2000-2005
Source: ESD/LMEA



Seasonal Structure. *Figure 14* shows the crop-specific seasonal structure of employment. Here one clearly sees the degree to which seasonal employment is driven by a few key crops – apples, cherries, and other berries. This dominance by selected crops that are sensitive to variations in seasonal weather patterns adds to the volatility of seasonal worker demand, by crop and across the state. The 2005 monthly patterns are as follows:

Seasonal employment is driven by a few key crops—apples, cherries, and other berries.

Figure 14
Crop-Specific Seasonal Agricultural Employment
Washington State, 2005
Source: ESD/LMEA

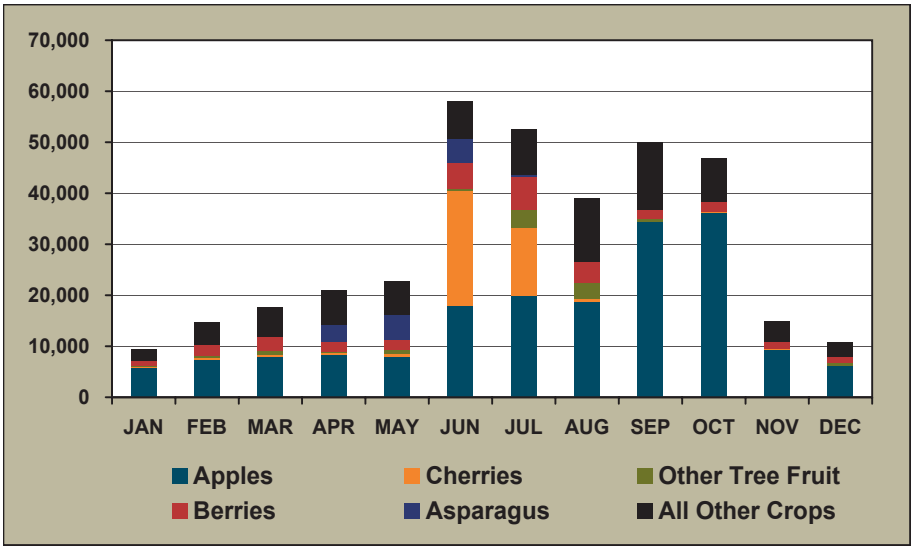


Figure 15
Top Ten Crops by Percent of Total Worker Months
Washington State, 2005
Source: Appendix Table 7

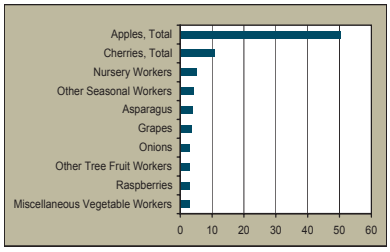


Figure 16
Top Ten Crops by Ratio of Highest Employment Month to Lowest, Relative to Apples
Washington State, 2005
Source: Appendix Table 7

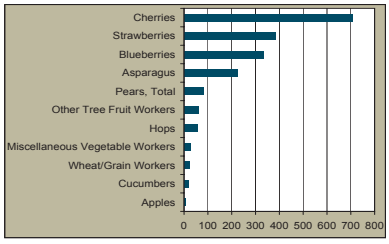
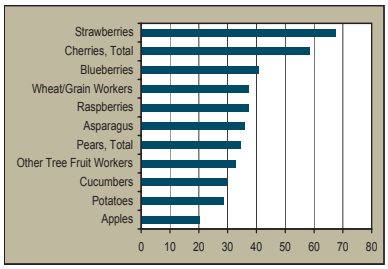


Figure 17
Top Ten Crops in Percent of Peak Crop Worker Months to Total Worker Months, Relative to Apples
Washington State, 2005
Source: Appendix Table 7



- January has the lowest total seasonal employment. Yet, apples comprise 60.9 percent of the seasonal employment in January! The next four crops, in order of importance are: raspberries, nurseries,[55] onions, and pears.
- Apples comprise 50.8 percent of February's seasonal employment, followed, in order, by nurseries, grapes, onions, and bulbs.
- In March, apples comprise 44.9 percent of seasonal employment followed by grapes, nurseries, onions, and other tree fruit.
- April is dominated by apple workers, at 40.0 percent of seasonal employment, followed by asparagus, nurseries, onions, and other seasonal workers.
- The employment share in apples drops to 34.3 percent in May, followed by the peak of asparagus production, then followed by nurseries, other seasonal workers, and grapes.
- The first seasonal peak in employment for the growing year hits dramatically in June, with an estimated 58,137 workers – a jump from May of over 35,000 workers. Of these June workers, 39.0 percent are employed in cherries, followed by 30.8 percent in apples, then followed by asparagus, strawberries, and other seasonal workers.
- Apples recover their seasonal employment dominance in July at 27.8 percent, followed by cherries at 25.5 percent, then raspberries, other tree fruit, and other seasonal workers.
- In August, cherry production is essentially finished and measured seasonal employment in this sub-sector becomes zero in September. Apples now comprise 47.9 percent of seasonal employment followed by other tree fruits, miscellaneous vegetables, other seasonal workers, and pears.
- September is the second seasonal peak in employment, dominated by apples at 68.8 percent of the 50,063 total seasonal employment. Pears are next, followed by miscellaneous vegetables, other seasonal workers, and potatoes.
- By October, apples comprise 77.5 percent of seasonal workers! This is followed by potatoes, miscellaneous vegetables, pears, and grapes.

[55] "Nurseries" are defined in the North American Industry Classification System (2002) as: "Greenhouse, Nursery, and Floriculture Production."

- By November total seasonal employment drops by a small army of about 30,000 workers. Apple workers comprise 63.1 percent of the total of 14,900 seasonal workers remaining. This is followed by other seasonal workers, nurseries, raspberries, and onions.

- December is second in terms of lowest total seasonal employment. Apples now comprise 56.3 percent of the total employment of 10,845 workers. These are followed by an estimated 975 raspberry workers, 650 onion workers, 618 nursery workers, and 442 pear workers.

The Issue of Labor Shortage: Volatility in Covered Seasonal Agricultural Employment. A constant and intense concern of farm operators is over the issue of labor shortages. The diverse seasonal pattern of demand for reliable, seasonal workers having the requisite skills for a given crop, the growing, maturation, and harvesting characteristics and requirements of each crop, and the annual and daily variability in the weather, both rainfall and temperature, create a situation of great volatility in demand. This volatility can result, on any given day for any given crop, in a shortage or surplus of seasonal labor in a particular locale. Thus, by the term "volatility," we mean to describe the labor demand situation where, say, at the beginning of the week, the seasonal demand for labor may be zero or close to zero. Then, during the week, temperatures change, rain threatens, and the demand for seasonal labor is now large and immediate.

Table 10 shows this volatility in detail. It is important to recognize that this volatility is crop and weather-specific.

The most volatile crop is cherries, total. This sector employed 38,756 worker/months of labor during 2005.

The most volatile crop is cherries, total. This sector employed 38,756 worker/ months of labor during 2005. During the peak harvesting month demand for seasonal labor was about 708 times higher than compared with the lowest month of labor demand. The surge in seasonal labor demand is such that almost three-fifths (58.48 percent) of all the labor hired in this sub-sector is hired during the single peak harvesting month. During this month in particular, on any given day, any threat of rain can create an even sharper surge in the local demand for seasonal labor.

Strawberries rank second in volatility. Peak seasonal employment is higher by a factor of 385 times compared to the lowest month of demand for seasonal workers in this sub-sector. Fully two-thirds of the seasonal labor hired in this sub-sector is hired during one harvesting month. Blueberries are third. Asparagus is fourth, and with the conversion of this crop almost entirely to fresh marketing and consumption, the volatility may

increase. Finally, pears are fifth in volatility, with peak seasonal labor demand increasing by a factor of 83 compared to the lowest labor demand month and about one-third (34.3 percent) of all seasonal workers hired in the seasonal peak month.

Though apples may appear to hang ripe on the tree for many weeks at a time, the optimal picking periods are much shorter.

In a certain respect, apples, total add stability to this seasonal labor demand phenomenon. During the peak harvest month, seasonal demand for labor was only about six (6.3) times higher than during the lowest seasonal labor demand month. During this peak month, only about one-fifth (20.1 percent) of total seasonal labor demanded is hired during that month. But, this picture for apples is more volatile than these simple statistics reveal. Though apples may appear to hang ripe on the tree for many weeks at a time, the optimal picking periods are much shorter. The picking season as a whole begins for the early varieties in August and ends for the latest varieties in November. In addition to the variety of apple, the specific growing district, and the daily weather, particularly the temperature, affect the optimal picking period for each variety. And, the optimal picking period, for best storage and movement to market, is a month or less for a given variety.[56]

Table 10
Volatility in Covered Seasonal Agricultural Employment
Washington State, 2005
Source: Appendix Table 7 Employment of Covered Seasonal Workers by Crop in Washington, Statewide, and by Agricultural Reporting Areas, 2005

Product/Workers	Total Annual Worker/Months[1]	Percent of Statewide Total Annual Worker/Months	Ratio of Highest Worker/Month to Lowest Worker/Month[2]	Percent Peak Crop Worker/Month to Total Annual Crop Worker/Months
State Total	**358,107**	**100.0**	**6.2**	**16.2**
Apples, Total	180,137	50.3	6.3	20.1
Cherries, Total	38,756	10.8	708.2	58.5
Nursery Workers	17,833	5.0	3.9	13.2
Other Seasonal Workers	15,486	4.3	16.3	14.4
Asparagus	13,761	3.8	223.5	35.7
Grapes	12,559	3.5	9.2	17.0
Onions	10,908	3.0	6.3	14.4
Other Tree Fruit Workers	10,579	3.0	61.9	32.8
Raspberries	10,544	2.9	17.1	37.2
Misc. Vegetable Workers	10,245	2.9	28.1	22.7
Potatoes	9,838	2.7	14.0	28.6
Pears, Total	8,723	2.4	83.1	34.3
Strawberries	4,572	1.3	385.0	67.4
Blueberries	4,093	1.1	332.8	40.7
Hops	3,597	1.0	55.1	15.3
Cucumbers	2,460	0.7	18.6	29.5
Bulbs	2,020	0.6	17.7	23.6
Wheat/Grain Workers	1,996	0.6	21.2	37.2

[56] This discussion is based on a conversation with an official at the Washington Apple Commission in Wenatchee, Washington, on May 24, 2006.

Figure 18
Seasonality and Volatility in Apple Production
Washington State, 2005
Source: Appendix Table 7 Employment of Covered Seasonal Workers by Crop in Washington, Statewide, and by Agricultural Reporting Areas, 2005

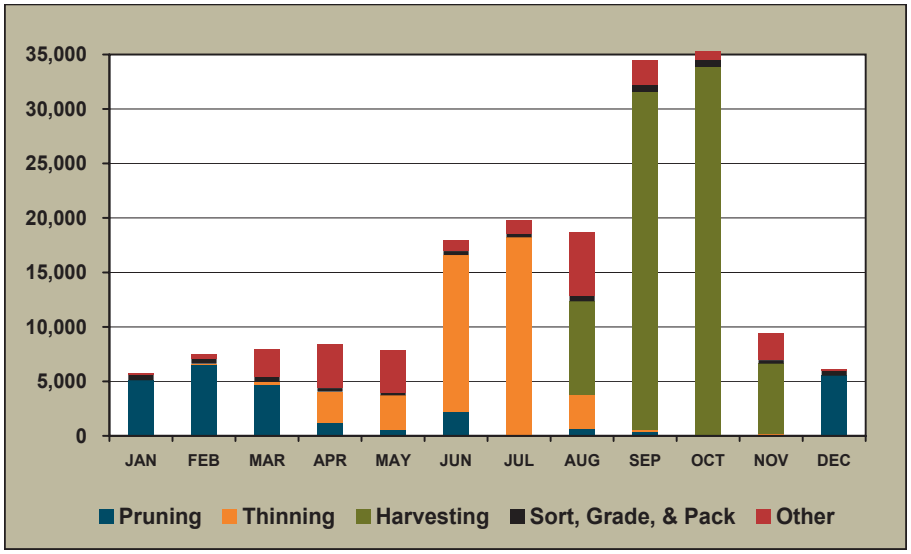


Figure 18 shows the seasonality and volatility of production within the apple sub-sector. December, January, February and March are the peak periods for apple pruning. Apple thinning occurs mainly in June and July, building up and tailing off in May and August, respectively. Harvesting begins in August, builds to its maximum in September and October, and tails off in November. Other Apple Activities have a busy period in March, April, and May and then again from August through November, with the peak for this bimodal seasonality being August, with an estimated 5,851 seasonal workers employed at this time. *Appendix Table 8* displays the wide variation in the intensity of seasonal demand for labor for a wide variety of crops and across regions in the state.

Summary

The story of the employment of agricultural labor in Washington is conditioned by several factors:

- An agricultural system that is dominated by production of crops for the fresh market.
- The regional pattern of crop production across the state.
- The weather patterns, especially precipitation and temperature, in each of these regions, relative to the crops grown in each region.
- The high dependence of the industry on migrant, seasonal labor.

NOTES:

[1] The ESD/LMEA monthly sample survey of 600 agricultural producers statewide reports, by farm operator/agricultural producer, the number of individuals he or she is employing that month. This measure is for both permanent and seasonal workers. Since the data in question is both seasonal and monthly, on the assumption a worker employed works the full month, it is reasonable to refer to the statistic being measured as a "worker-month."

[2] If the lowest month is 0 (zero), the next highest month having positive seasonal employment is chosen for the denominator.

December, January, February and March are the peak periods for apple pruning. Apple thinning occurs mainly in June and July, building up and tailing off in May and August, respectively.

This production reality leads to volatility in the demand for seasonal labor. This volatility, often very short term and sharply spiked, leads to constant concerns on the part of agricultural producers for an adequate supply of trained, reliable, seasonal workers. The growers' concerns about "labor shortages" are very real and are based in the structure of the industry itself.

Thus, the current debate at the federal level concerning undocumented workers and immigration reform with respect to a viable, responsive guest worker program are of intense concern and importance to agriculture in the State of Washington.

Chapter 3

Wage Rates, Hours Worked, and Earnings

Introduction – What Are Wage Rates?

If the farm operator were to pay on a straight-time, hourly basis, the workers would be more likely to stay and finish harvesting the crop.

From the employer's standpoint, the hourly wage rate measures the market value that a given worker creates during an hour of work.[57] From the worker's standpoint, the wage rate represents the value of the worker's time that he or she devotes to that hour of productive activity. Thus, when a voluntary employment bargain is struck, the market value of the extra output produced equals the value to the worker of the extra time the worker devotes to producing that output.[58]

These two concepts explain much of what we observe in Washington's seasonal agricultural labor market. For example, newspaper reports during the 2005 crop season indicate that, as the best part of a crop such as strawberries, is picked in a locale, piece-rate workers tend to move on to locations where they can earn a higher implicit hourly wage rate. This behavior frustrates some farm operators who find themselves with still-ripening crops left in the field but with insufficient workers to harvest the remaining crop in a timely fashion.[59] On the other hand, if the farm operator were to pay on a straight-time, hourly basis, the workers would be more likely to stay and finish harvesting the crop, but the farmer would find that at some point, the amount of crop picked per unit of labor paid would be insufficient in terms of market value to cover the straight-time hourly wage being paid.

The farmer would find that at some point, the amount of crop picked per unit of labor paid would be insufficient in terms of market value to cover the straight-time hourly wage being paid.

These two concepts shed light on two other issues facing agriculture in Washington: Foreign competition and comparative advantage, and the minimum wage. These two issues will be discussed after the general structure of wage rates, earnings, and hours for Washington agriculture is presented.

Washington State and U.S. Average Annual Earnings Compared

Workers overall in the State of Washington are relatively well off, compared to the average worker in the United States. As *Figure 19* shows, workers in Washington state earn an average of $1,000 to $2,000 more per year than do workers in the United States overall. Between 2000 and 2004, the average Washington worker earned from four to six percent more per year in constant dollar terms than did the average worker in the United States.

[57] Strictly speaking, the wage rate is the marginal output, the extra output produced by one more unit of labor hired, times the price at which that output can be sold in a competitive market.

[58] For this statement to be true, the labor market has to be competitive. The employment bargain must be mutually voluntary and uncoerced. And, both the employer and the employee can sever the bargain at will.

[59] See the account by Cookson Beecher in the *Capital Press*: "Uncertain Labor Market, Shortages Increase Some Growers' Worries." *Capital Press Agricultural Weekly*. August 22, 2005.

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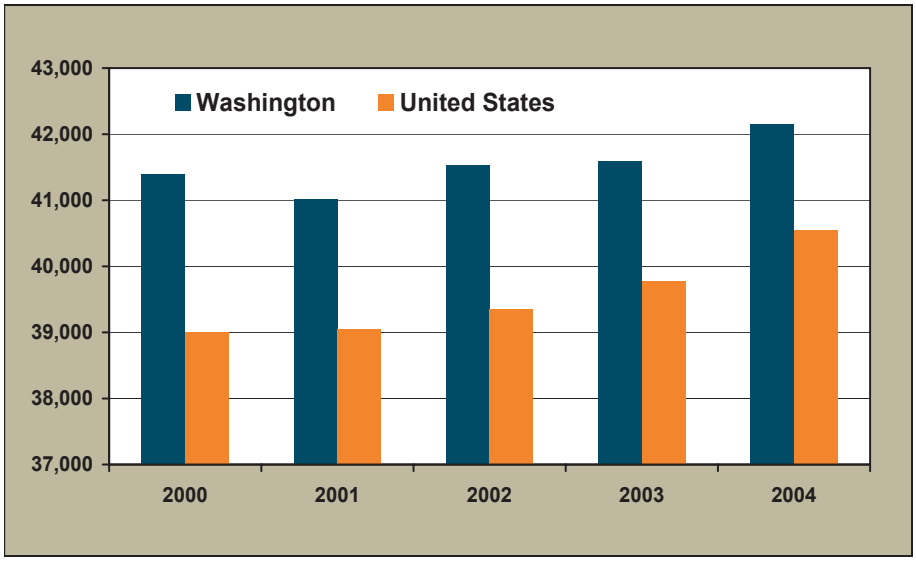
Figure 19
Annual Earnings per Job, in Constant Dollars
Washington State and United States, 2000-2004
Source: Appendix Table 9, Washington State Office of the Forecast Council.
Washington State Economic Climate Study, Volume X, October 2005



Average Annual Earnings in Washington: Agriculture and Nonagriculture Contrasted[60]

In 2004, the average worker in the state earned an estimated $39,351. In contrast, the average worker in the production agriculture sector earned $17,439 – 2.26 times less than the average worker in the state. In contrast, the average worker in value added agricultural manufacturing earned $35,055 in 2004 – only about 12.3 percent less than the average worker in the state.

Fruit and tree nut farming comprises 42.8 percent of the firms in the production agriculture sector. This is an increase from 35.3 percent in 2003.

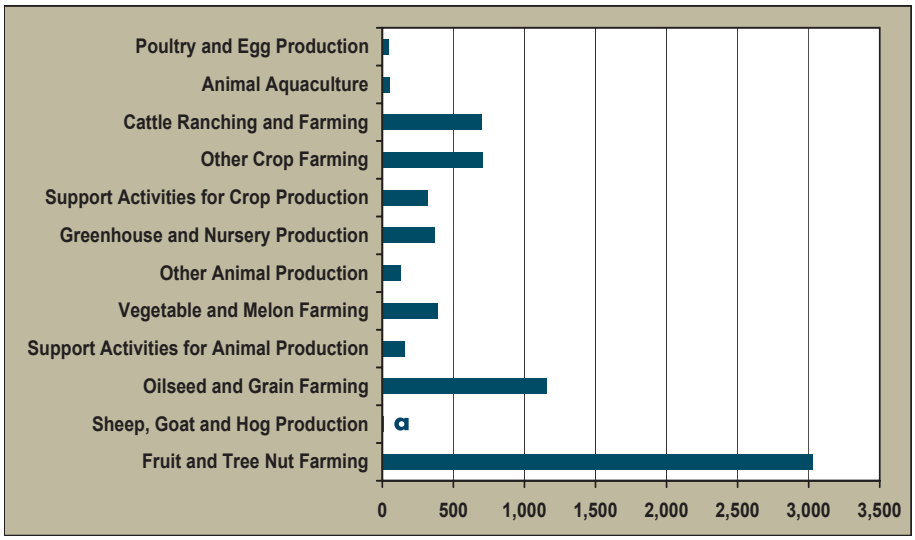
Production Agriculture

Firms. In 2004, based on the unemployment insurance (UI) wage files maintained by the Employment Security Department, there was an average of 7,064 firms in the production agriculture sector in Washington. This is down from 7,344 firms in 2003 and 7,664 firms in 2002. *Figure 20* shows the distribution of sub-sector firms in production agriculture. Fruit and tree nut farming comprises 42.8 percent of the firms in the production agriculture sector. This is an increase from 35.3 percent in 2003. Oil seed and grain farming comprises the next largest sub-sector, at 1,159 firms, or 16.4 percent of the total. The next three largest sub-sectors are: Other crop farming, cattle ranching

[60] The data in this section are based on the UI wage file of workers covered by the Unemployment Insurance Program in the state. Thus, the annual average earnings are somewhat different from the data reported by the Office of the Forecast Council data discussed above.

and farming, and vegetable and melon farming. Vegetable and melon farming contains asparagus farming that has been hit by a reduction in tariffs on Peruvian asparagus produced for processing.[61] This sub-sector is down by 354 firms compared to 2003, or, about nine percent. There were 473 firms in this sub-sector in 2002 – a two-year drop of about 22 percent.

Figure 20
Production Agriculture, Average Number of Firms
Washington State, 2004
Source: ESD/LMEA, Appendix Table 10



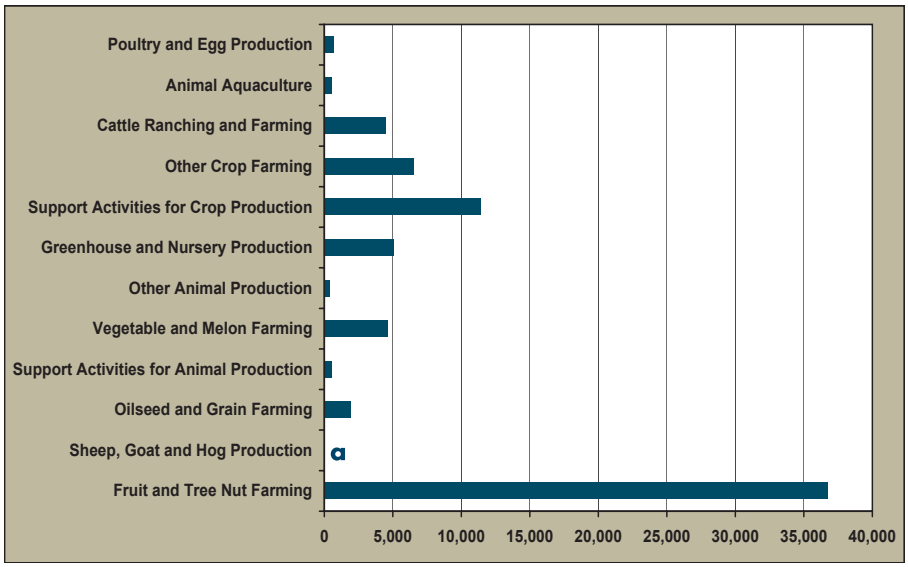
NOTE: [a]There are 9 firms estimated for this sub-sector.

Average Monthly Workers. There were an estimated 73,068 workers in UI covered employment jobs in the production agriculture sector in 2004. This is up from 68,469 workers in 2003 and 64,423 workers in 2002 – a two-year increase of about 13 percent. See *Figure 21*. Fruit tree and nut farming dominates employment in the sector with 36,761 workers – 50.3 percent of the total. In contrast, there were only 29,551 workers in this sub-sector in 2003 and 27,336 workers in 2002 – a two-year increase of about 25 percent. Support activities for crop production is the next largest sub-sector with workers in 11,421 jobs. This is followed by other crop farming (6,553 workers), greenhouse and nursery production (5,067 workers), and vegetable and melon farming (4,649 workers). This latter sub-sector had 4,461 workers in 2003 and 4,542 workers in 2002.

Fruit tree and nut farming dominates employment in the sector with 36,761 workers—50.3 percent of the total.

[61] See the discussion of **Peru, ATPA, ATPDEA, and Tariff Reduction on Asparagus** in *Chapter 1*.

Figure 21
Production Agriculture, Average Monthly Jobs
Washington State, 2004
Source: ESD/LMEA, Appendix Table 10



NOTE: [a]There are 16 average monthly jobs estimated for this sub-sector.

Average Annual Earnings per Worker. As *Figure 22* shows, there is a hierarchy of average annual earnings in the production agriculture sector. The highest earning jobs are in poultry and egg production, at $25,152 per year. The lowest earning jobs are in fruit and tree nut farming, at $14,273 per year. This hierarchy reflects the differing degree of employment seasonality in each of the sub-sectors.

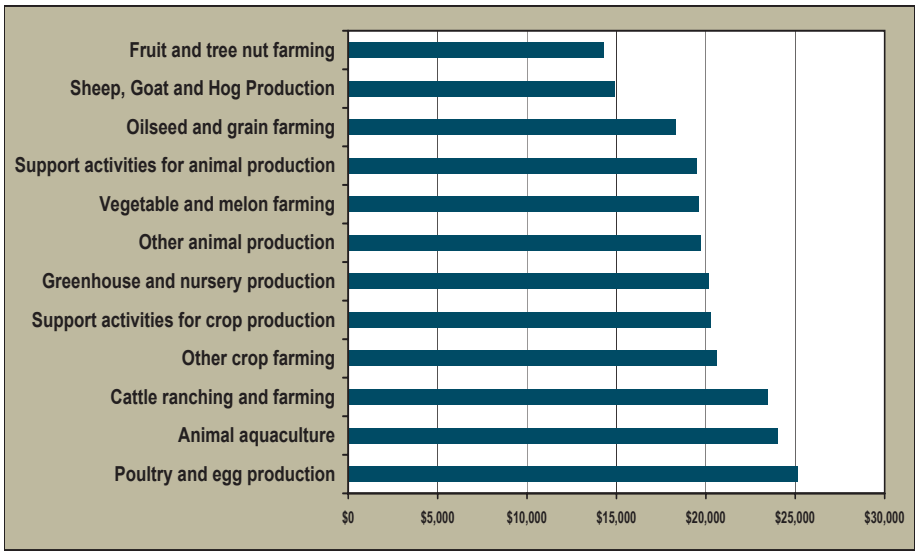
The highest earning jobs are in poultry and egg production, at $25,152 per year.

Migrant Mexican workers heavily dominate the fruit and tree nut farming sub-sector where annual average earnings are $14,273. In terms of Mexican pesos, this sum of U.S. $14,273 equals 160,071 pesos as of the end of 2004. While the sum of $14,273 looks low, in terms of pesos this sum is 49 percent higher than the per capita Gross Domestic Product (GDP) in Mexico at 107,700 pesos in 2004. This per capita GDP estimate is an average for the nation. For laborers, the per capita income in their families will be lower. Given this contrast, it is easy to see the draw of the U.S. agricultural labor market for workers in Mexico.[62]

[62] In 2000, the minimum wage in Mexico was set at U.S. $4.21 per day. For the same year, in Washington, a migrant worker, at the Washington minimum wage, could earn U.S. $52.00 per day. In 2000, about 20 percent of the Mexican labor force worked at or below that nation's daily minimum wage. The following observation from a study by the Pew Hispanic Center is relevant:

> "The vast majority of undocumented migrants from Mexico were gainfully employed before they left for the United States. Thus, failure to find work at home does not seem to be the primary reason that … undocumented migrants from Mexico have come to the U.S." Rakesh Kochhar. "The Economic Transition to America." *Survey of Mexican Migrants*. Part Three. December 6, 2005.

Figure 22
Production Agriculture, Average Annual Earnings per Worker
Washington State, 2004
Source: ESD/LMEA, Appendix Table 10



Value Added Agricultural Manufacturing

Firms. This sector has grown from 964 firms in 2003 to 1,078 firms in 2004 – an 11.8 percent increase. *Figure 23* shows the distribution of sub-sectors of the value added agricultural manufacturing sector in 2004. The bakeries and tortilla manufacturing sub-sector contains the largest number of firms – 278. This is an increase of 13 firms since 2003 and 14 firms since 2002. The second largest sub-sector is beverage manufacturing at 194 firms – an increase of 28 firms over 2003 and 38 firms over 2002. The next three largest sub-sectors are other food manufacturing (131 firms), seafood product preparation and packaging (110 firms), and fruit and vegetable preserving and specialty (99 firms). For the fruit and vegetable preserving and specialty sub-sector in 2004, the 99 firms represent an increase of 15 firms over 2003.

The bakeries and tortilla manufacturing sub-sector contains the largest number of firms – 278. This is an increase of 13 firms since 2003 and 14 firms since 2002.

Average Monthly Workers. There were 37,738 workers in the value added agricultural manufacturing sector in 2004. This number is slightly smaller than the 38,038 workers reported for 2003 and 38,671 reported for 2002. In terms of workers, the dominant sub-sector in this industry group is fruit and vegetable preserving and specialty. The 10,133 workers reported here imply an average firm size of 102 workers. Seafood product preparation and packaging provides the next largest group of workers at 6,432 – an average of about 58 workers per firm. The next three largest sub-sectors are animal slaughtering and processing, bakeries and tortilla manufacturing and beverage manufacturing. See *Figure 24*.

Figure 23
Value Added Agricultural Manufacturing, Number of Firms
Washington State, 2004
Source: ESD/LMEA, Appendix Table 10

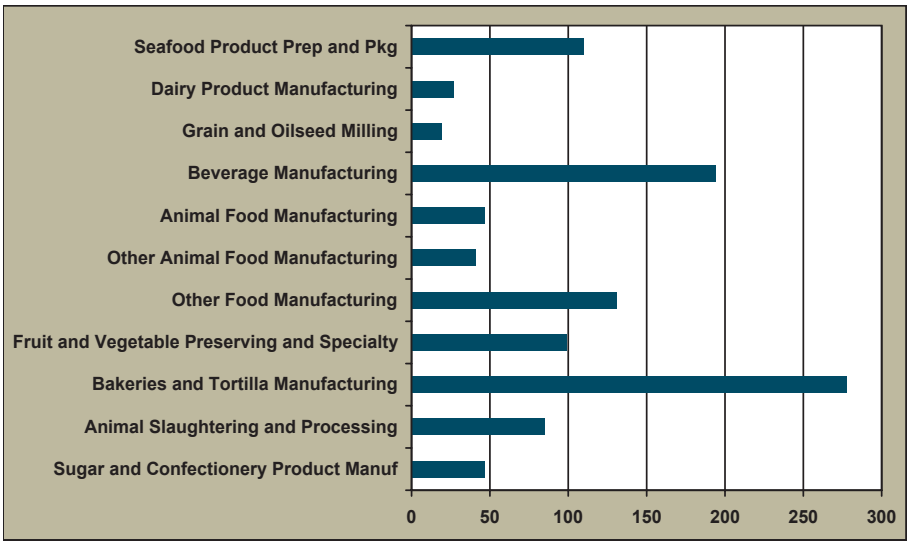
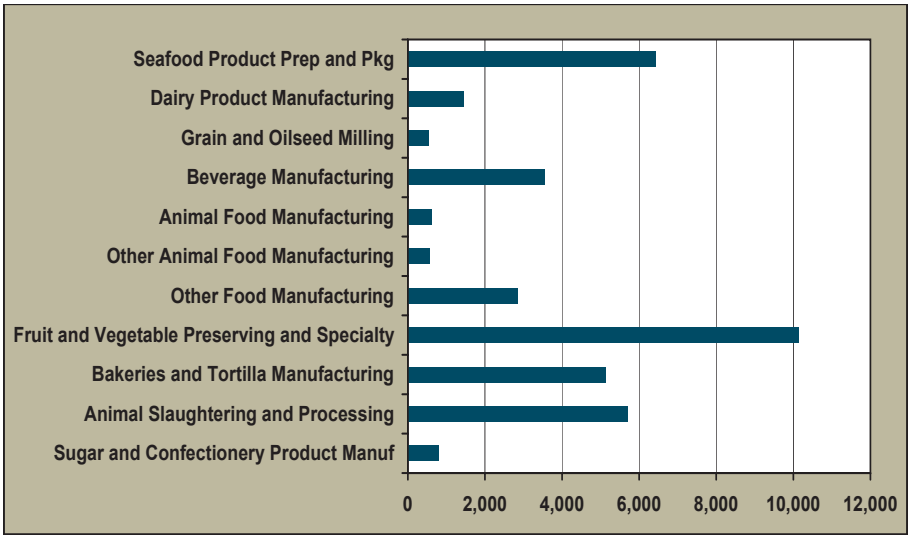


Figure 24
Value Added Agricultural Manufacturing, Average Monthly Jobs
Washington State, 2004
Source: ESD/LMEA, Appendix Table 10



Average Annual Earnings per Worker. We observe the same hierarchy of average annual earnings in the value added agricultural manufacturing sector as we do in the production agriculture sector – but with one major difference. The average annual earnings in the top four sub-sectors in the value added agricultural manufacturing sector

The average annual earnings in the top four sub-sectors in the value added agricultural manufacturing sector lie above the average annual earnings per job in the state as a whole.

lie above the average annual earnings per job in the state as a whole. These four sub-sectors are: seafood product preparation and manufacturing ($47,924); dairy product manufacturing ($41,708); grain and oilseed milling ($40,834); and, beverage manufacturing ($39,573). The lowest paid sub-sector is sugar and confectionery product manufacturing, paying average annual earnings per worker of $20,757. This quantity is still higher than nine of the 12 sub-sectors in production agriculture. Compare *Figure 22* with *Figure 25*.

Figure 25
Value Added Agricultural Manufacturing, Average Earnings per Worker
Washington State, 2004
Source: ESD/LMEA, Appendix Table 10

The Effect of Seasonality on Hours, Earnings, and Attachment to Agriculture

Seasonality in demand for agricultural labor has the effect of creating two kinds of working behavior in the state. Some workers spend their entire employment in a given year working only in agriculture. Other workers combine working in the agricultural sector with working in one or more nonagricultural industries. The earnings and employment patterns of these two types of workers differ considerably.

Average Annual Hours. For 2005, permanent and seasonal workers who were employed only in agriculture during the working year averaged an estimated 821 hours – far short of the 2,080 one could work in a 40-hour week and 52-week year.[63] On the

[63] 821 hours equals 20.5 40-hour weeks or about 4.74 months at 40 hours per week. Clearly, this average annual total is dominated by hours worked by seasonal workers.

other hand, this is an increase from the estimated 705 hours worked in 1997. This increase amounts to about three more weeks of full-time work (40-hour weeks) per working season for seasonal workers attached only to the agriculture industry.

For 2005, permanent and seasonal workers who were employed only in agriculture during the working year averaged an estimated 821 hours – far short of the 2,080 one could work in a 40-hour week and 52-week year.

Workers employed over the year in both agricultural and nonagricultural industries worked an average of 1,293 hours in 2005. This group worked an annual average of only 1,136 hours in 1997. Thus, over time, this group has added about four weeks of full-time work to its annual effort – though whether the increase in hours is in agriculture or nonagriculture, we have not determined.

These estimates of annual hours worked are also well below the averages in the non-agricultural sector for 2005. In the nonagricultural sector, weekly hours range from 30 to 45 per week, depending on the industry sub-sector. This implies average annual hours of between 1,560 to 2,340, depending on the nonagricultural industry sub-sector.

Average Annual Earnings. Average annual earnings in 2005 are estimated at $8,943 in current dollars for workers in agriculture only. Average annual earnings are $6,008 higher for those who worked in both agricultural and nonagricultural jobs – 67.2 percent higher, while differential hours worked were only 57.5 percent higher (1,293 / 821 = 1.575). Of course, these earnings are considerably below the state average of $41,050 in current dollars for 2005. See *Appendix Table 11*.

Over the past five years, average hourly wage rates have risen gradually in current dollars for agricultural workers only, from $10.04 to $10.89 per hour.

Average Hourly Wage Rates.[64] Over the past five years, average hourly wage rates (average annual earnings divided by average annual hours) have risen gradually in current dollars for agricultural workers only, from $10.04 per hour to $10.89 per hour. However, in constant, or inflation-adjusted terms, average hourly wage rates for this group have actually fallen from $10.04 in 2001 to $9.88 in 2005 (base year 2000 = 100.0). This is an average decline of about 1.6 percent a year in constant dollar terms. For those who worked in both agricultural and nonagricultural firms in 2005, average wage rates in current dollars rose from $10.48 in 2001 to $11.56 in 2005. However, in constant dollars, there was no change for this group of workers – constant dollar earnings were $10.48 in 2001 and remain at $10.48 in 2005.[65] See Appendix *Table 9*.

[64] As indicated in *Chapter 2*, the Consumer Price Index inflation calculator is used to adjust all current dollar quantities to constant dollar values. See *Chapter 2* for the website address of the CPI inflation calculator.

[65] For Washington and Oregon combined, using different methodology to estimate average hourly wage rates, the Washington Field Office of the USDA/National Agricultural Statistics Office estimates average hourly wage rates for all workers combined who worked in field work, livestock work, or a combination of the two as falling in the range of $8.74 (July 2003) to $10.33 (January 2005). Source: *Washington Annual Statistical Bulletin*. 2005. Page 12.

Finally, to put these average hourly wage rates in context, note that the constant dollar average hourly earnings in retail trade in the state is $12.79 in 2005 and it is $12.41 statewide for food manufacturing.

The Issue of the Washington State Minimum Wage. The issue of the minimum wage generates considerable passion in economic policy discussions – in Washington and at the national level. As of January 2006, Washington state's minimum wage rose to $7.63 – the highest in the nation – and up from $7.35 in 2005. In constant dollar terms (2001 = 100.0), the 2005 state minimum is equal to $6.67. In contrast, the current value of the federal minimum wage is $5.15 and in constant dollars, it is equal to $4.67. This quantity is $2.00 less per hour than the state minimum.[66]

As of January 2006, Washington state's minimum wage rose to $7.63 – the highest in the nation – and up from $7.35 in 2005.

The theoretical prediction of setting a minimum wage is straight forward. If nothing else changes in the economy and in the industry in question, imposing a minimum wage will result in dis-employing some quantity of workers. From the employer's point of view, the increase in the minimum wage represents an increase in the cost of business.[67] However, if hourly wages are already well above the minimum wage, as in construction, where in 2005, the current value average hourly wage rate was $22.98, then the minimum wage effect is not economically important. The minimum wage constraint simply doesn't apply.

To some extent, this factor is also true for agriculture in the state. In 2005, the constant dollar average hourly wage rate for workers employed only in agriculture was $9.98 – $3.31 higher than the constant dollar value of the 2005 state minimum. However, this is only part of the picture. As quoted in the *Wenatchee World* (November 14, 2005), Rick Anderson, corporate administrator of Sakuma Brothers, a berry producer in Burlington, Washington, stated:

"… the minimum wage has a huge impact because most employers in the state are small and pay the minimum wage."

In 2005, the constant dollar average hourly wage rate for workers employed only in agriculture was $9.98 – $3.31 higher than the constant dollar value of the 2005 state minimum.

[66] Should a guest worker law be passed by Congress during 2006 that is both operational and enforced, the issue of the state minimum wage may become moot. The reason is that under current H-2A legislation, workers authorized to work in American agriculture must be paid the *Adverse Effect Wage Rate* plus other benefits. In 2006 the AEWR is set at $9.01 for Washington and Oregon and $9.00 for California. The AEWR will become more of an issue with farm operators than the state minimum wage, since, as noted above, the average hourly wage paid in agriculture in 2005 is estimated at $9.98 per hour. Enforcement of the AEWR will compress the agricultural wage distribution and put pressure on farm operators to raise the wages of higher productivity workers – if workers in agriculture behave in general like workers in nonagricultural industries.

[67] Although some workers are predicted to be dis-employed, it is important to note that the remaining workers, following the same predictive model, do in fact earn a higher wage and the contribution to the value of output by the employed workers equals the minimum wage.

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Part of this statement is borne out by the facts. In 2002, Washington employers hiring 0 to 19 workers paid the lowest 10 percent of workers they hired just $6.63 per hour. In contrast, employers hiring between 100 and 249 workers paid their lowest 10 percent of workers $6.94. Firms hiring 1,000 or more workers paid their lowest 10 percent of workers $7.41. In 2002, the current value of the state minimum wage was $6.90. Only firms in the state employing at least 50 workers paid an average of $6.94 per hour. These examples apply only to the nonagricultural sector of the state, however.[68] Data are not available on the distribution of agricultural employers in the state who pay below, at, and above the state minimum wage.

Washington farm operators must pay all migrant farm workers the state minimum wage. Less than the state minimum wage can be paid for certain types of workers in certain agricultural activities.

The Current Economic and Policy Situation. Washington farm operators must pay all migrant farm workers the state minimum wage. Less than the state minimum wage can be paid for certain types of workers in certain agricultural activities. (See the box on "Who can be paid less than the state minimum wage?")

How important a factor is the minimum wage for state agriculture? There is no clear answer at this time. Note that some apple growers in the Yakima region are willing to pay H-2A contract workers from Thailand approximately $12.00 an hour, counting housing and transportation costs as well as the contracted hourly wage rate.[69] Yet, Washington agriculture, focusing heavily on fresh produce for the market, is relatively labor intensive. So, the impact of the state minimum wage must be assessed on a crop-by-crop basis. This has not yet been done. In principle, the comparative advantage of specific crops can be affected by the higher cost of migrant labor due to the minimum wage. And, certainly the AEWR, set at $9.01 for 2006, will have an even greater effect should immigration reform legislation be passed and enforced. Note that current H-2A legislation mandates the payment of the AEWR plus additional benefits for documented foreign contract workers.

WHO CAN BE PAID LESS THAN MINIMUM WAGE? The minimum wage does not apply to an individual if all of the following conditons are met:

- The individual is employed as a hand-harvest laborer, and
- The individual is paid on a piece rate basis in an operation where such payment is customary, and
- The individual is a permanent resident and commutes daily from his or her own residence to the farm, and
- The individual has been employed in agriculture less than 13 weeks in the preceding calendar year.

Table 11
Comparison of Average Hourly Wage Rates and the State Minimum Wage, Current and Constant Dollars
Washington State, 2001-2005
Source: ESD/LMEA

	2001	2002	2003	2004	2005
			Agricultural Workers Only		
Current	10.04	10.04	10.23	10.43	10.89
Constant	10.04	9.88	9.85	9.78	9.88
			Workers in Agricultural Plus Nonagricultural Industries		
Current	10.48	10.42	10.41	10.63	11.56
Constant	10.48	10.26	10.02	9.97	10.48
			Washington State Minimum Wage		
Current	6.72	6.90	7.01	7.16	7.35
Constant	6.72	6.79	6.75	6.71	6.67

NOTE: Base Year 2001 = 100.0.

[68] Scott Bailey. *Washington Wage Report*. 1990-2002. Table 5. Page 14.

[69] Recall the discussion in **Recent Activity with H-2A Contracting in Washington State** in *Chapter One*. The H-2A contract labor to be imported to the Yakima region will be paid an estimated $12.74 per hour in wages and benefits.

The State Minimum Wage and Selected Crops: Pears, Cherries, and Apples[70]

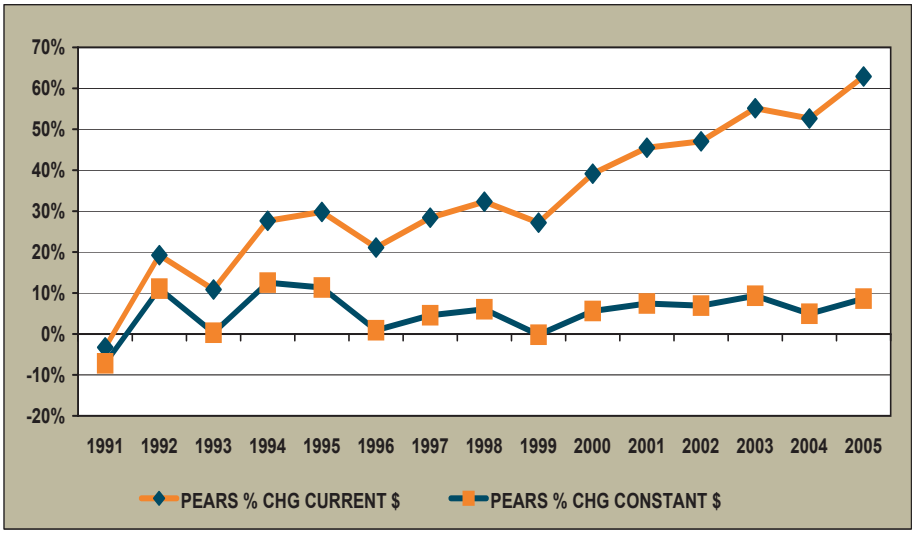
How have average hourly wage rates changed, both in current dollar terms and in constant dollar terms, for selected crops over time? What is the relationship of these current and constant dollar changes to the changing state minimum wage? We examine apples, cherries, and pears since apples and cherries, in particular, have such a heavy influence on seasonal demand and supply of migrant and seasonal workers in the state. Note that the average hourly wage rates we display represent, for each year, the average hourly wage rate set by the intersection of the demand for labor with the supply of labor. These average hourly wage rates are what economists call "equilibrium" wage rates, where the quantity demanded of labor equals the quantity supplied of labor.

The pattern for current dollar and constant dollar change in average hourly wage rates for the Washington pear crop is influenced by annual seasonal weather patterns.

Changes in Average Hourly Wage Rates[71, 72]

Pears. *Figure 26* displays the current dollar and constant dollar percent change in average hourly wage rates for the Washington pear crop. This pattern is influenced by annual seasonal weather patterns – a bumper crop will increase the demand by growers for migrant and seasonal workers – and it is influenced by changes in consumer demand for pears, which then feeds back into the growers' demand for labor. The pattern after 1999 shows a steady upward trend in both current and constant dollars. Note, however, that the upward trend in constant dollar change has a lower slope increase than does the upward trend in current dollar change. Over the period 1991-2005, current dollar average hourly wage rates increased a total of 62.9 percent, while in constant dollars the increase has been 8.7 percent – only about one-seventh as great.

Figure 26
Current and Constant Dollar Percent Change in Average Hourly Wage Rates, Pears
Washington State, 1991-2005, Third Quarter Data, Base Year = 2000
Source: ESD/LMEA, Appendix Table 12



[70] John Wines developed the analysis and performed the statistical computations for this section.

[71] These estimates are based on third quarter – peak harvest time – data for cherries and pears, and fourth quarter data for apples. Here, and elsewhere in the report, the Consumer Price Index-U is used to convert current into constant dollars.

[72] The estimates are based on the ESD/LMEA "UI Wage File," a record of earnings paid by employers to workers covered by the UI Program. The data have been edited to exclude firms who reported positive earnings but zero hours worked by a worker. Also, they have been edited to eliminate very hgh and very low average hourly wages, effectively cutting off anyone who is reported as earning less than the minimum wage. This latter edit in itself will impart an upward bias to the trend lines. But the high end edit will lower the trend line. The net effect lies between these two effects.

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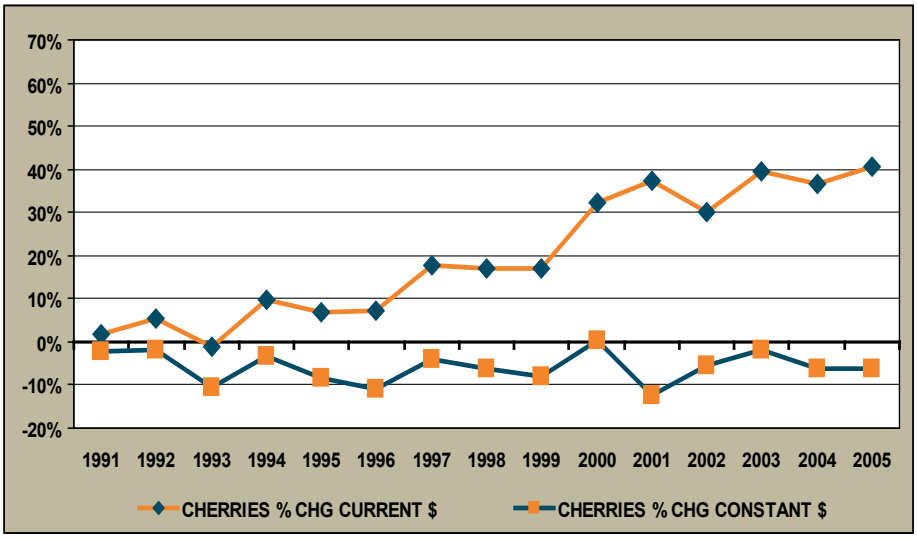
Cherries. *Figure 27* for the cherry crop shows a pattern similar to apples. There are noticeable seasonal effects, but the overall percentage change in current average hourly wage rates, while positive, has been much lower compared to pears. There is a clear upward trend in current dollar change, though in some years, the constant dollar value of average hourly wage rates has fallen. Current dollar percentage change in average hourly wage rates has totaled only 40.7 percent over the time period displayed, while constant dollar growth in average hourly wage rates for cherry production has decreased by an estimated 6.1 percent since the year 2000.

The cherry crop shows a pattern similar to apples.

Figure 27
Current and Constant Dollar Percent Change in Average Hourly Wage Rates, Cherries
Washington State, 1991-2005, Third Quarter Data, Base Year = 2000
Source: ESD/LMEA, Appendix Table 12

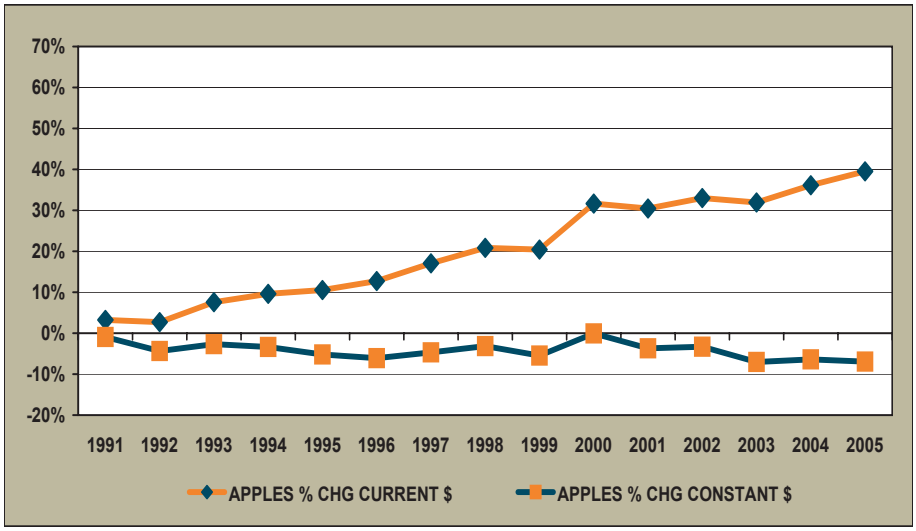


Apples. *Figure 28* displays the percent average hourly wage rate change for apple production. The current dollar growth trend in average hourly wage rates for apples has an even lower trend and total growth rate than pears – 39.5 percent. However, it is the constant dollar percent change that is most different. The total constant dollar increase in average hourly wage rates for the apple sector has decreased by 7.0 percent over the period 2000-2005. The constant dollar trend is almost flat. There does not appear to be much influence of annual seasonal demand on these constant dollar percent changes. From the consumer demand side, the demand for some types of apples is falling, such as the Red Delicious, while it is rising for such varieties as Fujis and Galas. Though a more sophisticated economic analysis would be needed to be more certain, it is reasonable

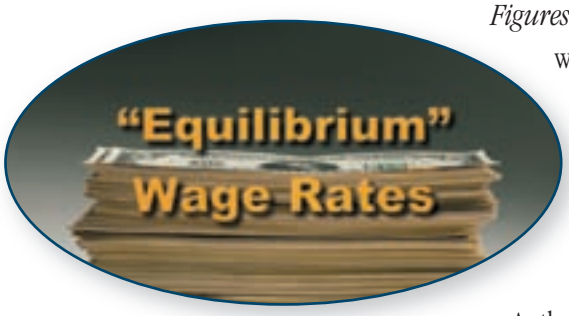
From the consumer demand side, the demand for some types of apples is falling, such as the Red Delicious, while it is rising for such varieties as Fujis and Galas.

to hypothesize that an increasing supply of migrant and seasonal workers over time has kept real wages very stable in the apple sector. Recall again that the apple sector dominates the statewide demand for migrant and seasonal labor.

Figure 28
Current and Constant Dollar Percent Change in Average Hourly Wage Rates, Apples Washington State, 1991-2005, Fourth Quarter Data, Base Year = 2000
Source: ESD/LMEA, Appendix Table 12



Average Hourly Wage Rates and the State Minimum Wage



These average hourly wage rates are what economists call "equilibrium" wage rates, where the quantity demanded of labor equals the quantity supplied of labor.

Figures 29, 30, and *31* track the constant dollar relationship between the average hourly wage rate during each crop's most intense harvest period and the state minimum wage, year by year. Note that for all three crops, the constant dollar average hourly wage rate always lies considerably above the constant dollar state minimum wage. This does not mean, however, that the minimum wage does not put pressure on growers' costs for those jobs of relatively low productivity.

As the three figures all show, the last major constant dollar increase in the state minimum occurred in 1999 when the current dollar minimum wage increased from $5.15 (in 1997) to $5.70 – 10.68 percent. Inflation from 1997 to 1999 was only 4.0 percent. So, the state minimum wage increased by a real 6.68 percentage points over this short period of time. The rise in the constant dollar state minimum wage appears to initially compress the interval between the average hourly wage rate and the state minimum in 1999. Recall again that these data are edited to remove all estimated average hourly wage rates below the state minimum in a given year. This alone will have the effect of raising the average hourly wage rate trend line. *See footnote 72*.

The next effect of the minimum, as discussed above, is to compress the entire wage rate distribution, thus shifting the average hourly wage rate to the right – increasing it. All three measures of average hourly wage rates bump up in 1999. For apples, the smaller interval is approximately maintained for the entire period 1999 through 2005. The interval for pears increases by a small amount by 2005 and for cherries there is no noticeable consistent change in the interval over the time period after 1999.

Overall, from 1990 to 2005, the constant dollar value of the state minimum wage changed by 15.4 percent. Thus, while the state minimum increased in real terms, only average hourly wage rates for pear crop workers increased, and then by only 8.7 percent. Constant dollar average hourly wage rates are almost unchanged for cherries and are trending down for apples.

Figure 29
Constant Dollar Average Hourly Pear Wage Rates and the State Minimum Wage
Washington State, 1990-2005, Third Quarter Data
Source: ESD/LMEA, Appendix Table 13

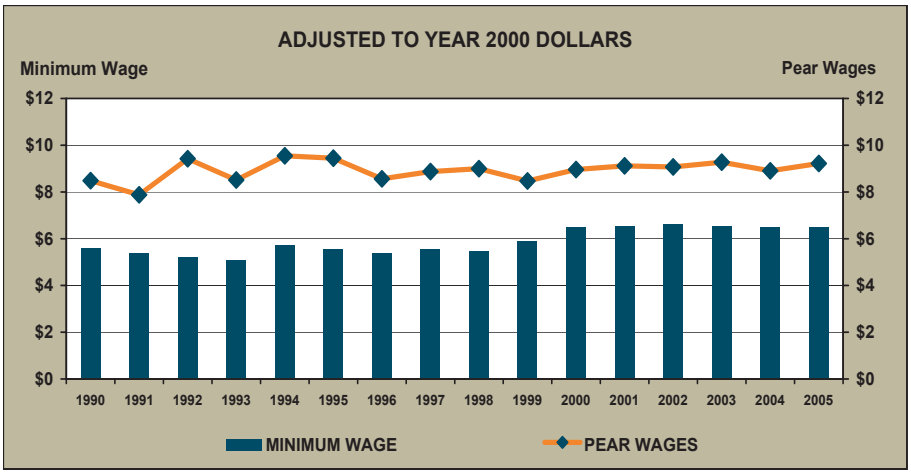


Figure 30
Constant Dollar Average Hourly Cherry Wage Rates and the State Minimum Wage
Washington State, 1990-2005, Third Quarter Data
Source: ESD/LMEA, Appendix Table 13

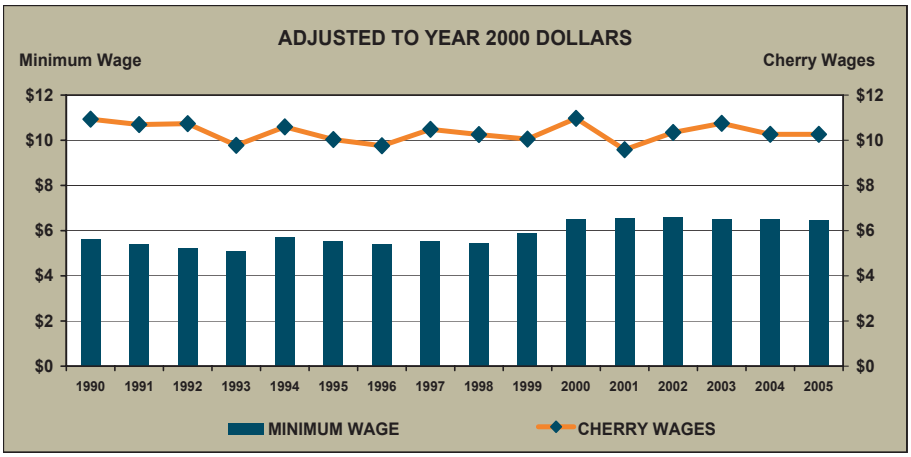
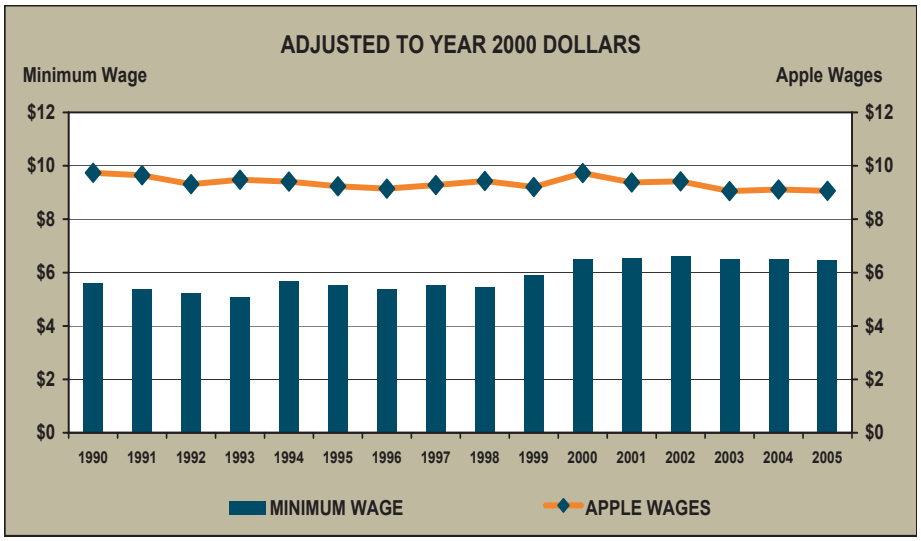


Figure 31
Constant Dollar Average Hourly Apple Wage Rates and the State Minimum Wage
Washington State, 1990-2005, Fourth Quarter Data
Source: ESD/LMEA, Appendix Table 13



Comparative Advantage

The hourly wage rate for labor is not the only consideration to affect the international competitive ability of American agriculture. The statistically adjusted average hourly wage rate for unskilled labor[73] in 2000 varies greatly among developed and developing nations, as shown in *Table 12*. If all that matters in determining comparative advantage is the average hourly wage rate, the United States could only export goods to Japan and it would import nothing from Japan, since higher priced Japanese labor could not compete head-to-head with the relatively cheaper American labor. Japan would not export to any of the nations listed in *Table 12* if all that mattered was the price of labor. Clearly, this conclusion is contrary to the facts in the real world. Thus, much more is involved in determining international trade patterns and trading partners than simply the hourly wage rate.

Table 12
Unskilled Labor Average Hourly Wage Rates in U.S. Dollars for 2000
United States and Selected International Trading Partners, 2001-2005
Source: Ashenfelter and Jurajda. "Cross-county Comparisons of Wage Rates: The Big Max Index." October 2001. Table 2.

Country	Average Hourly Wage Rate	Country	Average Hourly Wage Rate
United States	6.50	Hong Kong	1.86
Japan	7.73	Korea	1.88
Canada	4.51	Singapore	2.31
India	0.29	Thailand	0.57
China	0.42	Brazil	0.89
Taiwan	2.20	Argentina	1.50
		Columbia	0.55

[73] The unskilled labor in question are workers in McDonald's restaurants distributed worldwide. Due to McDonald's technology, the quantity and quality of labor required in any McDonald's store, worldwide, is essentially the same. The domestic wage rate is adjusted for differences in foreign exchange rates of the domestic currency in terms of the U.S. dollar and for purchasing power parity with regard to the number of Big Macs one can purchase in each nation for an hour's work of unskilled labor. See Ashenfelter, Orley, and Stepan Jurajda. "Cross-country Comparisons of Wage Rates: The Big Mac Index." Industrial Relations Section. Princeton University. Princeton, New Jersey. October 2001.

Chapter 3

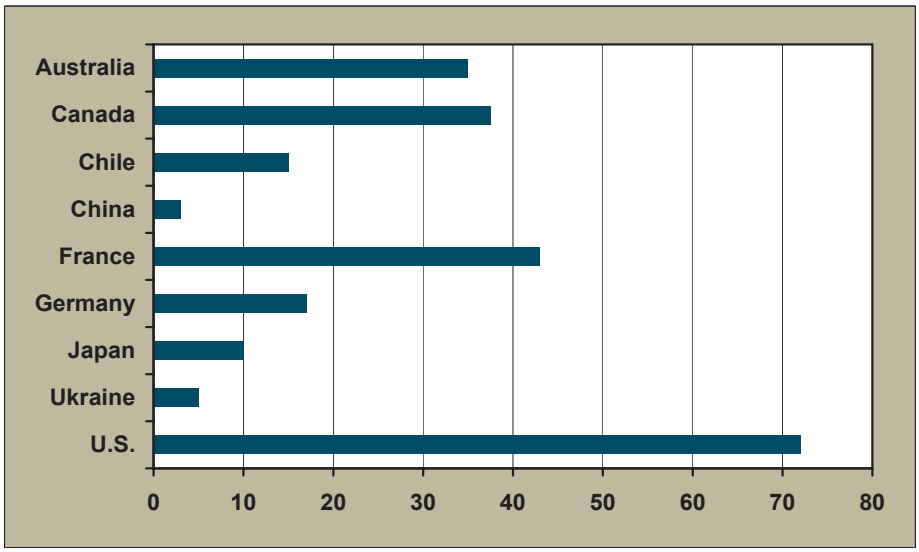
Comparative Advantage and Cheap Labor – The Case of Apples

Table 13 demonstrates the concept of comparative advantage in the production of apples. Note that the unskilled wage rate as indexed by labor working in a local McDonald's (in each nation in question) is estimated at 42 cents per hour in China for the year 2000, while the average hourly wage rate in America for similar skilled labor is more than 14 times higher at $6.00 per hour. Yet, the conditions for producing apples in China versus the United States are considerably different. These differences – in technology, marketing, storage, infrastructure, climate, and land – are such that it costs as much to produce a bin of apples in China as it does in America. At this time, the quality of the Chinese produce is such that China exports only apple juice to America.

The conditions for producing apples in China versus the United States are considerably different.

"China as a Market and Competitor – Are We Competitive?"

Figure 32
GDP per Agricultural Worker: Output/Productivity, U.S. Dollars in 1,000s
United States and Selected International Trading Partners
Source: Thomas I. Wahl, "China as a Market and Competitor – Are We Competitive?" IMPACT Center. Washington State University. No date.



In the rest of Southeast Asia and India, where quality appearances are not as important to consumers (except Japan), China is able to export fresh apples to market. Some predictions are that China will dominate this geographic market in the foreseeable future. Officially, in the 2002-2003 period, China exported an estimated 499,000 metric tons of apples. Unofficially through bi-lateral barter arrangements, China exported an estimated 2,050,000 metric tons. Over this same period, the United States exported over 500,000 metric tons. (See *DuBruille and Barritt. No Date.*) In this regard, a major

advantage to China is lower shipping costs to Southeast Asia relative to America. Note that America exports relatively little apple production to Europe. France is the major exporter of apples there – again favored by much lower costs of shipping to market. On the other hand, apples produced in France are not a factor in the market in Southeast Asia, where, compared to France, America has a real cost advantage in shipping costs.

Figure 33
Estimated Agricultural Wage Rates: Cost, U.S. Dollars/Hour
United States and Selected International Trading Partners
Source: Thomas I. Wahl, "China as a Market and Competitor – Are We Competitive?" IMPACT Center. Washington State University. No date.

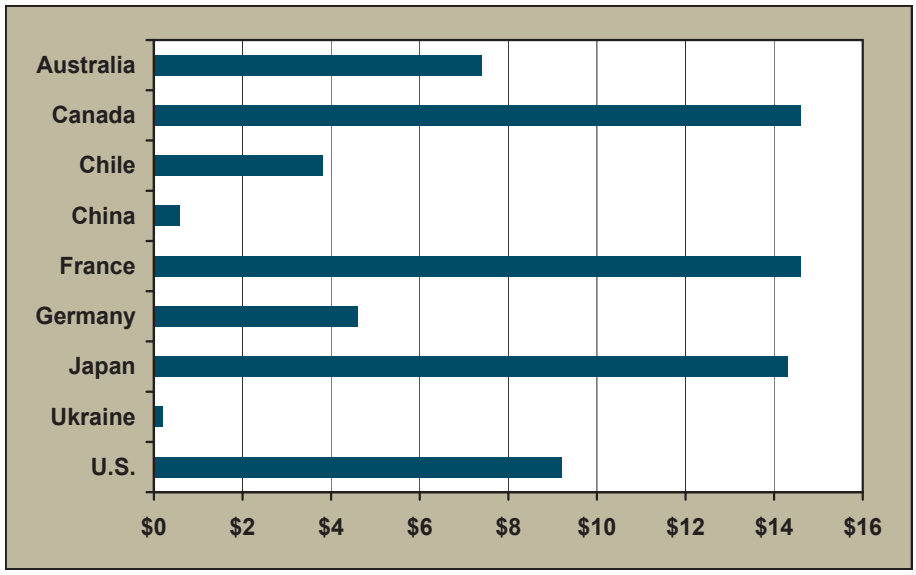


Table 13
Apple Production Costs, Selected Countries
United States and Selected International Trading Partners, 2002

Country	Statistically Adjusted Unskilled Wage Rate/Hour, U.S.[1] Dollars	Cost in U.S. Dollars per Acre[2] Labor	Total Direct Costs	Total Cost of Production	Yield in Bins per Acre	Cost per Bin in $U.S.
Italy	6.00	2,753	3,489	7,787	55	142
France	7.12	2,288	2,780	5,395	42	128
Germany	5.33	1,760	2,328	5,101	36	142
USA	6.50	2,052	2,502	5,004	42	119
Chile	n.a.	1,045	1,450	2,629	50	53
Brazil	0.89	586	1,092	1,853	35	53
Poland	1.15	325	672	1,842	34	54
China	0.42	374	1,369	1,953	16	122

NOTES: [1]Source: Ashenfelter and Jurajda. "Cross-country Comparisons of Wage Rates: The Big Max Index." October 2001. Table 2. The data are for the year 2000, except for Pland, where the year is 2001.

[2]Source: Jim Du Bruille and Bruce H. Barritt. "Global Apple Study – A Comparison of Costs of Production and Production Practices in Eight Leading Apple Producing Countries." Wenatchee Valley College and Washington State University. Wenatchee, Washington. No date.

Chapter 3

Yield in Bins per Acre. The yield in bins per acre is another interesting index to review in analyzing comparative advantage. Note that Italy has the highest estimated yield per acre, at 55 bins, yet it also has the highest cost of production at $142 per bin. Chile produces 50 bins per acre at a cost of $53. Thus, merely looking at total output per acre is insufficient to gauge comparative advantage.

The yield in bins per acre is another interesting index to review in analyzing comparative advantage.

Summary. Comparative advantage rests on a combination of production and product distribution characteristics in a given nation and among competing nations. Using one single input price or quantity per unit of production is an incorrect approach to measuring comparative advantage in international trade for a given commodity. The totality of real costs of production and distribution must be taken into account, relative to the real costs of production and distribution of competitors.

Conclusions

- Average hourly wage rates for those who work exclusively in agriculture have fallen in constant dollar terms over the past five years from $10.04 in 2001 to $9.88 in 2005. In constant dollars, average hourly wage rates for those who work in both agriculture and industry in a given year have remained unchanged over the past five years at an estimated $10.48 per hour.

- The high state minimum wage that must be paid to agricultural migrant workers is an issue to farm operators. The actual impact of the minimum wage is not totally clear. However, the smaller farm operator is likely to suffer a greater adverse impact of the minimum, holding other things constant, such as the crop produced.

- The constant dollar value of the state minimum wage has fallen in the past five years from $6.72 in 2001 to $6.67 in 2005.

- Should a practical, operational guest worker law be passed by Congress, and enforced, the Adverse Economic Wage Rate, mandated to be paid under the current H-2A legislation, will be a more serious cost issue for farm operators to deal with than the state minimum wage.

- Comparative advantage, in terms of the totality of relative real costs of production, determines trade patterns and determines the winners and losers in international trade for any given product.

The high state minimum wage that must be paid to agricultural migrant workers is an issue to farm operators. The actual impact of the minimum wage is not totally clear.

- Focusing only on one aspect of the cost of production and distribution, such as the hourly wage rate of workers, is incorrect when attempting to assess trade and production strategies that will enhance the economic well being of Washington agriculture. Other important factors to consider are:
  - The relative quantity and quality of land per unit of labor
  - The relative quantity and quality of capital per unit of labor
  - The social infrastructure, including the domestic transportation network
  - The level of technology and the rate of change in technology
  - Climate and water supply
  - Energy costs
  - Distance to market

There are other important factors to consider when attempting to assess trade and production strategies that will enhance the economic well being of Washington agriculture.

Chapter 4

Unemployment, Unemployment Insurance, and WorkSource Center Services

Introduction

This chapter focuses on permanent and seasonal labor supply and demand relative to each other in Washington state agriculture. Furthermore, this chapter discusses the employment services provided to agricultural employers and farm laborers as well as the degree to which documented agricultural farm laborers rely upon the Unemployment Insurance (UI) Program.

The agricultural labor force in Washington state grew almost four times slower than employment in the state overall.

Overall Situation of Employment Growth

From December 1997 to December 2005, the seasonally adjusted United States labor force grew from 124,361,000 to 134,376,000 workers – a growth rate of about 8.1 percent. Over this same period, the seasonally adjusted Washington state labor force grew from 3,008,485 to 3,321,257 – a growth rate of 10.4 percent. In contrast, on a seasonally unadjusted basis, the Washington state agricultural labor force is estimated as growing from 86,327 to 88,842 – about 2.7 percent.[74] Over this same time period, the year-by-year average monthly seasonal employment fell from 37,474 workers to 29,842 workers – a drop of 20.4 percent. Over the same time period, the non-seasonal component of the agricultural labor force is estimated to have increased from 48,853 workers annually to 58,793 workers – an increase of 20.3 percent.[75]

Structural Shift in the Agricultural Work Force

The agricultural labor force in Washington state grew almost four times slower (10.7 percent/2.7 percent = 3.85) than employment in the state overall.

However, the important story concerns the dynamic shift in the structure of agricultural employment that is taking place. Seasonal labor has dropped by about one-fifth, while non-seasonal labor has increased by about one-fifth, effectively replacing the drop in seasonal agricultural labor.

This structural shift implies that the technical and production structure of agriculture, as well as the array of agricultural products in the state, is changing over time. This change is allowing the employment of more permanent agricultural workers[76] and resulting in a movement away from employing migrant and seasonal workers. Generally speaking, seasonality in the agricultural labor force is being reduced over time. Among other

[74] The aggregate data for the United States and Washington come from the U.S. Department of Labor, Bureau of Labor Statistics. The basic web address is: ***http://data.bls.gov***. For the sake of consistency in making the national and state comparison, both national and state data are taken from the Quarterly Census of Employment and Wages. See the *Foreword*.

[75] The year-by-year average monthly seasonal component is based on the ESD/LMEA monthly survey of 600 agricultural producers statewide. The permanent component of the agricultural labor force is based on data from workers covered by the UI program, benchmarked every five years with survey data from the U.S. Census of Agriculture.

[76] This conclusion depends on the undocumented migrant and seasonal workers following the same downward trend as do the documented migrant and seasonal workers who are measured in the Unemployment Insurance Program data base on which these statistical measurements are based.

things, this shift has important implications for the role of the Unemployment Insurance Program in the state, and for the WorkSource Centers, and Labor and Industries in regard to issues in the enforcement of the state minimum wage law, the Adverse Economic Wage Rate (AEWR[77]), documentation of workers, and other labor standards.

The structural shift in the agricultural work force has important implications for the role of the UI Program and for the WorkSource Centers in the enforcement of minimum wage.

Recent Revision in the Unemployment Insurance Law. The precise reasons for this shift from fewer seasonal to more permanent workers, on average, are not fully understood at this time, though part of the explanation must lie in improvements in agricultural technology of all kinds. Also, one factor that could facilitate such a shift is the recent revision in the Unemployment Insurance Program – ESSB 6885. This bill, passed on March 8, 2006, made permanent two changes that were initiated in 2005. These changes are:[78]

- A reversal of the 2003 provision in the UI law that required calculation of benefits over a base year defined as the past four quarters of earnings. The 2005 temporary revision changed the base year benefit calculation back to the two quarters in the base year in which the wages were the highest. The 2006 passage made permanent this temporary change.

- Restoring the requirement that the unemployment insurance system is to be "liberally construed."

A third change, designed to help pay for the revision in the base year calculation, is the reduction of the claimant's weekly benefits from 4.0 percent to 3.85 percent of the claimant's average wages in the two quarters in which the base wages were the highest.

ESSB 6885, passed March 8, 2006, made permanent two changes that were initiated in 2005.

Potential Impact of the Revised Law

To see the impact of the revised law, note the following: Consider a legally employed seasonal worker who earns, say, $14,000 during the growing and harvesting season and nothing during the winter and early spring. Under the new law, this worker's benefits are calculated at the same rate as, say, a worker who worked full time during his or her base year and earned $28,000. This increase in the benefit structure can have the effect of tying some seasonal workers more closely to the agricultural sector and to their initial regions and employer groups.

[77] See *Chapter 1*.

[78] See Senate Bill Report ESSB 6885. Senate Committee on Labor, Commerce, Research and Development. See also: "Jobless Bill Helps Seasonal Workers" Yakima Herald-Republic. April 14, 2005.

Another effect will be, relative to the 2003 standards, to provide more incentive to apply for UI benefits. This, in turn, places the worker into the UI system. Placing the worker formally into the UI system has three effects: It notifies the WorkSource Center office of this worker's presence and availability for work. Second, it imposes on the worker the requirement to seek and accept suitable work as quickly as possible. Third, with the worker now in the UI system, his or her Social Security number can be cross-checked and the legal status of the worker can be ascertained. For any agricultural employer posting a job order with a WorkSource Center, this, then, relieves the farm operator of the burden of establishing the legal employment status of a prospective worker when that worker applies for the opening through the WorkSource Center.[79]

As of May 2006, "an agricultural employer who lists a job order with WorkSource can review the list of workers who are drawing unemployment benefits against that employer's account and can identify individuals who he's interested in rehiring. WorkSource staff will then contact the selected claimants and provide job-referral instructions."[80]

With the worker now in the UI system, his or her Social Security number can be cross-checked and the legal status of the worker can be ascertained.

In short, there is a synergy between enhancing the UI benefits for seasonal workers, registering them in the UI system, and linking them back to employers in the agricultural sector. Other things equal, this may add more stability to the agricultural labor force over time.

WorkSource Centers and the Formal Labor Market Sector

One can think of the agricultural labor market, where employers post job openings and workers seek jobs, as having a formal and an informal sector. The informal sector is characterized by such elements as word-of-mouth information flows, in-person applications at the firm, and ad hoc neighborhood worker pick-up points where employers can go to hire day-workers. The formal market is characterized by such elements as newspaper ads, and other printed and media advertising,[81] job fairs, private

[79] At this time the Workforce Development Areas and their WorkSource Centers are engaged in an initiative entitled the "Agricultural Initiative Program Performance and Improvements." A key objective of this initiative is to provide improved labor market services to agricultural employers and workers. Such an improvement will help to address the problem of regional and local labor shortages. WorkSource Center outreach is part of this initiative. WorkSource Center outreach staff ask for confidential information, but they keep that information confidential and do not report it to other agencies. If an undocumented worker identifies him or herself, the outreach professional explains that he or she is not eligible for WorkSource Center services. The undocumented worker is offered two toll-free numbers of groups which help with immigration issues. Email correspondence from Ken Pollock to Ignacio Marquez, June 13, 2006.

[80] State of Washington. Employment Security Department. "Ag Employers Have New Tool to Reduce Unemployment Costs – May 18, 2006." Media release: 06-039.

[81] The internet is now a major labor market exchange and is part of the formal market. For example, google "***Monster.com***." As another example, Stemilt Growers, a large fruit grower in Wenatchee, Washington, has a website – ***www.stemilt.com*** – where the firm advertises job openings. The single job currently advertised, as of June 9, 2006, is for an "Oracle Applications Program Analyst." This is a very high skilled information technology position. No cherry picker jobs are advertised in this website. The job fair and other advertising and the informal market are used to fill these relatively unskilled positions. In this most recent job fair, the firm was seeking workers to fill 2,500 job openings. The *Wenatchee World* reports that just 552 individuals showed up for the Stemilt job fair. This was down from 2005, when a reported 1,000 job applicants showed up at the Stemilt job fair for 1,400 job openings. It is possible that an offer of higher hourly wage rates would have resulted in more job applicants showing up at this April's job fair. See *Wenatchee World*. April 30, 2006.

sector labor contractors, private for-profit employment services,[82] and public sector employment services, such as the WorkSource Centers. It is important to note that historically, the informal labor market has been more important in helping employers find workers and workers find jobs than has been the formal sector.

The formal market is characterized by such elements as newspaper ads and other printed advertising.

Table 14
Seasonal Pattern of Continued Claimants and Seasonal Employment in Agriculture
Washington State, 2005
Source: Apendix Tables 8 and 14

Month	Continued Claimants Agriculture	Monthly Seasonal Employment Agriculture	Continued Claimants as a Percentage of Seasonal Employment
January	8,750	9,460	92.5
February	5,847	14,672	39.9
March	4,689	17,687	26.5
April	4,565	20,994	21.7
May	4,103	22,782	18.0
June	2,623	58,132	4.5
July	2,942	52,628	5.6
August	3,980	39,133	10.2
September	1,879	50,063	3.8
October	2,396	46,806	5.1
November	5,593	14,900	37.5
December	7,227	10,845	66.6
Monthly Average	4,550	29,842	15.2

Given the labor market role for the WorkSource Centers, what is the potential size of employer needs that these centers could fulfill with their services? *Appendix Table 8* indicates that the average worker/months of seasonal agricultural employment are estimated at 29,842 for 2005. In 2005, average monthly continued claimants[83] are 4,550. Continued claimants are, therefore, 15.2 percent of average annual worker/months of employment averaged over the year.[84] These workers, if they are non-U.S. citizens, are all legally eligible to work in the United States. There will be no undocumented migrant workers in this population, since a registered worker must have a valid Social Security number and these numbers are checked in a cross-match process to determine eligibility to receive UI benefits. (Historical continued claimant patterns are shown in *Appendix Table 14.)*

These workers, if they are non-U.S. citizens, are all legally eligible to work in the United States.

[82] For example, the Global Horizons firm, a labor contractor attempting to import Thai workers to the Washington agricultural labor market, is part of the formal labor market.

[83] Continued claimants are an unduplicated count of persons registered for waiting period credit or requesting benefit payment for one or more weeks of unemployment. This database contains all persons who are legally eligible to file for UI benefits, and who have done so, regardless of whether they are receiving an actual benefit payment. This is the single most comprehensive measure of individuals in the UI system at any point of time.

[84] Of course, there are additional unemployed workers in each of the Workforce Development Areas who are seeking jobs, either through the informal market, the formal market, or some combination of the two. Note that an unemployed person is a person who is out of work and is seeking work. Employed persons may also be seeking work, thus adding to the total individuals seeking work in any given Workforce Development Area.

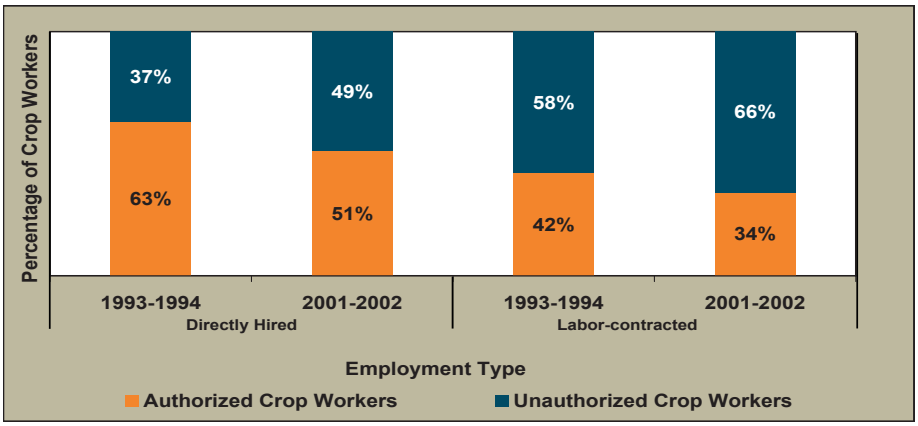
The Seasonal Continued Claimant Picture[85]

Due to sharp changes in seasonal demand, in January 2005, continued claimants are 92.5 percent of that month's total seasonal employment statewide. In contrast, in September 2005, continued claimants are just 3.8 percent of total monthly seasonal employment. The pattern in *Table 14* suggests that the WorkSource Centers are servicing the workers who can be legally employed and who are also essentially permanently attached to the agricultural sector for the time being. The data suggest that few migrant seasonal workers, and, of course, no undocumented seasonal workers are served by this particular component of the UI/WorkSource Centers system. Note that in May 2005, there is an average of 4,103 continuing claimants. By June, seasonal employment surges sharply to an estimate of over 58,000 workers. This is an estimated increase of over 35,000 workers in one month. At best, approximately 1,500 (4,103-2,623 = 1,480) workers are pulled out of the continued claimants pool – about 4 percent of the May-to-June surge.

The overwhelming bulk of migrant seasonal workers is aquired by farm operators from outside of the formal market of the WorkSource Centers.

The overwhelming bulk of migrant seasonal workers is acquired by farm operators from outside of the formal market of the WorkSource Centers. Therefore, recalling the discussion in *Chapter 1*, the H-2A program is facing a considerable task if the public policy intent is to supply these large surges in demand through some form of a revised H-2A program.[86] The workers needed to supply this surge will have to be identified largely outside of the available continued claimants group.

Figure 34
Legal Status by Employment Type: 1993-1994 and 2001-2002 Compared
United States Agricultural Labor Force, 1993-2002
Source: National Agricultural Workers Survey, 2001-2002. March 2005



Contract Labor Versus Directly Hired Labor

Concern over hiring properly documented workers under the H-2A program brings up the issue of the role of labor contractors in supplying documented workers to meet the permanent and seasonal variations in demand for these workers. *Figure 34* displays

[85] It is possible to separate continued claimants by industry sectors. This discussion relates only to continued claimants attached to the agricultural sector as identified by the NAICS code.

[86] The *Wenatchee World* (April 30, 2006) reports that "Four growers or companies from North Central Washington and two more from Yakima are seeking about 1,000 temporary workers from Mexico though the federal H-2A Guest Worker program with Gempler's help. It's a slow and expensive program but some of the applications have been accepted and certified for hiring, Gempler said." Mike Gempler is the executive director of the Yakima-based Washington Growers' League.

an unusual phenomenon. For the United States as a whole, over the nine year period from 1993-1994 through 2001-2002, agricultural labor contractors actually supplied a higher proportion of undocumented workers to the agricultural industry than were hired directly by agricultural producers. The exact wording in the U.S. Department of Labor's 2002 National Agricultural Workers Survey used to identify undocumented workers is that the workers were "unauthorized" to work in the United States. In 1993-1994, the United States Department of Labor estimated that 37 percent of total workers hired directly were undocumented – unauthorized workers. For that same year, labor contractors supplied a labor force to employers that was 58 percent undocumented. This situation worsened over time. By 2001-2002, 49 percent of the directly hired agricultural labor force was undocumented while this proportion had increased to 66 percent for the labor contractors.[87] By 2001-2002, labor contractors were supplying undocumented workers to the agricultural sector in roughly the same proportion as they are represented in the agricultural labor force over all. In contrast, those farm operators and others who hire farm labor were hiring undocumented workers at proportions less than that estimated as composing the agricultural labor force as a whole nationwide. Nearly four out of five farm workers (79 percent) were hired directly by growers and packers during this last survey year. Labor contractors supplied the remaining 21 percent, up from 14 percent in 1993-1994. Thus, in 2001-2002, an estimated 13 percentage points (64 percent x 21 percent = 13.4 percent) of the 64 percent of undocumented workers in the Pacific Region were supplied by labor contractors!

Nearly four out of five farm workers (79 percent) were hired directly by growers and packers during this last survey year.

Table 15
Characteristics of Continued Claimants, Agricultural Workers Contrasted with Food Production Workers
Washington State, 2004
Source: ESD/LMEA
http://www.wilma.org/occinfo/CharacteristicIndustAnu.asp

	Agricultural Workers		Food Products Workers	
Characteristic	**Number**	**Percent**	**Number**	**Percent**
Total Continued Claimants	**23,406**	**100.0**	**15,019**	**100.0**
Female	8,131	34.7	5,752	38.3
White	6,871	29.4	5,444	36.2
Black	158	0.7	733	4.9
Hispanic	15,710	67.1	6,612	44.0
Native American	190	0.8	197	1.3
Asian	183	0.8	1,643	10.9
Under Age 25	2,724	11.6	1,600	10.7
Age 25-34	5,432	23.2	3,284	21.9
Age 35-44	7,496	32.0	4,576	30.5
Age 45-54	5,051	21.6	3,660	24.4
Age 55 plus	2,703	11.5	1,899	12.6
Less than Grade 12 Education	14,976	64.0	6,419	42.7
High School Graduate or GED	5,605	23.9	5,738	38.2
More than HSG/GED	2,825	12.1	2,862	19.1

Source: ESD/LMEA, ***http://www.wilma.org/occinfo/CharacteristicIndustAnu.asp***

[87] National Agricultural Workers Survey (NAWS) 2001-2002. A Demographic and Employment Profile of United States Farm Workers. U.S. Department of Labor, Office of the Assistant Secretary for Policy, Office of Programmatic Policy, Research Report No. 9. March 2005. *Chapter 5. Figure 5.1.* Section L in the 2002 survey distinguishes among documented and undocumented workers by asking the answer to four categories. Is the worker: 1. A citizen; 2. Green Card holder; 3 Other Work Authorization; 4. Unauthorized.

Continuing Claimants by Agricultural Sub-Sector

Appendix Table 15 displays the annual seasonal sum of continued claimants by NAICS[88] agricultural sub-sector for 2004 and 2005. Across all agriculture, continued claimants dropped during 2005 compared to 2004. Depending on the sub-sector, the drop in continuous claimants ranged from a low of 0.53 percent (189 workers in 2004 compared to 188 workers in 2005) for farm labor to 49.39 percent for dairy farms – 245 workers in 2004 compared to 164 workers in 2005. Continuous claimants dropped 11.79 percent in deciduous tree fruits, by way of contrast.

Deciduous tree fruits represent the largest share of continuous claimants, both absolutely and relatively. Crop preparation, field crops, general farms and ornamental floriculture complete the top five.

Characteristics of Continued Claimants – Agricultural Workers Compared to Food Products Workers

A review of the characteristics of the annual total of non-duplicated continued claimants provides a picture, although not perfect, of the gender, ethnic, educational, and age make-up of the agricultural labor force.[89] These data are shown in *Table 15*.

About one in three of continued claimants in agriculture production is female, while almost two in five workers in food products are women.

Gender. About one in three of continued claimants in agriculture production is female, while almost two in five workers in food products are women. This proportion likely understates the share of males in agricultural production since a very large proportion of undocumented migrant and seasonal workers are male and do not show up in these data.

Ethnicity. Workers of white ethnicity represent about three in ten of the continued claimants in agriculture while they represent more than one out of three in the food products sector. Hispanic workers dominate agricultural production – comprising two out of three of the continued claimants there. This is surely an understatement, however, of Hispanic representation, since no undocumented workers will show up in the continued claimant data base. In contrast, somewhat more than two of out five workers in food products are Hispanic.

Age. In both the agricultural production and the food products sector, about two-thirds of the continued claimants are over age 35. Both sectors have a relatively mature labor force as characterized by the age structure of continued claimants. Again, due to the fact that undocumented workers tend to be younger than age 35, this proportion likely overstates the percent of workers over age 35.

[88] NAICS means North American Industry Classification System, United States, 2002. Executive Office of the President. Office of Management and Budget. 2002.

[89] Only if the population of Continued Claimants were a random sample of the population of all agricultural workers could we say the data above reflect the true demographic structure of the agricultural labor force.

Chapter 4

Education. The two sectors differ sharply in terms of the educational level of continued claimants. In the agricultural production sector, about two out of three of the continued claimants have less than a high school or GED education. This is true for only two out of five continued claimants in the food products sector. Only about one quarter of the continued claimants in agriculture have a high school education or a GED. But two out of five have this education level in the food products sector. One out of five in the food products sector has education beyond high school or the GED. Again, the presence of undocumented workers will increase the number of individuals in both sectors who have less than a high school education.

In the agricultural production sector, about two out of three of the continued claimants have less than a high school or GED education.

Table 16
Characteristics of Continued Claimants, Tree Nuts, Deciduous Tree Fruits, Fruits and Tree Nuts, N.E.C. Workers Contrasted with Grape Workers
Washington State, 2004
Source: ESD/LMEA
http://www.wilma.org/occinfo/CharacteristicIndustAnu.asp

	Tree Nuts, Deciduous Tree Fruits Fruits and Tree Nuts, N.E.C.		Grapes	
Characteristic	**Number**	**Percent**	**Number**	**Percent**
Total Workers	**7,524**	**100.0**	**773**	**100.0**
Female	2,454	32.7	241	31.2
White	756	10.0	39	5.0
Black	33	0.4	1	0.1
Hispanic	6,656	88.5	727	94.0
Native American	32	0.4	2	0.3
Asian	13	0.2	0	0.0
Under Age 25	581	7.7	49	6.3
Age 25-34	1,522	20.2	138	17.9
Age 35-44	2,698	35.9	286	37.0
Age 45-54	1,773	23.6	179	23.2
Age 55 plus	950	12.6	121	15.7
Less than Grade 12 Education	6,302	83.8	665	86.0
High School Graduate or GED	927	12.3	78	10.1
More than HSG/GED	295	3.9	30	3.9

Within the same website location, data are available by agricultural sub-sector detail on ethnicity, age, and education for continued claimants.

Characteristics of Continued Claimants – Tree Nuts, Deciduous Tree Fruits, Fruits and Tree Nuts, N.E.C. Workers Compared to Grape Workers

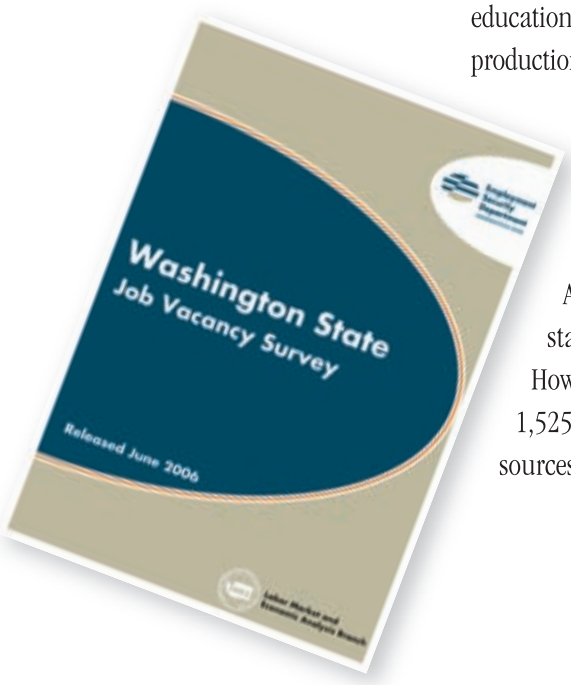
Tree fruits and wine, via grapes, are two of the more dynamic sectors in Washington state agriculture. *Table 16* reviews the characteristics of the continued claimants for these two agricultural sub-sectors. Recall, as before, that undocumented workers are not represented in these data. They are overwhelmingly Hispanic, male, relatively young, and with less than a high school education.

Gender. In both sectors, somewhat more than three out of ten workers are women – a lower proportion than in agricultural production as a whole.

Ethnicity. The dominance of Hispanic workers in both of these sectors is striking! Fully 88.5 percent of the workers are Hispanic in the tree nuts, deciduous tree fruits, fruits and tree nuts, N.E.C. sub-sectors. The presence of undocumented workers in these sectors would make the Hispanic proportion of the labor force even larger for this agricultural sub-sector. The picture is even more striking in grapes, where 94.0 percent of the workers are of Hispanic ethnicity.

Age. The labor force working in grapes, as indexed by continued claimants, is relatively mature. In both sectors, fully four out of five workers are over the age of 34.

Education. Education and ethnicity are clearly related in this group of continued claimants. About 84 percent (83.8 percent) of the continued claimants in the tree nuts, deciduous tree fruits, fruits and tree nuts, N.E.C. sub-sectors have less than a high school education or a GED. This is true of 86.0 percent of the continued claimants in the grape production sub-sector.



Job vacancy statistics represent only a part of the total agricultural labor demand system.

Job Vacancies by Workforce Development Areas[90]

Currently, job vacancy statistics are assembled by the Employment Security Department's Labor Market and Economic Analysis branch twice a year in April-May[91] of the spring quarter and October of the fall quarter. Job vacancy statistics represent only a part of the total agricultural labor demand system. However, viewing *Table 17*, we see that statewide for agriculture, there were only 1,525 total estimated job vacancies for April-May of 2005. Other formal and informal sources of agricultural labor demand complete the picture.

[90] Job vacancies and job order openings are two different concepts. A farm operator may report a job vacancy to the LMEA survey, but may or may not have placed a job order with a WorkSource Center, thus resulting in a job order opening.

[91] The first two weeks of May are included in the 2005 survey.

Table 17
Vacancies in Agriculture, Forestry, Fishing, and Hunting by Workforce Development Areas[1], Selected Months
Washington State, 2005
Source: ESD/LMEA

WorkSource Development Areas	Estimated Job Vacancies		Full-Time Positions in Percent		Permanent Positions in Percent		Newly Created Positions in Percent	
	Apr-May	Oct	Apr-May	Oct	Apr-May	Oct	Apr-May	Oct
North Central	506	86	84	100	4	44	7	0
South Central	370	61	97	0	68	0	0	0
Benton/Franklin	218	28	100	100	9	100	90	0
Seattle-King	110	84	86	100	8	0	14	0
Snohomish	86	0	95	0	5	0	5	0
Northwest	70	0	24	0	12	0	0	0
Spokane	37	0	100	0	38	0	63	0
Pacific Mountain	33	0	80	0	87	0	13	0
Tacoma-Pierce	28	0	100	0	92	0	25	0
Eastern	27	462	100	35	8	68	0	0
Olympic	26	0	100	0	88	0	13	0
Southwest	0	0	0	0	0	0	0	0
Statewide Total	1,525	770	89	52	27	55	19	0

NOTES: [1]See Figure 10 in Chapter 2 for a map of the Workforce Development Areas that display each area's county composition.
This job vacancy summary is conducted twice a year, at the beginning of the spring and fall quarters.

The two periods for which data are assembled coincide with the gearing up and the tapering off of seasonal agricultural labor demand for the production year. Reviewing *Table 14*, we see that in April and May 2005, an estimated 20,994 and 22,782 agricultural workers, respectively, were employed in agriculture. During this same period, 4,565 and 4,103 continued claimants, respectively, were registered in the UI system. However, viewing *Table 17*, we see that statewide for agriculture, only 1,525 estimated job vacancies are registered by agricultural, forestry, fishing, and hunting employers. About 65 percent of these job vacancies (1,094 vacancies) are registered in the three Workforce Development Areas that dominate agricultural employment in the state – the North Central, South Central, and Benton/Franklin Workforce Development Areas.

For agriculture statewide, only 1,525 estimated job vacancies are registered by agricultural, forestry, fishing, and hunting employers.

Thus, during this time, even if there were perfect matches between the characteristics of the continued claimants and the requirements specified in the job vacancies data, about two-thirds of the continued claimants during this period could not be placed using WorkSource Center advertised agricultural job vacancies. Note, finally, that the median wage offered in these job vacancies is $7.35, the Washington state minimum wage for 2005.

Job vacancy statistics have not been assembled for June 2005, when employment in agriculture surges to an estimated 58,132 workers. Thus, the picture above would change, though it is important to remember that most of this surge is comprised of migrant and

seasonal workers. Recall that for 2002, it is estimated that about 64 percent of the migrant and seasonal workers are undocumented workers for Washington and Oregon combined.[92] With a surge from May to June of 35,350 workers, then, if the proportion of undocumented workers is the same in 2005 as in 2002 and equal between Washington and Oregon, an estimated 22,624 workers of this surge in migrant seasonal workers may be undocumented. These workers almost certainly gain almost all of their labor market information and make all of their employment bargains through the informal labor market.[93]

Services Delivered by WorkSource Centers[94]

An estimted 22,624 workers of the surge in migrant seasonal workers may be undocumented. Given that, what services can the WorkSource Centers offer agricultural workers?

Given the above, what services can the WorkSource Centers offer agricultural workers? This view of the agricultural labor force and how it is served by the WorkSource Centers gives a different understanding of the formal labor market services provided to these workers compared to what one can observe when analyzing the continued claimant UI data. The data in this discussion refer to the 2004 program year, extending from July1, 2004 through June 30, 2005. The data are annual data. *See Table 18*.

Table 18
Comparison of Services Provided to all Agricultural Workers, Migrant and Seasonal Farm Workers (MSFW), and all Other Nonagricultural Workers
Washington State, Program Year July 1, 2004 to June 30, 2005
Source: ESD/Workforce Administration. SKIES Data Warehouse

	Migrant and Seasonal Farm Workers Number of Workers = 11,472[a]		Nonagricultural Workers Number of Workers = 301,728[a]	
	Number of Total Services	Percent of Total Services	Number of Total Services	Percent of Total Services
Module 1 - Orientation and Job Search Prep.	3,552	5.3	71,355	4.9
Job Referrals	11,776	17.5	271,982	18.6
Job Search and Placement Assistance	5,575	8.3	191,826	13.1
Service Orientation	1,704	2.5	16,068	1.1
Provided Labor Market Information	9,556	14.2	173,933	11.9
Follow-up Services	978	1.5	8,965	0.6
Staff-assisted Job Matching	4,845	7.2	48,422	3.3
Provided Training/Retraining Information	1,325	2.0	17,342	1.2
Job Search Planning	306	0.5	14,838	1.0
Job Referrals without Job Order	1,502	2.2	36,176	2.5
Referred to Supportive or Intensive Services	1,843	2.7	3,365	0.2
Vocational/Employment Guidance Services	1,231	1.8	4,862	0.3
Resource Room Assistance	1,470	2.2	43,163	3.0
Resume Assistance	185	0.3	24,823	1.7
Translation/Interpretation Services Provided	3,482	5.2	3,044	0.2
Internet Technical Assistance	675	1.0	49,048	3.4
Looking for Work on the Internet	---[b]	---[b]	196,989	13.5
Job Search Review Program Services	1,737	2.6	47,680	3.3
Unemployment Assistance	5,086	7.5	37,498	2.6
All Other Services	10,578	15.7	193,442	13.3

NOTES: [a]These numbers represent an unduplicated count of individual workers served.
[b]No services were reported in this category for migrant and seasonal farm workers.

[92] Note that this estimate is for 2002, based on U.S. Department of Labor data.

[93] It is interesting to note, however, that among the continued claimants, an estimated 70 percent of these documented workers are of Hispanic ethnicity.

[94] The source of the data in this section is the ESD, Workforce Administration. SKIES Data Warehouse.

Chapter 4

Employers Served

During the 2004 program year, 790 agricultural operators and companies – establishments – listed job orders with WorkSource Centers statewide.[95] This represents 11.2 percent of the 7,059 covered agricultural production establishments operating in 2004. In contrast, during the 2004 program year, an estimated 14,589 covered nonagricultural employers listed job openings with the WorkSource Centers. This represents an estimated 7.0 percent of the 208,090 nonagricultural establishments[96] covered under the Unemployment Insurance Program. Thus, based on these data, it appears the case that agricultural employers are much more likely to use the services of WorkSource Centers than are nonagricultural employers.

Job Orders, Job Openings, Job Referrals, and Job Hires

Over the 2004 program year, an estimated 11,472 unduplicated individuals who were covered migrant and seasonal agricultural workers received an estimated total of 67,406 services of all types. This amounts to an average of 5.88 services per worker. For the same period, an estimated 301,728 nonagricultural workers received an estimated total of 1,459,821 services of all kinds, or about 4.84 services per worker.

An estimated 11,472 unduplicated individuals who were covered migrant and seasonal agricultural workers received an estimated total of 67,406 services of all types.

Comparison of Services Offered

Table 18 shows a comparison of services offered to migrant and seasonal farm workers versus all nonagricultural workers. The mix of services delivered to the two groups of workers varies in significant ways. Some important comparisons are:

Module 1-Orientation and Job Search Preparation.[97] Three out of ten (31.0 percent) of the migrant and seasonal agricultural workers who are seeking work participate in this module while only one in four (23.6 percent) of the nonagricultural workers do so.

Job Referrals. While job referrals comprise roughly the same percentage of all services offered the two groups of workers, note that, on average, each migrant and seasonal farm worker received at least one job referral (11,776 / 11,472 = 1.026), while only about nine out of ten nonagricultural workers received a job referral (271,982 / 301,728 = .901).

[95] The United States Bureau of Labor Statistics draws a distinction between "firms" and "establishments." To see the distinction, McDonald's is a firm headquartered in Chicago, while the various McDonald's restaurants distributed around the world are establishments.

[96] There were 205,909 UI covered establishments in calendar year 2005. Source: ESD/Workforce Administration. SKIES Data Warehouse.

[97] This is a workshop module in which participants are introduced to information about employment and training resources available at the local delivery site and their community. There is an overview of the other workshop modules, a goal setting exercise, and a self assessment (Job Search Readiness Inventory) in this module. The module is mandatory for UI claimants who are called in through the Worker Profile Program or the Claimant Placement Program.

Roughly one out of two migrant and seasonal farm workers received job search and placement assistance.

Job Search and Placement Assistance. On average, roughly one out of two migrant and seasonal farm workers received job search and placement assistance while about two out of three nonagricultural workers received this specific service.

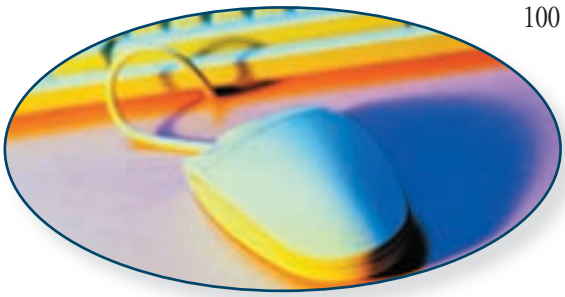
Provided Labor Market Information. About 83 percent of the migrant and seasonal farm workers received labor market information while this is true, on average, for about 58 percent of the nonagricultural workers.

Provided Training/Retraining Information. On average, 11.5 percent of the migrant and seasonal farm workers were provided some form of training information while this is true of only about 5.7 percent of nonagricultural workers. Thus, agricultural workers were about twice as likely to receive such services.

Referred to Supportive or Intensive Services. About one out of six migrant and seasonal farm workers were referred to supportive or intensive services, while this is true, on average, for one out of 90 nonagricultural workers.

Vocational/Employment Guidance Services. Migrant and seasonal farm workers are more likely to receive these services than are nonagricultural workers. On average, about one out of nine (10.7 percent) of the agricultural workers received such services while only one out of 62 (1.6 percent) of the nonagricultural labor force received such services.

Translation/Interpretation Services. Consistent with the heavy Hispanic representation among migrant and seasonal farm workers, about three out of ten of these workers received translation and interpretation services. This is true for only one out of 100 nonagricultural workers.



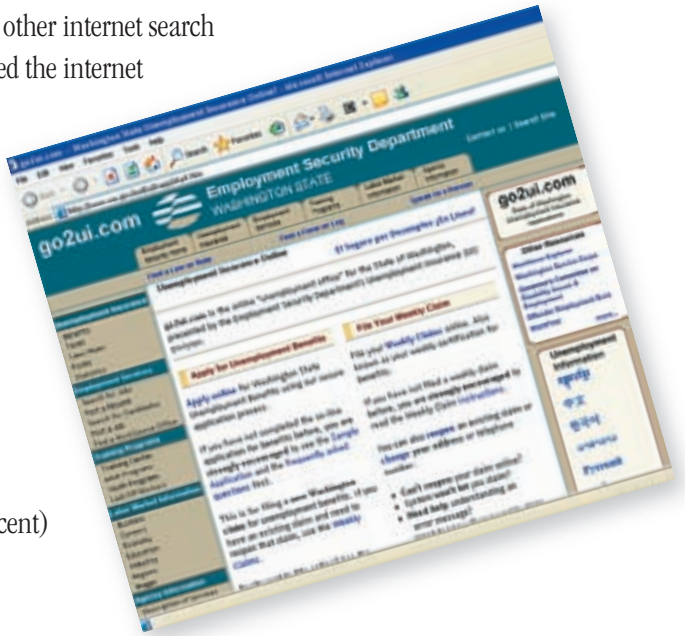
No migrant and seasonal farm laborer is reported as using the internet to seek work.

Internet Technical Assistance. About 5.9 percent of migrant and seasonal farm workers received internet technical assistance while this is true of about 16.3 percent of the nonagricultural workers, who are almost three times (16.3 / 5.9 = 2.76) more likely to receive this service.

Looking for Work on the Internet.[98] No migrant and seasonal farm laborer is reported as using the internet to seek work. In sharp contrast, this has become an important job search tool for nonagricultural workers, both for those workers seeking

[98] Recall the discussion in footnote 81. The Stemilt webpage listed only one highly technical job opening while the firm sought workers for 2,500 job openings at its job fair in Wenatchee in April 2006.

assistance from WorkSource Centers and those seeking jobs through other internet search engines. On average, 65.3 percent of the nonagricultural workers used the internet to help in their job search.



Job Search Review Services.[99] This process of validating job search behavior on the part of UI recipients is almost equally applied to agricultural (15.1 percent) and nonagricultural workers (15.8 percent).

Unemployment Assistance. On average, about two out of five (44.3 percent) of the migrant and seasonal farm workers received unemployment assistance. This is true for one out of eight (12.4 percent) of the nonagricultural workers on average.

Summary and Conclusions

- The estimated agricultural labor force – migrant and seasonal and non-seasonal permanent workers combined – has grown at a slow rate of 2.7 percent over the nine year period starting in 1997.
- This rate is about four times slower than the growth rate in the overall Washington labor force for the same time period.
- Over this same time period, a major structural shift in the composition of the agricultural labor force has occurred. Migrant and seasonal workers have dropped by about one-fifth of the total average annual employment while permanent workers have increased by about one-fifth.
- 2006 revisions in the unemployment insurance law have, in effect, increased the benefit payments to seasonal agricultural workers. This may have the effect of tying these documented seasonal workers more tightly to the agricultural sector.
- The legally documented agricultural labor force is heavily dominated by mature, Hispanic males, based on a review of the demographic characteristics of continued claimants to the UI Program. In some agricultural sub-sectors, they comprise almost the entire seasonal and non-seasonal agricultural worker labor force.
- WorkSource Centers tend to serve the documented, permanent component of the agricultural labor force in Washington.

2006 revisions in the unemployment insurance law have, in effect, increased the benefit payments to seasonal agricultural workers.

[99] This process occurs for Unemployment Insurance claimants who have received five weeks or more of UI benefits and who have a work search requirement. These claimants are called into the WorkSource Center offices to review their job search activities, validate their desired occupations, provide them with labor market information, and provide them with job matching and job referrals when appropriate.

- At present, WorkSource Centers do not fully respond to the surge in employment demand that is due to seasonality in the growth and maturation of crops – especially tree fruits. One reason for this fact is that the majority of the migrant and seasonal workers who respond to this surge are, apparently, undocumented and find jobs through the informal market.

- A recent – April 2006 – job fair in the Wenatchee Valley induced about 500 job seekers to show up for an advertised 2,500 job openings. This is not conclusive evidence of a "worker shortage." It is, however, evidence, that for many potential workers, the wage rate being offered was too low, given their alternative opportunities, including not working in the labor market at all.

- According to the United States Department of Labor, farm labor contractors supply a larger share of undocumented workers, out of the total they provide to the agricultural sector, than do farm operators, growers and packers, hiring directly. Proportionately speaking, farm operators and packers appear to be more careful in sifting out undocumented workers for placement in their job openings.

- Migrant and seasonal farm workers in search of employment receive a much different mix of services from the WorkSource Centers than do nonagricultural workers. As an example, on average, all migrant and seasonal farm workers receive a job referral, which this is true of nine out of ten nonagricultural workers.

A recent job fair in the Wenatchee Valley induced about 500 job seekers to show up for an advertised 2,500 job openings.

Chapter 5

Summary and Outlook

Introduction

Washington state is one of the dominant agricultural states in the United States. It continues to rank first in the production of a wide variety of agricultural products ranging from the well known apples, pears, and sweet cherries to less commonly known products as wrinkled seed peas and peppermint and spearmint oil. It ranks second nationwide in such products as grapes, lentils, dry edible peas, and fall potatoes. The state has a strong comparative advantage, both nationally and internationally, in the production of many agricultural products. That is, in terms of the resources used – the physical quantities of land, labor, and capital – Washington farmers produce a large number and variety of agricultural products at relatively lower cost than other states and nations.

Washington farmers produce a large number and variety of agricultural products at relatively lower cost than other states and nations.

Agriculture is currently a six-billion dollar industry in the state. Counting its direct, indirect, and induced effects, the industry generates and supports an estimated 186,000 jobs in the state annually. The state's agricultural sector contributes about 32 percent of its output to foreign export. In terms of international trade dynamics, Washington agriculture's expanding economic future lies to a large extent in extending its agricultural exports abroad. In this regard, its export future appears to lie in Mexico, Central and South America, India, and in the nations on the Pacific Rim – especially China and Japan.[100]

Prospects for the Future

Many factors influence the ability of a nation, region, or state to compete in international trade, or more generally, in the national and world economy. A short list includes:

- The ability of the agricultural sector to respond effectively to economic change – its dynamism and flexibility – are two major factors.
    - How quickly can it change its quantity and quality of products in response to changing consumer demand?
    - How quickly can it introduce new technology and improve its production techniques, processes, and technology in response to competition?
- Maintaining its comparative advantage – a factor related to the first two mentioned – is a third.

[100] The United States currently has bi-lateral agreements with 38 nations and trade entities. This count does not include such regional agreements such as NAFTA and ATPDEA or the United States' membership in the World Trade Organization.

Chapter 5

A Dynamic Agricultural Industry

Though nothing is certain in a changing political and economic world, Washington is positioned to take advantage of this expanding opportunity in international trade in part because the Washington agricultural economy is relatively dynamic. Adaptive change is continuous in response to changing economic conditions.

Over the ten-year period from 1995 to 2004, the number of farms has dropped from 38,000 to 35,000. It is reasonable to assume that the least efficient farms are those that are ceasing production with their land absorbed into alternative uses. Total land devoted to farming has decreased from 15,800,000 acres to 15,200,000 acres. While some of this is lost to urbanization, some of it likely represents the removal of relatively low productive land from farming.

Average farm size has gradually increased from 416 acres to 434 acres. The number of farms producing $9,999 or less in total receipts has dropped from 25,700 in 2000 to 19,300 in 2004.

The mix of migrant and seasonal farm workers compared to permanent farm workers has seen about a 20 percent shift away from migrant and seasonal farm workers and a concomitant 20 percent or so increase in permanent workers. This suggests a changing agricultural product mix and changing technology.

Total land devoted to farming has decreased. While some of this is lost to urbanization, some of it likely represents the removal of relatively low productive land from farming.

In current dollars, the capital value of the average Washington farm has increased from about $456,400 in 1999 to $526,600 in 2003. Compared to 1999, the constant dollar value of the average farm has increased an estimated 4.5 percent by 2003 to $476,800.

Production Trends of Dominant Agricultural Products

Overall Agricultural Industry Trends

The dynamic nature of Washington state agriculture – its ability to adjust to changing economic conditions – is further suggested by the way in which agricultural producers change the mix and quantity of agricultural production over time. *Table 19* displays the change in the structure of agricultural production in detail for the year 2000 compared to 2004. This five year period allows for a comparison that contains factors affecting trend as well as seasonal factors affecting the value of cash receipts.[101] Total cash receipts by type of agricultural product is the measure used to show the change in the structure of production.[102]

[101] For any given crop, such as sweet cherries, year-to-year variations in weather conditions can have significant effects on yield, and, therefore, cash receipts. In the case of livestock and products, events like the discovery of new cases of BSE, or "Mad Cow Disease" account for the recent sharp annual fluctuation observed.

[102] Total cash receipts is the product of the price(s) received for a given product times the quantity of that product sold at those prices. The measure includes the effects of both changing demand and changing supply for a given year.

Chapter 5

The constant dollar value of cash receipts has fallen for livestock and all other crops.

The constant dollar value of cash receipts for all commodities has risen between 2000 and 2004.[103] But the constant dollar value of cash receipts has fallen for livestock and all other crops. The rise in constant dollar value of cash receipts for both crops and fruits and nuts more than compensates for this decline.

Table 19

Change in Constant Dollar Value of Cash Receipts for Washington Agricultural Products: All Commodities and Commodities that Hold the 1st, 2nd, and 3rd Rank in Total National Production
Washington State, 2004 Compared to Base Year 2000
Source: USDA/NASS. 2005 Washington Annual Statistical Bulletin. Pages 8, 26 and 27.

Agricultural Product	National Rank in 2004	Percent Change in Constant Dollar Value, Base Year = 2000	
		Risen	Fallen
All Commodities	**---**	**5.7**	
Livestock and Products	---		8.4
Crops	---	12.8	
Fruits and Nuts	---	23.9	
All Other Crops	---		6.0
Crops			
Hops	1		28.7
Spearmint Oil	1		24.8
Wrinkled Seed Peas	1	86.7	
Peppermint Oil	1	53.7	
Lentils	2	34.1	
Dry Edible Peas	2	68.8	
Potatoes, Fall	2	12.0	
Fruit			
Apples, All	1	28.0	
Sweet Cherries	1	43.2	
Pears, All	1		0.7
Apricots	2	4.0	
Grapes, All*	2		9.2*
Tart Cherries	3	106.4	
Plums and Prunes	3		35.3
Vegetables			
Carrots, Processing	1	35.8	
Sweet Corn, Processing	2		19.1
Asparagus, Fresh	2	17.4	
Asparagus, Processing	2		52.8
Green Peas, Processing	2		38.2
Onions, All Summer	3	97.3	
Berries			
Red Raspberries	1	70.4	

NOTES: * There is a long run trend increase in grape production. The percent change in constant dollars from 2000 to 2003 – a four year period – was 11.2 percent.

[103] Between 2000 and 2004, the Consumer Price Index rose by about 9.7 percent. The data reported by NASS are unadjusted for inflation; they are in current dollars. Thus, any increase in the dollar value of cash receipts greater than 9.7 percent is taken as an increase in the value of the sector's output in constant dollars – a real increase in output.

Chapter 5

Trends by Dominant Crops

The comparison in *Table 19* is made for Washington crops ranked 1st, 2nd, and 3rd in overall production compared to the nation as a whole.

The constant dollar value of receipts has fallen for pears, prunes and plums.

Crops. The constant dollar cash receipts of hops and spearmint oil have fallen while receipts have risen for wrinkled seed peas, peppermint oil, lentils, dry edible peas, and potatoes. Hops production has been in a long term downward trend for a number of years.

Fruits. The constant dollar value of apples has risen by 28.0 percent. This positive trend reflects a considerable shift over time in the production of different apple varieties. The constant dollar value of sweet cherries has risen by 43.2 percent. Increases in apples and sweet cherries are particularly significant as they account for 79.4 percent of the 2004 value of fruits and nuts ($1,378,714,000 / $1,737,221,000 = .7936 x 100 = 79.36 percent). The constant dollar value of receipts has fallen for pears, prunes and plums. It is basically unchanged for grapes between 2000 and 2004.[104]

Vegetables. The constant dollar value of cash receipts has risen for carrots used in processing, fresh asparagus, and all summer onions. It has fallen for sweet corn used in processing, asparagus used in processing, and green peas used in processing. As noted in *Chapter 1*, much of the shift in the constant dollar value of fresh asparagus has been due to the effect of the ATPDEA agreement. This agreement is forcing Washington asparagus growers to focus production on the fresh produce market rather than on the processing market.

Among berries, the output of red raspberries has expanded in constant dollar terms by over 70 percent for the five-year period ending in 2004.

Berries. Among berries, the output of red raspberries has expanded in constant dollar terms by over 70 percent for the five-year period ending in 2004.

Summary. The Washington state agricultural sector shows considerable flexibility over this most recent five-year period. Painful as it is for farm operators forced to change for reasons out of their control, this flexibility helps to ensure the long run health of agriculture in the state.

Trends in Agricultural Productivity – Washington State

Productivity increase is another determinant of the ability to continue to compete. Increases in productivity will contribute to maintaining comparative advantage, but productivity increase is not the only consideration in maintaining comparative advantage. Recall that French apples have not penetrated Asian markets while American apples have, due in part to a real cost differential in transportation.

[104] See the note to Table 19.

Data comparing productivity change in Washington versus the remaining lower 48 states exist for the period 1960 through 1996. The data end ten years ago, but are still suggestive of the general productivity growth pattern that is achievable by the state's agricultural producers.[105]

Washington agriculture compares very well with its two other Pacific Coast states. As *Table 20* shows, the average annual percentage growth in total factor productivity[106] for the State of Washington exceeds that of both California and Oregon. Total factor productivity growth for Washington is estimated at 2.3 percent, while it is estimated at 1.7 percent for California and 2.0 percent for Oregon. The national median is 1.94 percent.[107]

To some extent, this difference can be due to the fact that Washington began at a lower productivity base in 1960.[108] But this growth rate also implies that Washington agricultural producers have been adept at adopting, diffusing, and applying the technology that is available to the benefit of their industry. In short, Washington agriculture has done a relatively good job of using technology to improve output.

The growth rate implies that Washington agricultural producers have been adept at adopting, diffusing, and applying technology to benefit their industry and improve output.

In addition, these data indicate that there is a "positive interaction between capital accumulation and productivity growth."[109] Note that the rate of increase in capital input is .004 per year for Washington (or 0.4 percent per year) while the national median for this 36-year period is .001 (or 0.1 percent per year). Note also the high growth rate in intermediate inputs, such as seeds, fertilizer, and irrigation equipment – all of which also incorporate new technology and enhance technological change.

[105] During the period 1947 to 1985, it is estimated that productivity growth accounted for 82 percent of the economic growth in agriculture while it accounted for only 13 percent of the growth in the nonfarm economy.

[106] Total factor productivity, briefly put, is the ratio of an index of total output divided by an index of the total factors of production used to produce that output. In the context of Table 20, we are discussing rates of productivity growth. In this case, using growth rates, the total factor productivity growth rate is the product of the growth rate in total output multiplied by the growth rate in total factor input – land, labor and capital combined.

[107] A recurring theme throughout this annual report concerns the significant impact of weather – temperature and precipitation – on the production of agricultural products in the state. Ball, Butault, and Nehring (2001) conduct productivity measures on sub-periods during the 36-year study that coincide with sharp regional changes in weather. They document that the productivity measures are very sensitive to weather conditions. See page 13 of their study.

[108] In 1960, Washington was ranked 19th in relative productivity level. California was ranked 7th. Oregon was ranked 31st. By 1996, Oregon's relative rank was unchanged while California's relative rank fell to 13th and Washington's relative rank rose to 6th. See Ball, Butault, and Nehring. 2001. Table 10.

[109] See Ball, Butault, and Nehring (2001) fully referenced in *Table 20*.

Table 20
Annual Percent Growth in Agricultural Productivity
Washington Contrasted with California and Oregon,[1] 1960-1996
Source: U.S. Department of Agriculture. Economic Research Service. Ball, V. Eldon, Jean-Pierre Butault, and Richard Nehring. "U.S. Agriculture, 1960-96. A Multilateral Comparison of Total Factor Productivity." Technical Bulletin Number 1895. May 2001.

Productivity, Output, or Input	Washington Percent Change	Washington Rank	California Percent Change	California Rank	Oregon Percent Change	Oregon Rank	Lower 48-State Median Value
Total Factor Productivity	**2.3**	**10**	**1.7**	**35**	**2.0**	**19**	**1.94**
Total Output	**3.1**	**2**	**2.2**	**14**	**2.2**	**13**	**1.5**
Crop Output	3.2	2	2.4	11	3.0	3	2.5
Livestock Output	2.8	6	1.8	19	0.7	30	1.2
Total Input	**0.7**	**4**	**0.5**	**10**	**0.2**	**16**	**-0.35**
Intermediate Input	2.3	2	1.4	17	1.2	19	0.9
Capital Input	0.4	9	0.3	13	0.4	9	0.1
Land Input	-0.3	7	-0.7	26	-0.6	18	-0.4
Labor Input	-0.8	6	-0.8	5	-0.5	4	-2.5

NOTES: [1] Each of the estimates in this table is an annual growth rate that has been converted to an annual percent change by multiplying the growth rate times 100. Thus, the annual growth rate in total factor productivity for Washington state over the period 1960-1996 is .023, while the annual percent change in total factor productivity can be interpreted as 2.3 percent (.023 x 100 = 2.3 percent).

These estimates are generated using a complex index number methodology. An index number is typically understood in terms of a base year and a mix of commodities or factors of production measured at that base year. One then tracks the changes from the base year over time. The base year for these estimates is 1960 and the factor and commodity mix is based on the agricultural structure of Alabama at that time.

If Washington state agricultural producers continue to innovate as they have in the past, the overall competitive strength of the state agricultural sector should be maintained.

Finally, over this period, it is important to note that inputs from land and labor have fallen. Less labor and land are being used to produce a given quantity of agricultural output. Ignoring for the moment the quality and quantity labor and land over time, these two declines in physical inputs to production will improve the comparative advantage of Washington agriculture.

In summary, if Washington state agricultural producers continue to innovate as they have in the past, the overall competitive strength of the state agricultural sector should be maintained.

International Trade and Comparative Advantage

Washington is the third largest fruit exporter and the second largest vegetable exporter nationwide.

Penetrating Markets. Washington is the third largest fruit exporter and the second largest vegetable exporter nationwide.[110] Growth in the state's agricultural sector will depend a great deal on the liberalization of international trade. "For agriculture, Canada and Mexico alone account for 55 percent of the increase in agricultural exports to the world … since 1993."[111]

There are enormous potential world markets for Washington agricultural products to further penetrate. China, India, Japan, and South Korea have very large consumer markets for food, yet all have significantly greater trade restrictions on the importation of agricultural products than does the United States.[112]

The federal government and the State of Washington have to continue their focus on decreasing trade restrictions on Washington-produced and U.S. agricultural products worldwide. China's recent entry to the World Trade Organization should contribute to a liberalization of her trade restrictions. Though, as with the American apple experience with Japan, breaking down a particular trade barrier can often be measured in decades, not years.

Comparative Advantage. Given a continued focus on trade liberalization, penetrating international markets then depends upon a nation's comparative advantage in producing a given product or service. In particular, comparative advantage depends on a complex set of economic and production factors, not just low wage rate labor.

To focus mainly on keeping average hourly wage rates low can result in several mistakes as a producer. First, and most importantly, the low wage focus distracts attention from the necessity of continuing innovation of all kinds, regardless of the price of labor. Second, other things equal, low wage rate labor is not very productive labor. Indeed, the shift we note by farm producers away from relatively heavy reliance on migrant and seasonal farm workers is recognition of this fact. Third, climate, availability of water, topography, human and physical capital, social infrastructure, and technology specific to each crop are also critical in maintaining a competitive edge.

[110] USDA. Foreign Agricultural Service. Fact Sheet. January 2006.

[111] Office of the United States Trade Representative. Trade Facts. March 2006.

[112] Measures of the overall extent of trade restrictions, county by county, differ by the concept used, such as total number of goods covered by tariffs, or the trade-weighted value of goods covered by tariffs, but by almost every measure, United States trade restrictions for agricultural products are lower than for most nations in the world. See Congress of the United States. Congressional Budget Office. "Policies That Distort World Agricultural Trade: Prevalence and Magnitude." A CBO Paper. August 2005. For the same source, see also: "The Effects of Liberalizing World Agricultural Trade: A Survey." A CBO Paper. December 2005.

Chapter 5

Comparative advantage is product, service, or crop-specific. It exists between pairs of trading partners for a given crop, service, or product. It is not a permanent condition. The United States once had a comparative advantage in the production of leather shoes and basic steel. It once dominated world automobile production. Comparative advantage was lost in leather shoes before World War II and in steel soon after World War II. The 1970's OPEC increases in the price of crude oil signaled the change in U.S. comparative advantage in automobiles.

The same can happen for any particular agricultural product in the state. To illustrate, consider the intersection of weather and technology with respect to row crops and tree fruit. Weather is a constant concern in this state, as our experience in 2005 has shown us. Water allocations were cut dramatically among those with junior versus senior claims on the available water supply. Crops suffered.[113] Yet, it is likely that drip irrigation, a major capital innovation which could reduce the uncertainty and the costs of the vagaries of precipitation and temperature, is not applied as widely in the state as would be optimal.[114]

Drip irrigation is complex and costly yet it saves water by reducing competition of farming needs with ecological and urban needs.

Drip irrigation technology is complex and costly to install – between $500 and $1,200 per acre – plus annual maintenance costs. Yet it saves water in a physical sense by reducing the competition of farming needs with ecological and urban needs. And, it saves in an economic, cost-of-production sense. In the process of utilizing a drip irrigation system, there are savings on such factors as:

- fertilizer costs,
- energy costs in transmitting water to the plant locus,
- decrease in water contact with crop leaves, stems and fruit, and
- allowing more flexible work in the fields both in terms of labor (e.g., the pruning process) and the use of farm equipment, among other benefits.

On the down side, apart from the capital cost, these systems must be carefully maintained. There will be a learning curve involved in achieving efficient operation and maintenance practices. This learning curve is also a cost of installing the system. Weed control may need to be redesigned. Technology must be carefully chosen and over-design of any given system must be avoided. In addition, there can be drip tape disposal costs.[115]

[113] "More than half of the Yakima Irrigation Project's 460,000 acres, some of the state's most diverse and productive farmland, have junior water rights," "Drought impacts felt in Yakima Valley." Capital Press. May 27, 2005. The Yakima Herald Tribune (March 10, 2005) reports that the U.S. Bureau of Reclamation recognizes slightly more than one million acre-feet of senior water rights and about 1.2 million acre-feet of junior water rights in the Yakima Irrigation Project. Regional or district water shortages can be alleviated by purchasing water from other surplus water sources, but the overall uncertainty cost of potential water shortages remains for the long run. And, when the drought is general, the economy bumps up against a fixed physical constraint – there simply is less water for all uses everywhere.

[114] See "Drip, linear irrigation use on rise." Capital Press. July 8, 2005. The term used to describe how technology is identified and adopted is "technology diffusion."

[115] See Clinton C. Schock. "An Introduction to Drip Irrigation." Oregon State University. Malheur Experiment Station. No date. ***http://www.cropinfo.net/drip.htm***. See also: Hanson, B.R., G. Fipps, and E. C. Martin. "Drip Irrigation of Row Crops: What is the State of the Art?' Abstract. Kansas State University. Research and Extension. No date. ***http://www.oznet.ksu.edu/sdi/Abstracts/Drip%20Irrigation%20of%20Row%20Crops.htm***.

The low-end estimate of drought-related losses of $300 million in agricultural receipts would support the installation of drip irrigation on about a quarter million acres of crop land.

In short, the costs of installation and maintenance and the learning curve costs are significant. But, there are significant costs in not responding to the historical uncertainty in the supply of water. During the 2005 water shortage, one orchardist in Zillah is reported to have spent an additional $50,000 to pump additional water to his 60 acre orchard. At the high-end estimate of installation cost of $1,200 per acre the same funds could have been used to install new irrigation technology into 42 acres of his orchard.[116] Alternatively, though the final figures for 2005 are not yet reported, the low-end estimate of drought-related losses of $300 million in agricultural receipts would support the installation of drip irrigation on about a quarter million acres of crop land.[117] This would provide improved irrigation to about one half of the 460,000 acres of land in the Yakima Irrigation Project which now are subject to junior water rights (See *footnote 113*).

Other Issues Facing Washington Agriculture

A review of the past year's media and industry publications reveals three additional issues facing Washington state agriculture. Interestingly, they are all interrelated. They are:

- Volatility of demand and supply of labor
- Heavy reliance on undocumented workers
- Average hourly wage rates and the state minimum wage

Volatility of Demand and Supply of Labor

Volatility of demand and supply of labor, heavy reliance on undocumented workers, and hourly wage rates and minimum wage are all issues facing Washington.

As discussed in previous chapters, the demand for agricultural labor in the state has two components. There is the annual seasonal component, driven by the various crop cycles and there are year-to-year and within-season weather patterns. The annual seasonal component of demand can change greatly from year to year and leads to industry-wide concerns over the adequacy of labor supply. The component of labor demand influenced by the day-to-day vagaries in temperature, sunlight, and rainfall can lead to volatile fluctuations in demand. Both types of demand, given the existing supply of labor at a time and place, can exacerbate the problem of "labor shortage."

It is possible to some degree to anticipate and even adjust to the year-to-year variations in labor demand and supply, but it is much more difficult to adjust to the very short-term volatility. At a given time and place, given the weather, it simply may be physically impossible to acquire the needed labor to save or harvest a crop in a production emergency.

[116] "Drought impacts felt in Yakima Valley." Capital Press. May 27, 2005.

[117] This is an overestimate to the extent that of the $300 million loss in gross receipts to agriculture, some of that loss is mitigated since farmers will avoid much of the expenditure on the intermediate inputs and labor that are part of those gross receipts. Recall that value added — the actual loss — is about half of gross receipts. See *Chapter 1*.

The formal and informal market can deal with the needs of the first type of shortage. Under existing institutional arrangements, the formal labor market is likely not nimble enough to completely deal with the second type of shortage. Even sharply raising wage rates may not draw the necessary labor supply in a given situation. Hence, growers are constantly concerned about labor shortage, as is understandable given the uncertainty caused by weather.

Just because a farmer does not gain all the workers he or she wants at a given wage rate, does not mean there is a shortage in an economic sense.

It is important to point out, though, that just because a farmer does not gain all the workers he or she wants at a given wage rate – say, the state minimum wage, which must be paid to all seasonal and migrant workers (See *Chapter 3*) – this does not mean there is a shortage in an economic sense. To see the point, note that if a given grower offers one-half of the state minimum wage, then the "shortage" he or she experiences will be even greater. If, however, agricultural wages rise continuously over time, this is evidence of a long term shortage. Note again, in *Chapter 3*, constant dollar average hourly wage rates in cherries and apples have generally declined in the past decade or so. There has been a long-term increase in constant dollar average hourly wage rates in pears, however.

Heavy Reliance on Undocumented Workers

Apple, sweet and sour cherry, and pear production are expanding agricultural sub-sectors in the state. This expansion implies consumer demand is increasing. Other things equal, this demand increase will lead to an increase in the demand for agricultural labor. If agricultural labor supply does not increase or responds sluggishly relative to labor demand, then average hourly wage rates should rise in these agricultural sub-sectors. The estimates presented in *Chapter 3* suggest that constant dollar wage rates have fallen for apples and sweet cherries, which comprise the dominant share of migrant and seasonal labor demand. One reason for this relative decline is that labor supply has indeed been increasing. Researchers at the Congressional Budget Office, U.S. Congress report that foreign-born workers account for more than half of the growth in the U.S. labor force over the past decade.[118] Recall that the U.S. Department of Labor estimates that over 64 percent of the migrant and seasonal farm workers in Washington and Oregon are undocumented as of 2001-2002 (See *Chapter 1*), and that this percent has risen considerably over time.

The U.S. Department of Labor estimates that over 64 percent of the migrant and seasonal farm workers in Washington and Oregon are undocumented as of 2002-2002.

It is reasonable to conclude that over all there has been an adequate supply of migrant and seasonal labor, particularly on the low-end of the wage scale. This labor supply has been fed largely by undocumented workers from Mexico, and, more recently, countries in

[118] See Congressional Budget Office. "The Role of Immigrants in the U.S. Labor Market." November 2005. Page 2.

Central America. Even the payment of minimum wages in Washington is a major draw to these workers. Recall that the daily minimum wage in Mexico, in recent years, has been about one-twelfth of the daily minimum wage in Washington state. Indeed, the wage differential between America and Mexico, together with the relatively open border, has led some analysts to discuss the concept of a "Binational Mexico-U.S. Workforce."[119]

However, this dependence of Washington agriculture on a large supply of undocumented workers now presents a problem to the state, and to the nation as well, given the current policy debate concerning illegal immigration.

Organizing the Formal Labor Market for Agricultural Production

Recall that there is an annual and a very short-term, even daily, volatility in the demand for relatively low-wage migrant and seasonal workers. Production of fruits and vegetables for the fresh produce market is labor intensive, particularly during the harvesting periods.

Production of fruits and vegetables for the fresh produce market is labor intensive, particularly during the harvest periods.

The question then becomes: How can the formal sector of the labor market organize itself to provide for this volatility in labor demand? Given the current agricultural production structure for these crops, tens of thousands of additional workers are needed for short periods. Given the current structure of wage rates growers are able and willing to pay, we have limited evidence that local, farm operator-run job fairs will not fill the gap.

There is a new "experiment" in the form of a joint labor contractor/labor union labor exchange (*Chapter 1*), but so far, we are discussing hundreds, not thousands, of workers being supplied by this potential innovation. And, the hourly wage rate that will have to be paid in order to comply with the H-2A program is above $12 per hour, counting the AEWR plus benefits and travel and housing cost. In its recent job fair, Stemilt was advertising a significant number of jobs at the 2006 state minimum wage of $7.63 per hour – about five dollars an hour less, not counting employment taxes that must be paid on these wages. Turnout for the job fair failed to meet expectations.

Can the state's WorkSource Centers, working with the Workforce Development Councils, fill the gap between labor demanded and labor supplied given the current wage structure? This remains to be determined. Some changes in the operational structure of the WorkSource Centers will likely have to occur. But the problem of meeting the harvest surges, linked with the requirement to provide legally documented workers present significant challenges.

[119] See Edward Kissam, Jo Ann Intili, and Anna Garcia. "The Emergence of a Binational Mexico-US Workforce: Implications for Farm Labor Workforce Security." Aguirre International. June 2001.

Chapter 5

Conclusion

Agriculture in Washington is an economically flexible and highly productive industry sector that provides great benefits to producers, workers, and consumers in the state and across the nation. Given its current economic structure, which includes the reliance on a large supply of undocumented workers, it has significant comparative advantages for a number of products in national and international trade. Washington agriculture contributes significantly to America's large historic, but decreasing, balance of trade in agricultural products. However, as currently structured, labor force issues are a nagging concern for state policy makers and agricultural producers and, nationwide, for consumers and national policy makers. Solutions to the labor market issues facing the industry will challenge policy makers at the state and national level in the next few years, just as they have been a challenge since the turn of the 20th century.[120]

Agriculture in Washington is a highly productive industry that provides great benefits to producers, workers, and consumers in the state and across the nation.

[120] See David Spener. "Mexican Migration to the United States, 1882-1992: A Long Twentieth Century of Coyotaje." October 2005.

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Appendix

Appendix Table 1

The Structure and Impact of Agriculture and Food Processing in the Washington State Economy: An Input-Output Perspective for the Year 2000

	AGRICULTURAL EXPORTS		PROCESSED FOOD EXPORTS	
	DOMESTIC AND FOREIGN	FOREIGN ONLY	DOMESTIC AND FOREIGN	FOREIGN ONLY
OUTPUT IMPACT				
TOTAL VALUE IN YEAR 2000 DOLLARS[1]	6,899,980,821	1,781,027,609	13,382,685,145	1,625,140,582
FARM SECTOR ONLY	3,177,673,216	799,313,984	314,864,352	106,711,768
AGRICULTURAL SERVICES SECTOR ONLY	272,957,632	71,145,696	30,625,876	5,242,648
FOOD PROCESSING SECTOR ONLY	37,087,936	8,470,035	6,761,919,488	786,194,432
OVERALL MULTIPLIER	1.7[2]	1.7	1.68	1.74
EMPLOYMENT IMPACT				
TOTAL NUMBER OF WORKERS[1]	94,518.3	25,727.3	92,112.6	11,250.1
FARM SECTOR ONLY	52,609.0	14,859.5	4,177.4	1,138.4
AGRICULTURAL SERVICES SECTOR ONLY	10,809.3	2,817.1	1,128.8	198.3
FOOD PROCESSING SECTOR ONLY	137.0	32.4	28,798.1	3,211.0
OVERALL MULTIPLIER	**1.62**	**1.56**	**2.39**	**2.58**

NOTES: [1] The "Total" is the sum of "Direct," "Indirect," and "Induced" effects with respect to productive activity for a given sector. The "Direct" effect measures the value of initial agricultural production, such as dollar value of total hops produced in the state. The "Indirect" effect measures the change in the dollar value of output of the industries that supply inputs to agriculture and food processing, such as fertilizer sold to farmers. The "Induced" effect measures the change in household income and household consumption as a result in the change in payrolls to labor engaged in direct and indirect production.

[2] Interpretation: One dollar's worth of agricultural exports to the rest of the U.S. and foreign countries creates approximately $1.70 worth of total sales throughout the Washington economy, including agriculture.

Source: Joydeep Ghosh and David W. Holland. "The Role of Agriculture and Food Processing in the Washington Economy: An Input-Output Perspective." TWP-2004-114. Department of Agricultural and Resource Economics. College of Agriculture. Washington State University. August 2004.

Appendix Table 2

Change in Seasonal Worker Demand, by Month, 2005 Compared to 2004

MONTH	TOTAL MONTHLY SEASONAL EMPLOYMENT: WORKERS		DIFFERENCE BETWEEN	CHANGE IN SEASONAL EMPLOYMENT	CHANGE IN SEASONAL EMPLOYMENT
	2004	2005	2004 and 2005	2004-2005: Apples	2004-2005: Cherries
JANUARY	8,322	9,460	1,138	1,025	107
FEBRUARY	12,460	14,672	2,212	763	-155
MARCH	16,503	17,687	1,184	35	-626
APRIL	23,065	20,994	-2,071	-624	-381
MAY	24,128	22,782	-1,346	-847	20
JUNE	60,140	58,137	-2,003	559	-3,891
JULY	59,467	52,629	-6,838	-791	-4,776
AUGUST	39,525	39,133	-392	-311	704
SEPTEMBER	51,760	50,063	-1,697	-518	-131
OCTOBER	49,650	46,806	-2,844	-3,078	6
NOVEMBER	16,179	14,900	-1,279	-966	2
DECEMBER	12,585	10,845	-1,740	-1,630	-420
TOTAL WORKER-MONTHS	**373,784**	**358,108**	**-15,676**	**-6,383**	**-9,541**

Source: ESD/LMEA

Appendix Table 3

Value of Production and Government Payments, Washington, 1995-2004, in $1,000s, Current Dollars

YEAR	FIELD CROPS	FRUITS AND NUTS	COMMERCIAL VEGETABLES	BERRY CROPS	TOTAL CROPS	SPECIALTY PRODUCTS[1]	LIVESTOCK AND PRODUCTS	TOTAL VALUE OF PRODUCTION	GOVERNMENT PAYMENTS	TOTAL VALUE[2]
1995	2,121,180	1,351,311	317,143	53,159	3,842,793	682,704	1,396,058	5,921,555	116,062	6,037,617
1996	2,083,200	1,232,736	307,635	54,431	3,678,002	619,731	1,457,443	5,755,176	155,364	5,910,540
1997	1,869,686	1,235,820	357,558	50,183	3,513,247	577,012	1,447,592	5,537,851	147,263	5,685,114
1998	1,648,070	1,070,299	357,016	40,405	3,115,790	584,544	1,542,459	5,242,793	260,524	5,503,317
1999	1,617,658	1,233,033	299,306	66,252	3,216,249	592,518	1,553,370	5,362,137	270,594	5,632,731
2000	1,697,526	1,164,734	329,667	46,739	3,238,666	587,994	1,519,056	5,345,716	352,503	5,698,219
2001	1,750,181	1,315,196	310,235	61,534	3,437,146	535,386	1,604,115	5,576,647	298,784	5,875,431
2002	1,798,986	1,450,719	361,775	62,378	3,673,858	515,334	1,396,461	5,585,653	215,911	5,801,564
2003	1,730,268	1,653,018	419,806	66,161	3,869,253	503,751	1,449,168	5,822,172	265,396	6,087,568
2004	1,798,977	1,485,034	365,930	78,762	3,728,703	534,974	1,678,414	5,942,091	197,011	6,139,102

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

Source: 2005 Washington Annual Statistical Bulletin. 2005. Page 5. ***http://www.nass.usda.gov***

Appendix

Appendix Table 4

Value Added to the U.S. Economy by the Agricultural Sector via the Production of Goods and Services, Washington, Current Dollars, 1998-2004[1]

Item	1998 1,000s DOLLARS	1999 1,000s DOLLARS	2000 1,000s DOLLARS	2001 1,000s DOLLARS	2002 1,000s DOLLARS	2003 1,000s DOLLARS	2004 1,000s DOLLARS
CASH RECEIPTS:							
CROPS (FINAL CROP OUTPUT)	3,397,774	3,206,379	3,372,938	3,461,655	3,695,081	3,986,505	4,132,391
LIVESTOCK (FINAL ANIMAL OUTPUT)	1,736,336	1,644,239	1,712,827	1,755,285	1,552,649	1,527,014	1,735,805
MACHINE HIRE AND CUSTOM WORK	72,218	70,702	85,196	59,205	57,605	88,552	139,215
FOREST PRODUCTS SOLD	247,000	235,000	225,000	171,000	140,000	120,000	130,000
OTHER FARM INCOME	173,026	210,796	128,270	210,224	131,077	148,867	176,848
GROSS IMPUTED RENTAL VALUE OF FARM DWELLINGS	202,544	197,441	207,778	206,158	210,342	218,849	244,694
FINAL AGRICULTURAL SECTOR OUTPUT	**5,828,898**	**5,564,557**	**5,732,009**	**5,863,527**	**5,786,754**	**6,089,787**	**6,558,953**
LESS: INTERMED CONSUMPTION OUTLAYS:							
FARM ORIGIN	816,788	793,380	884,498	814,580	834,937	771,218	693,409
MANUFACTURED INPUTS	689,090	694,193	699,831	759,829	685,737	638,402	745,579
OTHER INTERMED EXPENSES:							
REPAIR AND MAINTAINANCE OF CAPITAL ITEMS	310,050	346,485	314,645	271,389	264,895	206,273	302,052
MACHINE HIRE AND CUSTOM WORK	154,697	141,732	106,706	102,441	177,527	97,157	82,359
MARKETING, STORAGE, AND TRANSPORTATION EXPENSE	301,163	317,144	383,071	423,538	372,686	401,388	397,828
CONTRACT LABOR	36,425	39,429	38,603	54,892	47,585	37,448	31,215
MISCELLANEOUS EXPENSES	487,188	492,945	463,476	549,968	549,776	492,386	469,189
TOTAL INTERMED CONSUMPTION OUTLAYS	**2,795,401**	**2,825,308**	**2,890,830**	**2,976,637**	**2,933,143**	**2,644,272**	**2,721,631**
GOVERNMENT TRANSACTIONS:							
+ DIRECT GOVERNMENT PAYMENTS	260,524	270,594	352,503	298,784	215,911	265,396	197,011
- MOTOR VEHICLE REGISTRATION AND LICENSE FEES	21,601	22,594	17,438	19,416	13,105	10,315	10,642
- PROPERTY TAXES	161,736	165,091	164,220	165,226	142,699	160,000	170,000
GROSS VALUE ADDED	**3,110,684**	**2,822,158**	**3,012,024**	**3,001,032**	**2,913,718**	**3,540,596**	**3,853,691**
LESS: CAPITAL CONSUMPTION	409,213	402,291	397,149	402,146	406,211	404,989	422,349
NET VALUE ADDED	**2,701,471**	**2,419,867**	**2,614,875**	**2,598,886**	**2,507,507**	**3,135,607**	**3,431,342**
LESS: FACTOR PAYMENTS:							
EMPLOYEE COMPENSATION (TOTAL HIRED LABOR)	986,162	1,126,503	1,141,855	1,134,115	1,073,301	1,122,552	1,168,785
NET RENT RECEIVEDD BY NONOPER LANDLORDS	396,399	354,853	362,975	306,850	301,608	233,683	225,917
REAL ESTATE AND NONREAL ESTATE INTEREST	273,107	276,656	294,294	271,202	253,960	243,520	249,342
NET FARM INCOME	**1,045,803**	**661,855**	**815,751**	**886,719**	**878,638**	**1,535,852**	**1,787,298**

NOTE: [1] Value of agricultural sector production is the gross value of the commodities and services produced within a year. Net value-added is the sector's contribution to the national economy and is the sum of the income from production earned by all factors-of-production, regardless of ownership. Net farm income is the farm operator's share of income from the sector's production activities.

Source: ***http://www.nass.usda.gov***

Appendix Table 5

Number of Firms and Jobs, Percent Change, 2003-2004

	FIRMS 2004	FIRMS 2003	PERCENT CHANGE 2003-2004	JOBS 2004	JOBS 2003	PERCENT CHANGE 2003-2004
TOTAL PRODUCTION AGRICULTURE	**7,059**	**6,812**	**3.6%**	**73,076**	**63,987**	**14.2%**
OILSEED AND GRAIN FARMING	1,159	1,278	-9.3%	1,961	1,971	-0.5%
VEGETABLE AND MELON FARMING	387	422	-8.3%	4,649	4,461	4.2%
FRUIT AND TREE NUT FARMING	3,026	3,127	-3.2%	36,761	33,727	9.0%
GREENHOUSE, NURSERY, AND FLORICULTURE	372	374	-0.5%	5,067	4,752	6.6%
OTHER CROP FARMING	705	748	-5.7%	6,553	6,638	-1.3%
CATTLE RANCHING AND FARMING	702	738	-4.9%	4,471	4,482	-0.2%
HOG AND PIG FARMING	3	10	-70.0%	5	12	-54.9%
POULTRY AND EGG PRODUCTION	48	38	26.3%	718	615	16.7%
ANIMAL AQUACULTURE	50	46	8.7%	541	475	13.8%
OTHER ANIMAL PRODUCTION	127	144	-11.8%	386	391	-1.3%
SUPPORT ACTIVITIES FOR CROP PRODUCTION	319	251	27.1%	11,421	10,426	9.5%
SUPPORT ACTIVITIES FOR ANIMAL PRODUCTION	161	168	-4.2%	543	519	4.7%

	FIRMS 2004	FIRMS 2003	PERCENT CHANGE 2003-2004	JOBS 2004	JOBS 2003	PERCENT CHANGE 2003-2004
TOTAL FOOD MANUFACTURING	**1,039**	**964**	**7.8%**	**37,203**	**38,083**	**-2.3%**
ANIMAL FOOD MANUFACTURING	47	34	38.2%	618	612	0.9%
GRAIN AND OILSEED MILLING	19	13	46.2%	540	331	63.3%
SUGAR AND CONFECTIONERY PRODUCT MANUFACTURING	47	33	42.4%	796	619	28.5%
FRUIT AND VEGETABLE PRESERVING AND SPECIALTY	99	84	17.9%	10,133	10,932	-7.3%
DAIRY PRODUCT MANUFACTURING	27	23	17.4%	1,449	1,126	28.7%
ANIMAL SLAUGHTERING AND PROCESSING	85	90	-5.6%	5,689	5,748	-1.0%
SEAFOOD PRODUCT PREPARATION AND PACKAGING	112	111	0.9%	6,465	6,401	1.0%
BAKERIES AND TORTILLA MANUFACTURING	278	265	4.9%	5,128	5,202	-1.4%
OTHER FOOD MANUFACTURING	131	145	-9.7%	2,844	3,395	-16.2%
BEVERAGE MANUFACTURING	194	166	16.9%	3,541	3,717	-4.7%

Source: ESD/LMEA

Appendix Table 6

Total Monthly Seasonal Employment Workers, 2004 and 2005

	2004	2005	DIFFERENCE BETWEEN 2004 AND 2005	CHANGE IN SEASONAL EMPLOYMENT 2004-2005: APPLES	CHANGE IN SEASONAL EMPLOYMENT 2004-2005: CHERRIES
JANUARY	8,322	9,460	1,138	1,025	107
FEBRUARY	12,460	14,672	2,212	763	-155
MARCH	16,503	17,687	1,184	35	-626
APRIL	23,065	20,994	-2,071	-624	-381
MAY	24,128	22,782	-1,346	-847	20
JUNE	60,140	58,137	-2,003	559	-3,891
JULY	59,467	52,629	-6,838	-791	-4,776
AUGUST	39,525	39,133	-392	-311	704
SEPTEMBER	51,760	50,063	-1,697	-518	-131
OCTOBER	49,650	46,806	-2,844	-3,078	6
NOVEMBER	16,179	14,900	-1,279	-966	2
DECEMBER	12,585	10,845	-1,740	-1,630	-420

Source: ESD/LMEA

Appendix

Appendix Table 7

Employment of Covered Seasonal Workers by Crop in Washington, Statewide, and by Agricultural Reporting Areas, 2005

WASHINGTON STATE													
	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	AVG
STATE TOTALS	**9,460**	**14,672**	**17,687**	**20,994**	**22,782**	**58,137**	**52,628**	**39,133**	**50,063**	**46,806**	**14,900**	**10,845**	**29,842**
APPLES, TOTAL	5,760	7,448	7,938	8,400	7,889	17,898	19,851	18,735	34,442	36,270	9,397	6,109	15,011
CHERRIES, TOTAL	323	402	347	250	581	22,663	13,446	498	0	32	53	161	3,230
PEARS, TOTAL	334	369	360	37	164	400	647	1,706	2,992	1,236	36	442	727
OTHER TREE FRUIT WORKERS	56	228	781	332	796	313	3,466	3,301	650	157	67	432	882
GRAPE WORKERS	266	1,534	2,132	1,370	1,458	1,504	974	755	756	1,050	529	231	1,047
BLUEBERRY WORKERS	24	264	48	48	162	239	1,055	1,664	324	137	5	123	341
RASPBERRY WORKERS	777	245	642	393	303	230	3,923	877	670	654	855	975	879
STRAWBERRY WORKERS	0	67	8	60	72	3,080	530	712	43	0	0	0	381
BULB WORKERS	55	423	477	432	27	30	82	155	56	78	96	109	168
HOP WORKERS	0	215	551	305	637	186	116	201	1,181	10	88	107	300
NURSERY WORKERS	776	1,799	2,012	1,937	2,355	2,192	1,881	1,638	957	605	1,063	618	1,486
WHEAT/GRAIN WORKERS	65	43	83	97	112	136	380	742	108	111	84	35	166
ASPARAGUS WORKERS	0	0	88	3,362	4,916	4,852	476	45	0	22	0	0	1,147
CUCUMBER WORKERS	0	39	111	107	119	98	273	725	540	397	51	0	205
ONION WORKERS	576	661	897	1,495	249	768	1,294	1,575	1,289	801	653	650	909
POTATO WORKERS	228	201	260	509	427	437	750	1,692	1,700	2,813	423	398	820
MISC. VEGETABLE WORKERS	83	116	229	462	606	889	1,399	1,883	2,330	1,703	407	138	854
OTHER SEASONAL WORKERS	137	618	723	1,398	1,909	2,222	2,085	2,229	2,025	730	1,093	317	1,291

WESTERN AREA 1													
	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	AVG
TOTAL	**1,765**	**3,004**	**3,329**	**3,042**	**3379**	**5,955**	**7,698**	**6,427**	**4,533**	**3,005**	**2,257**	**2,231**	**3,885**
BLUEBERRY WORKERS	24	264	48	48	162	239	1,055	1,664	324	137	5	123	341
RASPBERRY WORKERS	777	245	642	393	303	230	3,923	877	670	654	855	975	879
STRAWBERRY WORKERS	0	67	4	32	31	2,898	14	119	13	0	0	0	265
BULB WORKERS	55	423	477	432	27	30	82	155	56	78	96	109	168
CUCUMBER WORKERS	0	39	111	107	119	98	273	725	540	397	51	0	205
POTATO WORKERS	157	139	98	105	103	106	101	196	291	347	192	185	168
MISC. VEGETABLE WORKERS	72	19	66	162	164	270	391	815	1,099	785	209	98	346
NURSERY WORKERS	664	1,699	1,755	1,560	1,988	1,728	1,504	1,279	798	505	689	598	1,231
RHUBARB WORKERS	5	81	88	54	163	64	9	13	5	0	0	0	40
OTHER SEASONAL WORKERS	11	28	40	149	319	292	346	584	737	102	160	143	243

SOUTH CENTRAL AREA 2													
	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	AVG
TOTAL	**1,835**	**3,399**	**4,142**	**4,842**	**5,930**	**17,564**	**11,072**	**8,702**	**13,900**	**11,448**	**2,070**	**1,893**	**7,233**
APPLES, TOTAL	1,408	1,578	1,609	1,642	1,099	5,173	5,130	3,620	10,031	9,218	1,499	1,378	3,615
CHERRIES, TOTAL	18	25	19	59	244	8,401	2,528	72	0	22	26	21	953
PEARS, TOTAL	201	315	238	0	4	210	536	1,420	1,098	1,031	5	279	445
OTHER TREE FRUIT, TOTAL	10	126	467	156	312	94	928	1,885	153	15	10	5	347
GRAPES, TOTAL	195	967	1,199	556	708	907	508	516	507	632	371	154	602
ASPARAGUS WORKERS	0	0	53	1,597	2,334	1,734	476	25	0	0	0	0	518
HOPS, TOTAL	0	193	377	199	341	112	46	68	1,024	0	0	0	197
ONION WORKERS	0	0	22	77	22	211	10	272	251	22	0	0	74
POTATO WORKERS	0	0	11	0	0	0	147	197	12	0	0	0	31
MISC. VEGETABLE WORKERS	3	5	53	132	88	250	360	218	242	226	59	40	140
OTHER SEASONAL WORKERS	0	190	94	424	778	472	403	409	582	282	100	16	313

Appendix Table 7 *(Continued)*

Employment of Covered Seasonal Workers by Crop in Washington, Statewide, and by Agricultural Reporting Areas, 2005

NORTH CENTRAL AREA 3

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	AVG
TOTAL	**2,899**	**3,940**	**4,549**	**4,725**	**4,514**	**13,739**	**19,731**	**10,901**	**15,134**	**14,823**	**3,803**	**3,029**	**8,482**
APPLES, TOTAL	2,621	3,645	4,142	4,450	3,713	4,769	8,745	9,670	13,151	14,444	3,654	2,689	6,308
CHERRIES, TOTAL	84	142	159	75	182	8,546	8,870	291	0	8	3	39	1,533
PEARS, TOTAL	63	51	113	27	144	106	111	247	1,737	205	15	118	245
OTHER TREE FRUIT WORKERS	36	8	31	34	362	90	1,910	557	171	131	43	175	296
OTHER SEASONAL WORKERS	95	94	104	139	113	228	95	136	75	35	88	8	101

COLUMBIA BASIN AREA 4

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	AVG
TOTAL	**1,613**	**1,733**	**2,222**	**2,377**	**3,003**	**6,422**	**6,369**	**5,879**	**8,274**	**9,276**	**2,883**	**1,862**	**4,326**
APPLES, TOTAL	1,059	1,295	1,421	1,288	1,857	3,925	3,354	3,501	6,440	7,150	1,812	1,162	2,855
CHERRIES, TOTAL	130	103	77	32	61	1,332	1,632	12	0	0	24	9	284
PEAR WORKERS	70	3	9	10	16	84	0	39	157	0	16	45	37
MINT WORKERS	0	4	0	11	93	0	30	41	112	0	251	0	45
OTHER TREE FRUIT WORKERS	0	9	196	66	17	4	91	143	0	11	9	178	60
ASPARAGUS WORKERS	0	0	5	112	235	207	0	20	0	22	0	0	50
ONION WORKERS	192	243	191	206	119	90	124	112	238	171	168	190	170
POTATOES, TOTAL	29	14	13	269	140	43	236	911	945	1,773	83	170	386
MISC. VEGETABLE WORKERS	3	3	14	38	90	51	278	438	111	63	3	0	91
WHEAT/GRAIN WORKERS	7	0	5	3	5	21	56	100	26	13	14	0	21
NURSERY WORKERS	104	19	80	161	138	284	242	251	64	16	311	17	141
OTHER SEASONAL WORKERS	19	40	211	181	232	381	326	311	181	57	192	91	185

SOUTH EASTERN AREA 5

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	Avg
TOTAL	**1,285**	**2,484**	**3,150**	**5,625**	**6,094**	**14,109**	**7,206**	**6,310**	**8,010**	**8,058**	**3,743**	**1,795**	**5,656**
APPLES, TOTAL	672	930	766	1,020	1,220	4,031	2,622	1,944	4,820	5,458	2,432	880	2,233
CHERRIES, TOTAL	91	132	92	84	94	4,384	416	123	0	2	0	92	459
OTHER TREE FRUIT WORKERS	10	85	87	76	105	125	537	716	326	0	5	74	179
GRAPE WORKERS	71	567	933	814	750	597	466	239	249	418	158	77	445
ASPARAGUS WORKERS	0	0	30	1,653	2,347	2,911	0	0	0	0	0	0	578
HOP WORKERS	0	22	174	106	296	74	70	133	157	10	88	107	103
ONION WORKERS	384	418	684	1,212	108	467	1,160	1,191	800	608	485	460	665
POTATOES, TOTAL	42	48	138	135	184	288	266	388	452	693	148	43	235
MISC. VEGETABLE WORKERS	0	8	8	76	101	254	361	399	873	629	136	0	237
WHEAT/GRAIN WORKERS	7	13	16	6	13	34	85	108	11	15	10	12	28
NURSERY WORKERS	0	11	23	19	25	73	74	3	6	10	0	0	20
STRAWBERRY WORKERS	0	0	4	28	41	182	516	593	30	0	0	0	116
OTHER SEASONAL WORKERS	8	250	195	396	275	689	633	473	286	215	281	50	313

EASTERN AREA 6

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	AVG
TOTAL	**63**	**112**	**295**	**383**	**397**	**348**	**552**	**914**	**212**	**196**	**144**	**35**	304
WHEAT/GRAIN, TOTAL	51	30	62	88	94	81	239	534	71	83	60	23	118
NURSERY WORKERS	8	70	154	197	204	107	61	105	89	74	63	3	95
OTHER SEASONAL WORKERS	4	12	79	98	99	160	252	275	52	39	21	9	92

Appendix

Appendix Table 8

Employment of Covered Seasonal Workers by Activity/Crop in Washington, Statewide, and by Agricultural Reporting Areas, 2005

WASHINGTON

ACTIVITY	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	AVG
STATE TOTALS	**9,460**	**14,672**	**17,687**	**20,994**	**22,782**	**58,137**	**52,628**	**39,133**	**50,063**	**46,806**	**14,900**	**10,845**	**29,842**
APPLES, TOTAL	5,760	7,448	7,938	8,400	7,889	17,898	19,851	18,735	34,442	36,270	9,397	6,109	15,011
APPLE PRUNING	5,101	6,541	4,675	1,226	589	2,191	87	673	410	53	104	5,520	2,264
APPLE THINNING	0	86	278	2,829	3,124	14,407	18,129	3,115	135	0	42	0	3,512
APPLE HARVESTER	0	0	0	0	0	0	0	8,559	30,996	33,829	6,479	0	6,655
APPLE SORT, GRADE, PACK	534	422	452	333	256	367	348	537	690	661	331	478	451
OTHER APPLE ACTIVITIES	125	399	2,533	4,012	3,920	933	1,287	5,851	2,211	1,727	2,441	111	2,129
CHERRIES, TOTAL	323	402	347	250	581	22,663	13,446	498	0	32	53	161	3,230
CHERRY PRUNING	297	358	228	34		66	11	105	0	22	24	161	119
CHERRY HARVESTER	0	0	0	0	0	17,953	10,813	315	0	0	0	0	2,423
OTHER CHERRY ACTIVITIES	26	44	119	216	461	4,644	2,622	78	0	10	29	0	687
PEARS, TOTAL	334	369	360	37	164	400	647	1,706	2,992	1,236	36	442	727
PEAR PRUNING	261	360	239	0	52	0	6	0	0	0	11	390	110
PEAR THINNING	0	0	0	0	0	303	397	118	0	0	0	0	68
PEAR HARVESTER	0	0	0	0	0	0	207	1,351	2,640	1,115	0	0	443
OTHER PEAR ACTIVITIES	73	9	121	37	112	97	37	237	352	121	25	52	106
OTHER TREE FRUIT WORKERS	56	228	781	332	796	313	3,466	3,301	650	157	67	432	882
GRAPE WORKERS	266	1,534	2,132	1,370	1,458	1,504	974	755	756	1,050	529	231	1,047
BLUEBERRY WORKERS	24	264	48	48	162	239	1,055	1,664	324	137	5	123	341
RASPBERRY WORKERS	777	245	642	393	303	230	3,923	877	670	654	855	975	879
STRAWBERRY WORKERS	0	67	8	60	72	3,080	530	712	43	0	0	0	381
BULB WORKERS	55	423	477	432	27	30	82	155	56	78	96	109	168
HOP WORKERS	0	215	551	305	637	186	116	201	1,181	10	88	107	300
NURSERY WORKERS	776	1,799	2,012	1,937	2,355	2,192	1,881	1,638	957	605	1,063	618	1,486
WHEAT/GRAIN WORKERS	65	43	83	97	112	136	380	742	108	111	84	35	166
ASPARAGUS WORKERS	0	0	88	3,362	4,916	4,852	476	45	0	22	0	0	1,147
CUCUMBER WORKERS	0	39	111	107	119	98	273	725	540	397	51	0	205
ONION WORKERS	576	661	897	1,495	249	768	1,294	1,575	1,289	801	653	650	909
POTATO WORKERS	228	201	260	509	427	437	750	1,692	1,700	2,813	423	398	820
MISC. VEGETABLE WORKERS	83	116	229	462	606	889	1,399	1,883	2,330	1,703	407	138	854
OTHER SEASONAL WORKERS	137	618	723	1,398	1,909	2,222	2,085	2,229	2,025	730	1,093	317	1,291

WESTERN AREA 1

ACTIVITY	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	AVG
TOTAL	**1,765**	**3,004**	**3,329**	**3,042**	**3,379**	**5,955**	**7,698**	**6,427**	**4,533**	**3,005**	**2,257**	**2,231**	**3,885**
BLUEBERRY WORKERS	24	264	48	48	162	239	1,055	1,664	324	137	5	123	341
RASPBERRY WORKERS	777	245	642	393	303	230	3,923	877	670	654	855	975	879
STRAWBERRY WORKERS	0	67	4	32	31	2,898	14	119	13	0	0	0	265
BULB WORKERS	55	423	477	432	27	30	82	155	56	78	96	109	168
CUCUMBER WORKERS	0	39	111	107	119	98	273	725	540	397	51	0	205
POTATO WORKERS	157	139	98	105	103	106	101	196	291	347	192	185	168
MISC. VEGETABLE WORKERS	72	19	66	162	164	270	391	815	1,099	785	209	98	346
NURSERY WORKERS	664	1,699	1,755	1,560	1,988	1,728	1,504	1,279	798	505	689	598	1,231
RHUBARB WORKERS	5	81	88	54	163	64	9	13	5	0	0	0	40
OTHER SEASONAL WORKERS	11	28	40	149	319	292	346	584	737	102	160	143	243

Appendix Table 8 *(Continued)*

Employment of Covered Seasonal Workers by Activity/Crop in Washington, Statewide, and by Agricultural Reporting Areas, 2005

SOUTH CENTRAL AREA 2

ACTIVITY	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	AVG
TOTAL	**1,835**	**3,399**	**4,142**	**4,842**	**5,930**	**17,564**	**11,072**	**8,702**	**13,900**	**11,448**	**2,070**	**1,893**	**7,233**
APPLES, TOTAL	1,408	1,578	1,609	1,642	1,099	5,173	5,130	3,620	10,031	9,218	1,499	1,378	3,615
APPLE PRUNING	1,298	1,558	1,477	880	159	0	69	223	110	50	25	1,157	584
APPLE THINNING	0	0	0	0	49	4,784	4,462	183	85	0	0	0	797
APPLE HARVESTER	0	0	0	0	0	0	0	2,337	8,378	8,026	397	0	1,595
APPLE SORT, GRADE, PACK	96	5	55	0	5	267	253	346	393	494	57	195	181
OTHER APPLE ACTIVITIES	14	15	77	762	886	122	346	531	1,065	648	1,020	26	459
CHERRIES, TOTAL	18	25	19	59	244	8,401	2,528	72	0	22	26	21	953
CHERRY PRUNING	18	25	9	0	0	0	6	72	0	22	21	21	16
CHERRY HARVESTER	0	0	0	0	0	4,527	1,184	0	0	0	0	0	476
OTHER CHERRY ACTIVITY	0	0	10	59	244	3,874	1,338	0	0	0	5	0	461
PEARS, TOTAL	201	315	238	0	4	210	536	1,420	1,098	1,031	5	279	445
PEAR PRUNING	201	315	195	0	0	0	6	0	0	0	5	279	83
PEAR THINNING	0	0	0	0	0	210	307	64	0	0	0	0	48
PEAR HARVESTER	0	0	0	0	0	0	207	1,310	1,098	1,031	0	0	304
OTHER PEAR ACTIVITIES	0	0	43	0	4	0	16	46	0	0	0	0	9
OTHER TREE FRUIT, TOTAL	10	126	467	156	312	94	928	1,885	153	15	10	5	347
OTHER TREE FRUIT PRUNER	10	126	300	32	0	0	0	0	0	0	0	5	39
OTHER TREE FRUIT HARVESTER	0	0	0	0	0	0	867	1,846	153	0	0	0	239
OTHER TREE FRUIT ACTIVITIES	0	0	167	124	312	94	61	39	0	15	10	0	69
GRAPES, TOTAL	195	967	1,199	556	708	907	508	516	507	632	371	154	602
GRAPE PRUNING	191	939	1,012	92	70	25	32	31	0	0	16	154	214
GRAPE HARVESTER	0	0	0	0	0	0	0	0	178	623	231	0	86
OTHER GRAPE ACTIVITY	4	28	187	464	638	882	476	485	329	9	124	0	302
ASPARAGUS WORKERS	0	0	53	1,597	2,334	1,734	476	25	0	0	0	0	518
HOPS, TOTAL	0	193	377	199	341	112	46	68	1,024	0	0	0	197
HOP TWINING AND TRAINING	0	0	0	169	231	112	0	0	0	0	0	0	43
HOP HARVESTER	0	0	0	0	0	0	0	0	777	0	0	0	65
OTHER HOP ACTIVITY	0	193	377	30	110	0	46	68	247	0	0	0	89
ONION WORKERS	0	0	22	77	22	211	10	272	251	22	0	0	74
POTATO WORKERS	0	0	11	0	0	0	147	197	12	0	0	0	31
MISC. VEGETABLE WORKERS	3	5	53	132	88	250	360	218	242	226	59	40	140
OTHER SEASONAL WORKERS	0	190	94	424	778	472	403	409	582	282	100	16	313

NORTH CENTRAL AREA 3

ACTIVITY	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	AVG
TOTAL	**2,899**	**3,940**	**4,549**	**4,725**	**4,514**	**13,739**	**19,731**	**10,901**	**15,134**	**14,823**	**3,803**	**3,029**	**8,482**
APPLES, TOTAL	2,621	3,645	4,142	4,450	3,713	4,769	8,745	9,670	13,151	14,444	3,654	2,689	6,308
APPLE PRUNING	2,145	3,029	1,916	167	361	2,102	0	210	68	0	17	2,359	1,031
APPLE THINNING	0	0	278	2,401	1,264	2,253	8,367	779	5	0	0	0	1,279
APPLE HARVESTER	0	0	0	0	0	0	0	3,821	12,206	13,568	2,267	0	2,655
APPLE SORT, GRADE, PACK	438	417	397	333	251	100	95	191	297	167	274	283	270
OTHER APPLE ACTIVITIES	38	199	1,551	1,549	1,837	314	283	4,669	575	709	1,096	47	1,072

Appendix

Appendix Table 8 *(Continued)*

Employment of Covered Seasonal Workers by Activity/Crop in Washington, Statewide, and by Agricultural Reporting Areas, 2005

NORTH CENTRAL AREA 3 (Continued)

ACTIVITY	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	AVG
CHERRIES, TOTAL	84	142	159	75	182	8,546	8,870	291	0	8	3	39	1,533
CHERRY PRUNING	81	142	109	15	52	53	0	0	0	0	0	39	41
CHERRY HARVESTER	0	0	0	0	0	7,781	7,626	227	0	0	0	0	1,303
OTHER CHERRY ACTIVITIES	3	0	50	60	130	712	1,244	64	0	8	3	0	190
PEARS, TOTAL	63	51	113	27	144	106	111	247	1,737	205	15	118	245
PEAR PRUNING	60	45	44	0	52	0	0	0	0	0	6	111	27
PEAR THINNING	0	0	0	0	0	93	90	54	0	0	0	0	20
PEAR HARVESTER	0	0	0	0	0	0	0	41	1,542	84	0	0	139
OTHER PEAR ACTIVITIES	3	6	69	27	92	13	21	152	195	121	9	7	60
OTHER TREE FRUIT WORKERS	36	8	31	34	362	90	1,910	557	171	131	43	175	296
OTHER SEASONAL WORKERS	95	94	104	139	113	228	95	136	75	35	88	8	101

COLUMBIA BASIN AREA 4

ACTIVITY	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	AVG
TOTAL	**1,613**	**1,733**	**2,222**	**2,377**	**3,003**	**6,422**	**6,369**	**5,879**	**8,274**	**9,276**	**2,883**	**1,862**	**4,326**
APPLES, TOTAL	1,059	1,295	1,421	1,288	1,857	3,925	3,354	3,501	6,440	7,150	1,812	1,162	2,855
APPLE PRUNING	989	1,181	850	89	50	89	0	203	194	0	18	1,124	399
APPLE THINNING	0	0	0	284	885	3,548	3,050	1,702	39	0	42	0	796
APPLE HARVESTER	0	0	0	0	0	0	0	1,058	5,723	6,817	1,506	0	1,259
OTHER APPLE ACTIVITIES	70	114	571	915	922	288	304	538	484	333	246	38	402
CHERRIES, TOTAL	130	103	77	32	61	1,332	1,632	12	0	0	24	9	284
CHERRY PRUNING	107	59	20	0	17	13	5	0	0	0	3	9	19
CHERRY HARVESTER	0	0	0	0	0	1,294	1,602	12	0	0	0	0	242
OTHER CHERRY ACTIVITIES	23	44	57	32	44	25	25	0	0	0	21	0	23
PEAR WORKERS	70	3	9	10	16	84	0	39	157	0	16	45	37
MINT WORKERS	0	4	0	11	93	0	30	41	112	0	251	0	45
OTHER TREE FRUIT WORKERS	0	9	196	66	17	4	91	143	0	11	9	178	60
ASPARAGUS WORKERS	0	0	5	112	235	207	0	20	0	22	0	0	50
ONION WORKERS	192	243	191	206	119	90	124	112	238	171	168	190	170
POTATOES, TOTAL	29	14	13	269	140	43	236	911	945	1,773	83	170	386
POTATO HARVESTER	0	0	0	0	0	0	0	0	35	60	0	0	8
POTATO SORT, GRADE, PACK	15	0	0	36	82	0	123	738	654	853	6	141	221
OTHER POTATO ACTIVITIES	14	14	13	233	58	43	113	173	256	860	77	29	157
MISC. VEGETABLE WORKERS	3	3	14	38	90	51	278	438	111	63	3	0	91
WHEAT/GRAIN WORKERS	7	0	5	3	5	21	56	100	26	13	14	0	21
NURSERY WORKERS	104	19	80	161	138	284	242	251	64	16	311	17	141
OTHER SEASONAL WORKERS	19	40	211	181	232	381	326	311	181	57	192	91	185

Appendix Table 8 *(Continued)*

Employment of Covered Seasonal Workers by Activity/Crop in Washington, Statewide, and by Agricultural Reporting Areas, 2005

SOUTH EASTERN AREA 5

ACTIVITY	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	AVG
TOTAL	**1,285**	**2,484**	**3,150**	**5,625**	**6,094**	**14,109**	**7,206**	**6,310**	**8,010**	**8,058**	**3,743**	**1,795**	**5,656**
APPLES, TOTAL	672	930	766	1,020	1,220	4,031	2,622	1,944	4,820	5,458	2,432	880	2,233
APPLE PRUNING	669	773	432	90	19	0	18	37	38	3	44	880	250
APPLE THINNING	0	86	0	144	926	3,822	2,250	451	6	0	0	0	640
APPLE HARVESTER	0	0	0	0	0	0	0	1,343	4,689	5,418	2,309	0	1,147
OTHER APPLE ACTIVITIES	3	71	334	786	275	209	354	113	87	37	79	0	196
CHERRIES, TOTAL	91	132	92	84	94	4,384	416	123	0	2	0	92	459
CHERRY PRUNING	91	132	90	19	51	0	0	33	0	0	0	92	42
CHERRY HARVESTER	0	0	0	0	0	4,351	401	76	0	0	0	0	402
OTHER CHERRY ACTIVITIES	0	0	2	65	43	33	15	14	0	2	0	0	15
OTHER TREE FRUIT WORKERS	10	85	87	76	105	125	537	716	326	0	5	74	179
GRAPE WORKERS	71	567	933	814	750	597	466	239	249	418	158	77	445
ASPARAGUS WORKERS	0	0	30	1,653	2,347	2,911	0	0	0	0	0	0	578
HOP WORKERS	0	22	174	106	296	74	70	133	157	10	88	107	103
ONION WORKERS	384	418	684	1,212	108	467	1,160	1,191	800	608	485	460	665
POTATOES, TOTAL	42	48	138	135	184	288	266	388	452	693	148	43	235
POTATO HARVESTER	0	0	0	0	0	6	34	97	186	371	4	0	58
POTATO SORT, GRADE, PACK	39	41	94	0	165	272	166	231	143	180	67	42	120
OTHER POTATO ACTIVITIES	3	7	44	135	19	16	66	60	123	142	77	1	58
MISC. VEGETABLE WORKERS	0	8	8	76	101	254	361	399	873	629	136	0	237
WHEAT/GRAIN WORKERS	7	13	16	6	13	34	85	108	11	15	10	12	28
NURSERY WORKERS	0	11	23	19	25	73	74	3	6	10	0	0	20
STRAWBERRY WORKERS	0	0	4	28	41	182	516	593	30	0	0	0	116
OTHER SEASONAL WORKERS	8	250	195	396	275	689	633	473	286	215	281	50	313

EASTERN AREA 6

ACTIVITY	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	AVG
TOTAL	**63**	**112**	**295**	**383**	**397**	**348**	**552**	**914**	**212**	**196**	**144**	**35**	**304**
WHEAT/GRAIN, TOTAL	51	30	62	88	94	81	239	534	71	83	60	23	118
WHEAT/GRAIN HARVESTER	0	0	0	0	0	0	0	0	0	0	0	0	0
WHEAT/GRAIN EQPMT OPERATOR	0	0	45	40	39	36	162	523	30	42	26	0	79
OTHER WHEAT/GRAIN ACTIVITY	51	30	17	48	55	45	77	11	41	41	34	23	39
NURSERY WORKERS	8	70	154	197	204	107	61	105	89	74	63	3	95
OTHER SEASONAL WORKERS	4	12	79	98	99	160	252	275	52	39	21	9	92

Source: ESD/LMEA

Appendix

Appendix Table 9

Annual Earnings per Job, in Current and Constant Dollars
Calendar Year 2000 = 100.0
Washington State and United States, 2000-2004

CALENDAR YEAR	WASHINGTON CURRENT	WASHINGTON CONSTANT	UNITED STATES CURRENT	UNITED STATES CONSTANT	WASHINGTON % GAIN IN CONSTANT DOLLARS
2000	41,399	41,399	39,007	39,007	6.13
2001	42,175	41,013	40,164	39,049	5.03
2002	43,381	41,528	41,114	39,350	5.53
2003	44,437	41,590	42,502	39,775	4.56
2004	46,243	42,152	44,482	40,548	3.96

Source: Washington State Office of the Forecast Council. Washington State Economic Climate Study. Volume X. October 2005.

Appendix Table 10

Total Employers, Total Jobs, Total Annual Earnings and Average Annual Earnings, Current Dollars, by Industry, Washington State, 2004

INDUSTRY	NAICS	AVERAGE NUMBER OF FIRMS, 2004	TOTAL ANNUAL EARNINGS	AVERAGE MONTHLY JOBS	AVERAGE EARNINGS PER JOB
PRODUCTION AGRICULTURE		**7,064**	**$1,274,205,306**	**73,068**	**$17,439**
POULTRY AND EGG PRODUCTION	1123	48	$18,054,824	718	$25,152
ANIMAL AQUACULTURE	1125	49	$12,548,908	522	$24,029
CATTLE RANCHING AND FARMING	1121	702	$104,884,185	4,471	$23,460
OTHER CROP FARMING	1119	705	$135,058,449	6,553	$20,609
SUPPORT ACTIVITIES FOR CROP PRODUCTION	1151	319	$231,280,287	11,421	$20,250
GREENHOUSE AND NURSERY PRODUCTION	1114	372	$102,205,237	5,067	$20,172
OTHER ANIMAL PRODUCTION	1129	127	$7,612,425	386	$19,721
VEGETABLE AND MELON FARMING	1112	387	$91,120,539	4,649	$19,600
SUPPORT ACTIVITIES FOR ANIMAL PRODUCTION	1152	161	$10,581,137	543	$19,474
OILSEED AND GRAIN FARMING	1111	1,159	$35,941,293	1,961	$18,332
SHEEP, GOAT AND HOG PRODUCTION	1122, 1124	9	$233,537	16	$14,907
FRUIT AND TREE NUT FARMING	1113	3,026	$524,684,485	36,761	$14,273
VALUE ADDED AGRICULTURAL MANUFACTURING		**1,078**	**$1,322,905,518**	**37,738**	**$35,055**
SEAFOOD PRODUCT PREPARATION AND PACKAGING	3117	110	$308,261,339	6,432	$47,924
DAIRY PRODUCT MANUFACTURING	3115	27	$60,434,548	1,449	$41,708
GRAIN AND OILSEED MILLING	3112	19	$22,067,145	540	$40,834
BEVERAGE MANUFACTURING	3121	194	$140,114,295	3,541	$39,573
ANIMAL FOOD MANUFACTURING	3111	47	$22,510,775	618	$36,445
OTHER ANIMAL FOOD MANUFACTURING	311119	41	$20,337,841	569	$35,764
OTHER FOOD MANUFACTURING	3119	131	$95,393,716	2,844	$33,539
FRUIT AND VEGETABLE PRESERVING AND SPECIALTY	3114	99	$333,807,445	10,133	$32,943
BAKERIES AND TORTILLA MANUFACTURING	3118	278	$155,381,648	5,128	$30,300
ANIMAL SLAUGHTERING AND PROCESSING	3116	85	$148,081,368	5,689	$26,031
SUGAR AND CONFECTIONERY PRODUCT MANUFACTURING	3113	47	$16,515,398	796	$20,757

Source: ESD/LMEA

Appendix Table 11

Average Annual Hours, Average Annual Earnings, and Average Number of Employers, Washington State, 1996-2005

YEAR	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
WASH. AVERAGE ANNUAL EARNINGS	**$28,889**	**$30,778**	**$33,075**	**$35,726**	**$37,076**	**$37,431**	**$38,218**	**$39,019**	**$39,239**	**$41,050**
ALL AGRICULTURAL WORKERS (ANY)	**154,870**	**155,980**	**161,423**	**152,474**	**154,154**	**150,315**	**149,871**	**146,255**	**150,606**	**146,781**
AVERAGE ANNUAL HOURS	788	835	849	859	889	861	859	888	938	953
AVERAGE ANNUAL EARNINGS	$6,606	$7,294	$7,649	$8,018	$8,747	$8,803	$8,745	$9,438	$10,165	10,624
AVERAGE HOURLY EARNINGS	$8.38	$8.74	$9.01	$9.33	$9.83	$10.22	$10.18	$10.37	$10.56	$11.15
AVERAGE NUMBER OF EMPLOYERS	---a	---a	2.62	2.53	2.58	2.49	2.49	2.45	2.52	2.52
WORKERS IN AGRICULTURE ONLY	**110,620**	**108,870**	**113,591**	**106,744**	**108,552**	**107,725**	**108,001**	**107,347**	**107,874**	**105,710**
AVERAGE ANNUAL HOURS		705	720	728	752	729	732	771	811	821
AVERAGE ANNUAL EARNINGS	$5,503	$6,116	$6,418	$6,697	$7,308	$7,323	$7,346	$8,036	$8,613	$8,943
AVERAGE HOURLY EARNINGS	$8.29	$8.68	$8.91	$9.20	$9.71	$10.04	$10.04	$10.23	$10.43	$10.89
AVERAGE NUMBER OF EMPLOYERS	---a	---a	2.08	2.01	2.09	2.03	2.04	2.03	2.06	2.08
WORKED IN AG AND NONAG INDUSTRIES	**44,250**	**47,110**	**47,832**	**45,730**	**45,602**	**42,500**	**41,870**	**38,908**	**42,732**	**41,071**
AVERAGE ANNUAL HOURS	1,097	1,136	1,154	1,165	1,216	1,196	1,185	1,210	1,260	1,293
AVERAGE ANNUAL EARNINGS	$9,361	$10,017	$10,574	$11,102	$12,172	$12,548	$12,353	$13,307	$14,085	$14,951
AVERAGE HOURLY EARNINGS	$8.53	$8.82	$9.16	$9.53	$10.01	$10.48	$10.42	$10.41	$10.63	$11.56
AVERAGE NUMBER OF EMPLOYERS	---a	---a	3.88	3.74	3.75	3.67	3.65	3.59	3.67	3.66

NOTE: 2005 Hourly wage from AIS tables 3 digit NAICS code rollup on wages and is calculated as a weighted average. Average Annual Earnings, Washington State, 2005 are for March.
[a]Data Unavailable.

Source: ESD/LMEA

Appendix Table 12

Selected Tree Fruit, Average Hourly Wage Rates, Percent Change, Adjusted to Year 2000 Dollars, Washington State, 1991-2005

YEAR	PEARS PERCENT CHANGE CURRENT $	PEARS PERCENT CHANGE CONSTANT $	YEAR	CHERRIES PERCENT CHANGE CURRENT $	CHERRIES PERCENT CHANGE CONSTANT $	YEAR	APPLES PERCENT CHANGE CURRENT $	APPLES PERCENT CHANGE CONSTANT $
1991	-3.3%	-7.2%	1991	1.9%	-2.2%	1991	3.2%	-0.9%
1992	19.3%	11.1%	1992	5.4%	-1.8%	1992	2.7%	-4.4%
1993	10.9%	0.3%	1993	-1.2%	-10.6%	1993	7.6%	-2.7%
1994	27.6%	12.5%	1994	9.9%	-3.1%	1994	9.6%	-3.4%
1995	29.8%	11.3%	1995	7.0%	-8.2%	1995	10.6%	-5.2%
1996	21.1%	0.9%	1996	7.1%	-10.8%	1996	12.7%	-6.1%
1997	28.4%	4.6%	1997	17.7%	-4.1%	1997	17.1%	-4.7%
1998	32.3%	6.0%	1998	17.0%	-6.2%	1998	20.8%	-3.2%
1999	27.2%	-0.2%	1999	17.1%	-8.1%	1999	20.4%	-5.5%
2000	39.1%	5.6%	2000	32.2%	0.3%	2000	31.7%	-0.1%
2001	45.5%	7.4%	2001	37.3%	-12.4%	2001	30.4%	-3.7%
2002	47.0%	6.9%	2002	30.1%	-5.4%	2002	33.0%	-3.3%
2003	55.1%	9.3%	2003	39.5%	-1.7%	2003	31.9%	-7.0%
2004	52.6%	4.9%	2004	36.5%	-6.2%	2004	36.1%	-6.4%
2005	62.9%	8.6%	2005	40.7%	-6.1%	2005	39.5%	-7.0%

Source: ESD/LMEA, UI WAGE RECORDS

Appendix

Appendix Table 13

Comparison of Selected Tree Fruit Average Hourly Wage Rates with the State Minimum Wage Adjusted to Year 2000 Dollars Washington State, 1990-2005

YEAR	WASHINGTON STATE MINIMUM WAGE	HARVEST 3RD QTR PEAR WAGES	YEAR	WASHINGTON STATE MINIMUM WAGE	HARVEST 3RD QTR CHERRY WAGES	YEAR	WASHINGTON STATE MINIMUM WAGE	HARVEST 4TH QTR APPLE WAGES
1990	$5.60	$8.48	1990	$5.60	$10.94	1990	$5.60	$9.74
1991	$5.37	$7.88	1991	$5.37	$10.70	1991	$5.37	$9.65
1992	$5.21	$9.42	1992	$5.21	$10.74	1992	$5.21	$9.31
1993	$5.07	$8.51	1993	$5.07	$9.77	1993	$5.07	$9.48
1994	$5.69	$9.55	1994	$5.69	$10.59	1994	$5.69	$9.41
1995	$5.54	$9.45	1995	$5.54	$10.03	1995	$5.54	$9.23
1996	$5.38	$8.56	1996	$5.38	$9.76	1996	$5.38	$9.14
1997	$5.53	$8.87	1997	$5.53	$10.48	1997	$5.53	$9.28
1998	$5.44	$9.00	1998	$5.44	$10.25	1998	$5.44	$9.43
1999	$5.89	$8.47	1999	$5.89	$10.05	1999	$5.89	$9.20
2000	$6.50	$8.96	2000	$6.50	$10.97	2000	$6.50	$9.73
2001	$6.54	$9.11	2001	$6.54	$9.58	2001	$6.54	$9.38
2002	$6.61	$9.07	2002	$6.61	$10.34	2002	$6.61	$9.42
2003	$6.51	$9.28	2003	$6.51	$10.75	2003	$6.51	$9.05
2004	$6.49	$8.90	2004	$6.49	$10.26	2004	$6.49	$9.11
2005	$6.46	$9.22	2005	$6.46	$10.26	2005	$6.46	$9.06

Source: LMEA/ESD, UI WAGE RECORDS

Appendix Table 14

Unemployment Claims for Agriculture and All Industries Washington State, 2002-2005

	AGRI. CONT. CLAIMS 2002	ALL CONT. CLAIMS 2002	% AG.* CONT. CLAIMS OF ALL CONT. CLAIMS IN 2002	AGRI. CONT. CLAIMS 2003	ALL CONT. CLAIMS 2003	% AG.* CONT. CLAIMS OF ALL CONT. CLAIMS IN 2003	AGRI. CONT. CLAIMS 2004	ALL CONT. CLAIMS 2004	% AG.* CONT. CLAIMS OF ALL CONT. CLAIMS IN 2004	AGRI. CONT. CLAIMS 2005	ALL CONT. CLAIMS 2005	% AG.* CONT. CLAIMS OF ALL CONT. CLAIMS IN 2005
JANUARY	12,103	180,222	6.72%	11,033	163,542	6.75%	11,055	150,001	7.37%	8,750	116,057	7.54%
FEBRUARY	9,806	169,266	5.79%	8,701	149,086	5.84%	8,270	130,389	6.34%	5,847	93,845	6.23%
MARCH	8,802	165,784	5.31%	7,619	148,637	5.13%	6,346	118,411	5.36%	4,689	86,016	5.45%
APRIL	7,703	157,877	4.88%	6,781	139,158	4.87%	5,384	106,538	5.05%	4,565	82,488	5.53%
MAY	6,246	141,167	4.42%	5,410	127,791	4.23%	4,707	95,399	4.93%	4,103	77,284	5.31%
JUNE	5,332	135,164	3.94%	5,066	126,562	4.00%	3,204	87,733	3.65%	2,623	69,583	3.77%
JULY	4,285	129,005	3.32%	4,182	116,573	3.59%	3,188	83,534	3.82%	2,942	69,106	4.26%
AUGUST	5,869	119,034	4.93%	6,085	113,776	5.35%	4,733	85,532	5.53%	3,980	67,318	5.91%
SEPTEMBER	3,895	117,489	3.32%	3,436	107,704	3.19%	2,137	75,433	2.83%	1,879	60,878	3.09%
OCTOBER	3,193	114,220	2.80%	4,177	107,125	3.90%	2,725	78,500	3.47%	2,396	66,074	3.63%
NOVEMBER	8,591	129,188	6.65%	9,058	122,721	7.38%	6,605	88,701	7.45%	5,593	74,396	7.52%
DECEMBER	11,526	154,934	7.44%	10,635	137,002	7.76%	7,504	97,272	7.71%	7,227	82,953	8.71%
AVERAGE	**7,279.25**	**142,779**	**5.10%**	**6,849**	**129,973**	**5.27%**	**5,488**	**99,787**	**5.50%**	**4,550**	**78,833**	**5.77%**

NOTE: *Percent Agriculture Continued Claims of all Continued Claims (in the year stated).

Source: ESD/LMEA

Appendix Table 15

Detailed Agricultural Industries: Most Continuing Claims Washington State, 2004-2005

NAICS	2004	2005	% CHANGE 2004-2005
DECIDUOUS TREE FRUITS	7,322	6,550	-11.79%
CROP PREPARATION	4,257	3,256	-30.74%
FIELD CROPS	1,363	1,174	-16.10%
GENERAL FARMS	1,022	851	-20.09%
ORNAMENTAL FLORICULTURE	950	767	-23.86%
GRAPES	750	681	-10.13%
VEGETABLES AND MELON	645	524	-23.09%
IRISH POTATOES	642	560	-14.64%
WHEAT	403	339	-18.88%
BERRY FARMS	255	232	-9.91%
DAIRY FARMS	245	164	-49.39%
FARM LABOR	189	188	-0.53%
TOTAL	**18,043**	**15,286**	**-18.04%**

Source: ESD/LMEA

Appendix Table 16

Total Agricultural Employment in Washington State, Statewide, and by Area, 2005 (Benchmark: March 2005)

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	AVG
WASHINGTON	**61,540**	**70,920**	**78,660**	**82,100**	**87,260**	**132,230**	**127,830**	**109,900**	**119,880**	**114,480**	**70,420**	**63,020**	**93,190**
BELLINGHAM MSA	2,540	2,930	3,110	3,090	3,240	4,380	5,410	4,110	3,090	2,940	2,900	2,790	3,380
BREMERTON PMSA	310	350	370	390	420	440	460	430	400	380	390	360	390
OLYMPIA PMSA	1,290	1,330	1,400	1,500	1,580	1,710	1,860	1,750	1,710	1,550	1,440	1,410	1,540
RICHLAND-KENNEWICK-PASCO MSA	5,760	7,260	7,970	10,000	11,400	21,700	12,110	12,090	14,050	13,400	7,220	6,010	10,750
SEATTLE-BELLEVUE-EVERETT MD	3,020	3,410	3,750	3,860	4,150	4,480	4,350	4,530	4,010	3,990	3,100	3,040	3,810
SPOKANE MSA	1,160	1,340	1,530	1,640	1,770	1,840	1,850	1,730	1,590	1,480	1,280	1,190	1,530
TACOMA MD	1,280	1,680	1,840	1,670	1,830	1,990	2,090	1,850	1,760	1,600	1,470	1,350	1,700
CHELAN-DOUGLAS LMA	8,010	9,480	10,260	9,640	9,920	18,140	21,770	14,170	18,360	16,060	8,650	8,310	12,730
YAKIMA MSA	15,480	17,260	18,910	19,270	20,910	34,460	29,390	27,310	31,710	29,430	15,970	14,720	22,900
ADAMS	1,260	1,440	1,780	1,880	2,000	2,550	2,980	2,560	2,910	3,260	1,620	1,410	2,140
ASOTIN	120	130	160	180	190	170	190	180	170	150	140	130	160
CLALLAM	930	1,020	1,130	1,170	1,250	1,310	1,410	1,340	1,190	1,140	1,140	1,020	1,170
CLARK	960	1,060	1,160	1,190	1,310	1,570	1,510	1,330	1,240	1,090	980	1,080	1,210
COLUMBIA	220	240	250	260	260	320	350	330	280	280	230	220	270
COWLITZ	410	450	520	630	620	910	860	860	560	560	520	480	610
FERRY	100	110	120	130	140	150	160	140	130	110	100	100	120
GARFIELD	150	160	170	160	180	190	210	230	180	170	150	160	180
GRANT	5,530	6,080	7,190	7,640	8,130	11,870	10,770	10,640	12,210	12,910	6,770	5,430	8,760
GRAYS HARBOR	410	560	630	590	630	630	630	590	560	410	350	290	520
ISLAND	260	290	330	350	370	390	430	390	350	330	290	280	340
JEFFERSON	100	110	120	130	140	160	170	150	140	120	120	110	130
KITTITAS	720	850	1,230	1,450	1,080	1,230	1,240	1,110	1,200	1,400	690	610	1,070
KLICKITAT	1,000	1,210	1,270	1,350	1,330	2,120	2,080	1,480	1,750	1,870	1,440	1,040	1,490
LEWIS	930	1,020	1,130	1,170	1,250	1,310	1,410	1,340	1,190	1,140	1,140	1,020	1,170
LINCOLN	560	620	690	650	690	720	800	930	700	690	580	560	680

NOTE: PMSA = Primary Metropolitan Statistical Area; MSA = Metropolitan Statistical Area; MD = Metropolitan Division; LMA = Labor Market Area

Appendix

Appendix Table 16 *(Continued)*

Total Agricultural Employment in Washington State, Statewide, and by Area, 2005 (Benchmark: March 2005)

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	AVG
MASON	410	430	440	460	500	500	540	510	490	490	480	370	470
OKANOGAN	3,170	3,560	3,730	3,940	4,110	6,820	11,550	7,160	8,370	7,890	3,640	3,270	5,600
PACIFIC	280	300	330	350	370	390	410	370	330	350	310	280	340
PEND OREILLE	90	110	120	130	140	150	150	140	130	120	110	110	130
SAN JUAN	120	120	140	150	160	170	180	170	150	140	120	120	140
SKAGIT	2,260	2,700	2,850	2,990	3,010	3,670	4,440	4,560	4,200	3,680	2,670	2,580	3,300
SKAMANIA	60	70	100	100	110	100	90	80	100	90	90	70	90
STEVENS	550	640	740	810	860	900	910	840	790	700	610	560	740
WAHKIAKUM	50	50	60	60	70	70	70	70	60	50	50	50	60
WALLA WALLA	1,910	2,400	2,940	2,990	2,980	4,540	4,830	3,990	3,640	4,270	3,610	2,390	3,370
WHITMAN	840	910	1,030	1,010	1,070	1,140	1,250	1,450	1,100	1,050	920	860	1,050

NOTE: Indicated numbers include wage and salary employment as well as owners and unpaid family workers. The numbers have not been adjusted for multiple job holders (those who work for more than one employer during the reference period.)

Source: ESD/LMEA

Appendix 17

Agricultural Reporting Areas in Washington State[1, 2]

NOTE: [1] These geographic areas are the areas on which the sample frame for the monthly 600 Agricultural Employer Survey is based.

[2] Area 1 = Clallam, Clark, Cowlitz, Grays Harbor, Island, Jefferson, King, Kitsap, Lewis, Mason, Pacific, Pierce, San Juan, Skagit, Skamania, Snohomish, Thurston, Wahkiakum
Area 2 = Klickitat, Yakima
Area 3 = Chelan, Douglas, Kittitas, Okanogan
Area 4 = Adams, Grant
Area 5 = Benton, Franklin, Walla Walla
Area 6 = Asotin, Columbia, Ferry, Garfield, Lincoln, Pend Oreille, Spokane, Stevens, Whitman

Source: ESD/LMEA

GLOSSARY OF TERMS

Absolute Advantage – The economic situation in which a person or firm requires fewer resources, e.g. labor hours, to produce a given amount of goods or services compared to some other economic competitor. American agricultural workers, on the whole, have an absolute advantage in agriculture compared to China because, as shown in *Chapter 3*, the American farm worker produces over $70,000 worth of output per year while the farm worker in China produces about $3,000 worth of output per year. *See Figure 33*.

Adverse Effect Wage Rate (AEWR) – Under the H-2A Program defined below, this is the hourly wage rate that must be paid for foreign contract laborers. For Washington state in 2006, it is currently $9.01 per hour.

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

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

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

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

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

Check-off – In labor management relations, the practice whereby an employer directly subtracts union dues from a worker's earnings and pays their dues directly to the union in question.

Glossary

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

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

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

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

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

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

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

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

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

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

Glossary

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

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

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

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

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

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

Labor Market – Any locus in which information is supplied on job openings posted by employers and information on offers to work are posted by workers.

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

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

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

Glossary

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

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

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

Shortage of Labor – This is the difference between the quantity of labor supplied and the quantity of labor demanded when the hourly wage rate (or its piece-rate equivalent) lies below the equilibrium wage rate. The 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.

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

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

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

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

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