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Apples

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PREFACE

The United States International Trade Commission (USITC) has initiated its current Industry and Trade Summary series of reports to provide information on the rapidly evolving trade and competitive situation of the thousands of products imported into and exported from the United States. From 1988 to 2008, U.S. international trade in goods and services rose by almost 350 percent, compared to an increase of 180 percent in the U.S. gross domestic product (GDP), before falling sharply in late 2008 and 2009 due to the economic downturn. During the same two decades, international supply chains became more global and competition increased.

Each Industry and Trade Summary addresses a different commodity/industry and contains information on trends in consumption, production, and trade, as well as an analysis of factors affecting industry trends and competitiveness in domestic and foreign markets. This report on apples primarily covers the period 2004 to 2008.

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ABSTRACT

This report addresses trade and industry conditions for fresh apples, primarily covering the years 2004 through 2008.

- U.S. apple farming and packing has become both more concentrated and more productive as acreage continues to decline. Acreage fell from a peak of approximately 467,000 acres in the late 1990s to 350,100 acres in 2008. The acreage decline occurred as less efficient growers left the market following the low apple prices of the late 1990s and early 2000s. Production levels remained more stable than acreage, however, as producers began using more advanced planting and horticultural management practices to increase yields.

- The Washington state apple industry is the largest in the country and includes the most efficient U.S. apple producers. Between 2004 and 2008, the industry in state of Washington had an average yield 37 percent higher than the U.S. average and accounted for 58 percent of total U.S. production. New York, Michigan, Pennsylvania, and California are also major apple-producing states; compared to Washington, however, they sell a larger percentage of their production in the domestic market and to the processing sector.

- U.S. consumer preference has shifted from the traditional Red Delicious variety to newer varieties, such as Fuji and Gala. As production has shifted in the United States and demand has grown for these newer varieties abroad, other global producers and exporters have begun shifting their production as well.

- The Chinese apple industry has increasingly dominated global production, with its share of global output increasing to 43 percent in 2007. The European Union (EU) and the United States were the world's second- and third-largest apple producers, respectively. The United States supplies approximately 7 percent of yearly world output. Other large producers include Iran, Turkey, Russia, India, and Chile. The world's largest apple producers are also its primary consumers, as Turkey, the EU, New Zealand, Canada, and China had the highest per capita consumption levels in 2007.

- In 2008, the United States held a $608 million trade surplus in apples and a position as the fourth-largest global apple exporter by volume. Between 2004 and 2008, the volume of U.S. apple exports increased by 45 percent as higher disposable incomes in certain developing markets led to increased demand for high-quality U.S. apples, promotion increased abroad, and certain nontariff barriers were eliminated. The two primary U.S. export markets, Mexico and Canada, together accounted for 50 percent of total U.S. exports by volume in 2008. The majority of imports are supplied by counter-seasonal producers, the largest being Chile, which fill the supply void that exists in the northern hemisphere just before the domestic harvest season in the fall.

- Without considering internal EU trade, apple exports worldwide increased from 4.2 million mt in 2004 to 5.0 million mt in 2008. The four largest exporters (China, the EU, Chile, and the United States) accounted for 70 percent of global trade in 2008. Russia and the EU, the world's two largest importers of fresh apples, accounted for 21 and 16 percent, respectively, of global imports in 2008.

INTRODUCTION

Definition and Scope

This report covers fresh apples, classified for tariff purposes under chapter 8, heading 0808.10, of the Harmonized Tariff Schedule of the United States (HTS). The summary presents information on the structure of the U.S. and foreign industries, the production process and supply chain, trends in consumer preferences, trade levels and trends, domestic and foreign tariff and nontariff measures, and the factors affecting the international competitiveness of the U.S. apple industry. While it primarily analyzes developments during 2004–08, the summary discusses events prior to 2004 if they had an impact on the industry's current structure.

Apples are one of the most widely cultivated tree fruits and the third most internationally traded fruit behind only bananas and grapes. Apples are commonly consumed not only because of their flavor but also because of the important nutrients that they contain, including high levels of antioxidants, vitamins, and dietary fiber. Apple trees are deciduous and grow in temperate regions of the world. However, apples' popularity is global: they are consumed worldwide in greater quantities than any other temperate-region tree fruit, such as peaches and pears.

Apples are used in many forms, with roughly two-thirds of U.S. production consumed as fresh fruit. All other U.S. production is converted into processed apple products, such as juice, jellies, preserves, sauces, and pastry fillings. This summary, however, focuses on the fresh apple sector.

U.S. Industry and the Global Market

Although apples are grown commercially in 36 states, production is highly concentrated. Of the 4.4 million metric tons (mt) produced nationally on average between 2004 and 2008, Washington state alone accounted for almost 60 percent.[1] Nationally, about 16 percent of annual production is exported, but among individual states Washington exports a much larger share of its production (about 30 percent).[2]

Since the late 1990s, two major trends have occurred in the U.S. apple industry: (1) industry consolidation, with production increasingly concentrated among fewer growers and packers, and (2) a continued shift in consumer preferences away from the Red Delicious variety. In the late 1990s and early 2000s, the industry suffered financial losses associated with lower demand for Red Delicious, traditionally the most popular variety. In response, the U.S. industry consolidated as less efficient producers left the market. National apple production levels, however, remained stable as yields increased due to improved horticultural techniques. In order to meet changing consumer preferences, the industry also shifted production to higher-value apple varieties, such as

[1] USDA, NASS, *Noncitrus Fruit and Tree Nuts 2008 Summary*, July 2009, 10.

[2] Steward, "Chile is the Most Competitive: The U.S. Apple Industry Ranks Fifth in Global Competitiveness, An Agricultural Economist Calculates," 2008, 12; USDA, NASS, *Noncitrus Fruit and Tree Nuts 2008 Summary*, July 2009, 10; GTIS, World Trade Atlas Database (accessed June 2009).

Fuji and Gala. As a result of these developments, by 2008 the U.S. industry had become more competitive in international markets as it continued to supply the large U.S. market.

Between 2003 and 2007,[3] global apple production increased from 58 million mt to 64 million mt, or by approximately 10 percent.[4] The Chinese apple industry increasingly dominated global production, as Chinese output grew rapidly during this period: China accounted for 43 percent of global production in 2007, up from 30 percent in 2003. The European Union (EU) and the United States were the second- and third-largest apple producers worldwide, but together accounted for just over 20 percent of global production in 2007. Unlike in China, apple production levels in the EU and United States were relatively stable during 2003–07.

Apple exports worldwide increased from 4.2 million mt in 2004 to 5.0 million mt in 2008, or by 19 percent.[5] The four largest exporters (China, the EU, Chile, and the United States) accounted for 70 percent of global trade in apples in 2008. The export growth experienced by these countries represented 100 percent of the growth in global exports of apples between 2004 and 2008. China, the largest global exporter, accounted for 23 percent of global exports of apples in 2008, up from 18 percent in 2004. China's emergence as a major player in the global apple market has altered the competitive landscape for other large exporting countries. For example, China has expanded into some Southeast Asian markets that traditionally consumed large quantities of high-quality U.S. apples. Nonetheless, the EU, Chile, and the United States all experienced strong export growth between 2004 and 2008.

Russia and the EU, the two largest apple importers in the world, accounted for 21 and 16 percent, respectively, of global imports in 2008. These two countries were followed by Mexico, Ukraine, Canada, and the United States, each of which accounted for less than 4 percent of global imports in 2008.[6] Import growth between 2004 and 2008 occurred primarily in eastern European and developing economies, such as Russia, Ukraine, Indonesia, and India. Russia, one of the few markets to experience growth in per capita apple consumption during the period, accounted for almost 30 percent of the global growth in imports between 2004 and 2008, primarily purchasing low-cost apples from China and Poland. Despite the recent trend of increasing counter-seasonal trade, which occurs when domestic supplies are low, imports by developed economies, such as the EU and the United States, actually decreased slightly as limited supplies abroad and the onset of the economic recession depressed demand for imports in 2008.

Industry Issues

According to U.S. industry officials, the major domestic issues facing the industry are food safety protocols, rising labor costs, and immigration policy, while the primary international issues are non-tariff trade measures, such as sanitary and phytosanitary (SPS) measures, as well as tariffs.[7] Following food safety protocols, such as proper

[3] Although 2008 trade statistics are discussed throughout the report, international production statistics generally appear more than a year later than trade data: 2007 international production data were the latest available at the time of publication. As a result, this summary analyzes production trends between 2003 and 2007 for international producers.

[4] FAO, FAOSTAT Production Database.

[5] GTIS, Global Trade Atlas Database.

[6] Ibid.

[7] Industry representatives, telephone interview by Commission staff, December 22, 2008.

sanitation techniques, decreases the risk of foodborne illness and increases traceability throughout the supply chain if outbreaks do occur. However, protocols also add costs that arise from increased oversight, liability, and documentation. The declining availability and associated rising cost of labor have focused the industry on obtaining the passage of new immigration legislation that might relieve some of these problems.

Despite the increases in global trade, significant barriers still exist in many markets and are a concern for the U.S. apple industry. Tariffs vary significantly, ranging from duty free in some markets, such as in Hong Kong, to 50 and 60.3 percent in India and Turkey, respectively. Beyond tariffs, the most prominent impediments to trade are SPS restrictions despite ongoing negotiations to resolve them between the United States and other countries, such as New Zealand and Australia. Certain long-standing SPS issues are a major concern for U.S. apple exporters and in some cases have effectively halted exports to certain markets, such as South Korea.

U.S. INDUSTRY

Industry Structure

Overview

The apple industry encompasses growers, packers, shippers, and processors. Apples destined for the fresh market are shipped from the orchard either to a packer or to a farmers' market that supplies consumers directly. The majority of apples are sent to packers, who pack and then distribute the product to retailers and exporters (figure 1). Consumers in the United States buy most of their apples through retailers such as grocery stores. Although direct sales to consumers account for a very small percentage of total consumption, this niche market is important to growers who have developed consistent sales through this avenue;[8] direct sales are advantageous because they limit transportation costs and the fees associated with selling through a packing house.

Number and Concentration of Growers and Packers

There are approximately 7,500 commercial apple growers in the United States, most of which are small family farmers who operate their own orchards.[9] While most U.S. farms have less than 100 acres, some cover as many as 3,000 acres.[10] Many apple farmers are diversified, often growing other fruits such as pears and cherries. Washington is the largest apple-producing state, accounting for almost 60 percent of national production on average between 2004 and 2008, whereas New York and Michigan, the second- and third-largest producers, accounted for approximately 13 and 8 percent, respectively.[11]

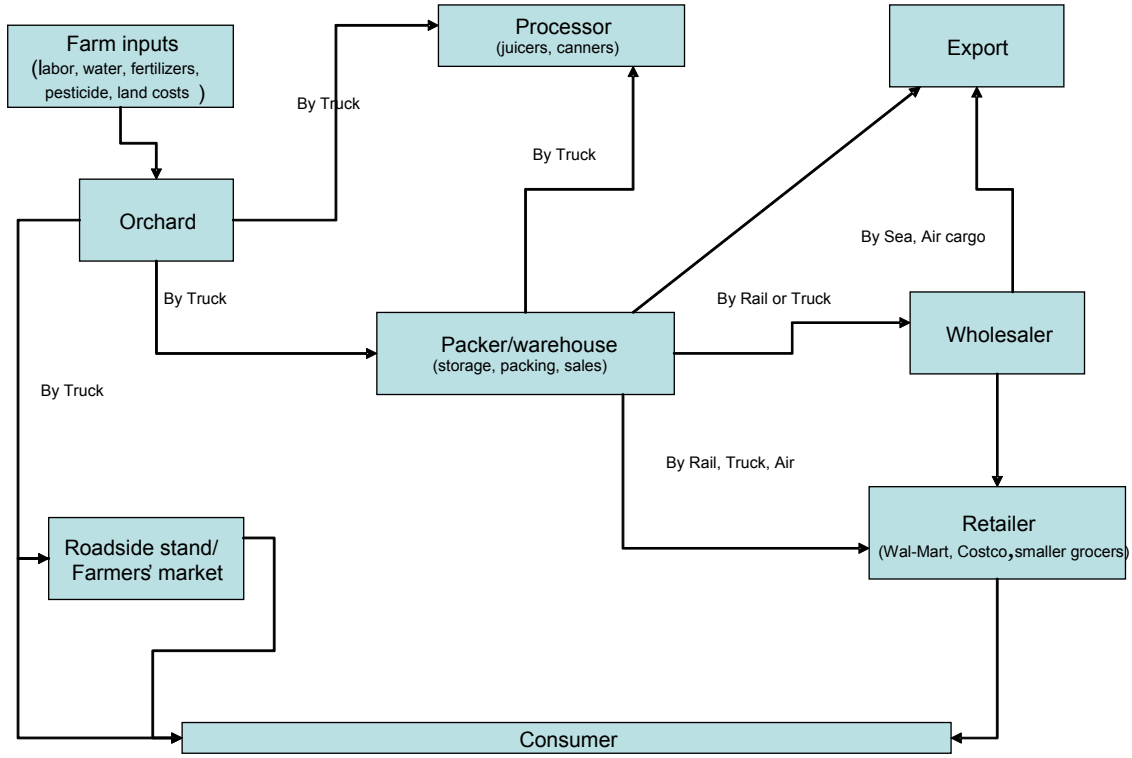
[8] Schotzko, "A Brief Look at the Washington Apple Industry," 2005, 26.

[9] U.S. Apple Association Web site. http://www.usapple.org/industry/legislative/issuepapers.cfm (accessed December 2009).

[10] In 2007, 4 percent of apple farms covered more than 100 acres. USDA, NASS, *2007 Census of Agriculture: United States Summary and State Data,* table 35, February 2009.

[11] USDA, NASS, *Noncitrus Fruit and Tree Nuts 2008 Summary,* July 2009, 10.

FIGURE 1 U.S. apple distribution system



Source: Compiled by Commission staff.

Apple orchards in the three largest producing states are larger than in other producing states. In Washington, for example, the size of the average apple farm is approximately 3.5 times the national average.[12]

In the two largest apple-producing states, Washington and New York, the growing sector consolidated between 2002 and 2007. Industry-wide financial losses, caused by low apple prices in the late 1990s and early 2000s, resulted in consolidation in the growing sector. Between 1996 and 2001, according to U.S. Department of Agriculture (USDA) estimates, nationally aggregated losses totaled approximately $1.7 billion.[13] As a result, many of the smaller and less efficient growers were forced out of the industry. In Washington, the total number of orchards declined by more than 20 percent during this period. As the number of growers declined in Washington, the average farm size expanded from 45 acres to 55 acres.[14] Nationally, although the average farm size remained stable, a decline in the number of farms from almost 27,000 to about 25,500 resulted in a decline

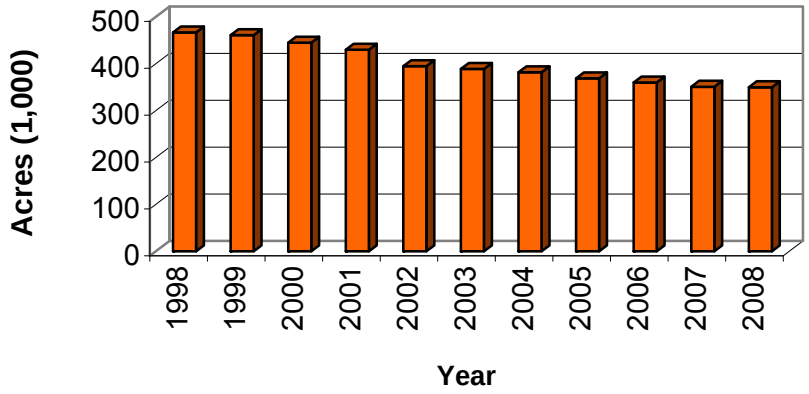
[12] The total number of orchards in Washington state fell from 3,870 in 2002 to 3,052 in 2007. USDA, NASS, *2007 Census of Agriculture: Washington State and County Data*, table 35, February 2009.

[13] U.S. Apple Association Web site. http://www.usapple.org/media/industry/index.cfm (accessed April 2008).

[14] USDA, NASS, *2007 Census of Agriculture: Washington State and County Data*, table 35, February 2009.

in national acreage from a peak of approximately 467,000 acres in the late 1990s to 350,100 in 2008 (figure 2).[15]

FIGURE 2 U.S. apple-bearing acreage



Source: USDA, NASS, *Noncitrus Fruit and Nuts Summary 2008*, July 2009; *Noncitrus Fruit and Nuts Summary 2004*, July 2005; and *Noncitrus Fruit and Nuts Summary 2001*, July 2002.

The packing house sector also consolidated over the last decade. Packing houses sort and grade fruit of similar quality and size and then place it into containers. Afterwards, they sell the fruit, often through their own in-house sales forces. Packing facilities are either privately owned or operated by grower cooperatives. Cooperative-run packinghouses were once a more substantial part of the packing sector, but their numbers have fallen sharply: in Washington state, for example, in 2008 there were only two remaining grower cooperatives focusing on apples that own a packing facility.[16] In Washington, the total number of packers reportedly declined from 44 in the late 1990s to 24 in 2008.[17]

The apple industry has also become more vertically integrated, as large-scale packers more often own and operate their own orchards. Some of the larger packers now source close to 60 percent of their fruit from their own operations. Fully integrated packing operations now encompass all aspects of the supply chain, from growers and packers to shippers and marketers that offer a range of services, such as warehousing, transportation, customs and trade consulting, and distribution.[18]

Another factor that has contributed to industry consolidation and greater vertical integration is the increasing role of larger retailers, such as Wal-Mart and Costco, in food distribution. Larger retailers would rather buy fruit from large operations that can supply

[15] Ibid.; USDA, NASS, *Noncitrus Fruit and Tree Nuts 2001 Summary*, July 2002, 10; and USDA, NASS, *Noncitrus Fruit and Tree Nuts 2008 Summary*, July 2009, 10.
[16] Industry representative, telephone interview with Commission staff, August 20, 2008.
[17] Ibid., August 19, 2008.
[18] Industry representative, interview by Commission staff, Yakima, Washington, May 30, 2008.

many apple varieties consistently throughout the year. This has pushed some smaller packers who could not meet these demands out of the industry.[19]

Price-Setting and Marketing

Historically, packers and marketers sold most of their produce to retailers at public auctions in open markets. Although this practice still occurs, its importance has decreased because of dramatic price fluctuations and concerns regarding consistency of supply. Most sales are now made on the spot market. A buyer will call a packer or shipper and negotiate prices for specific grades and quantities. Most sales are not guaranteed by contracts; however, with the recent entry into food retailing of large multinational companies, such as Wal-Mart and Costco, the use of more formal agreements has risen, because these firms have the purchasing power to demand them.[20] These companies require large, reliable supplies of produce in order to keep shelves filled, maintain inventory, and maximize supply chain efficiency.

Growers are paid based on the average price that a packer receives for the specific grades and quantity of the fruit that the grower supplied. The produce arrives at the packing facility from the grower in large bins, and tracking labels are used so that the source of the fruit, often down to the specific row in an orchard, can be tracked throughout the supply chain. This tracking technology is crucial for determining grower compensation. Once the bins are dumped onto the packing line and the apples are graded and sorted, they are stocked in a cold storage facility through a process called pooling. The apples are grouped into pools that contain specific quality grades, varieties, and sizes. When a particular grade pool is filled with a predetermined quantity of apples, it is marketed and sold. The average price for each particular pool is determined when the entire pool is sold. Growers are paid based on the average price of the pool and the quantity they contributed to that particular pool. The pool prices vary significantly depending on grade and variety. Growers are often not paid until all their product is sold, but because apples are often stored for up to a year before they are sold, many of the larger packing facilities and marketers provide credit to growers for the future sale. [21]

Production Process

Horticultural Practices

The ideal growing conditions for apples occur in temperate regions where trees receive plentiful sunshine in the summer and 500 to 1,000 chilling hours during the winter.[22] The sunshine allows good color and flavor development; the cold weather fosters winter dormancy and a proper bloom in the spring. Despite their need for cool winter temperatures, orchards are vulnerable to damage from cold weather in the spring, when freezing temperatures, frost, or hail can destroy entire crops during the bloom. Similarly, too-high summer temperatures can cause sunburn, prevent proper color development, and limit growth if the soil becomes too dry. Well-distributed rainfall of 40–50 inches per

[19] Hopkin, "Washington's Apple Industry on Rebound," December 8, 2007.

[20] Industry representative, interview by Commission staff, Yakima, Washington, May 30, 2008; Schotzko, "A Brief Look at the Washington Apple Industry," 2005, 26.

[21] Industry representative, interview by Commission staff, Yakima, Washington, May 30, 2008.

[22] Chilling hours are the number of hours below 45 degrees Fahrenheit.

year on average is also important for optimum apple tree growth. Heavy rainfall concentrated during the spring or summer can make the fruit susceptible to disease.

The planting of dwarf apple trees in orchards has become the industry standard. Dwarfs are created by grafting a standard fruit-bearing apple tree variety onto a root system (rootstock) that has been selected for its dwarfing character.[23] Compared to standard-sized apple trees, dwarfs have four advantages: (1) a shorter time period before reaching full production, (2) higher tree density and yields per acre, (3) better quality, and (4) faster and less expensive pruning, thinning, and fruit harvesting. Dwarfs become fully productive much more rapidly, often in three to four years; standard apple trees generally take seven or eight years. The shorter production time allows growers to respond to changing consumer preferences more quickly.[24] Dwarfs are also much smaller in size,[25] allowing growers to plant higher-density orchards without limiting sunlight and to minimize their land use while maintaining production levels.[26] Dwarfs increase yields because the center branches of dwarf varieties are not shaded from the sun and can therefore produce more fruit, relative to their size. Fruit quality is improved with dwarfs because more direct sunlight allows sugar to concentrate in the fruit and improve its flavor.[27] The trees' reduced size makes tree care and the fruit harvest less labor-intensive.

Apple trees require pollen to germinate. Pollination takes place during the early spring once the flowers on the trees blossom. Although there are some exceptions, pollination generally produces superior results when it involves a second apple variety.[28] Some growers cross-pollinate with other commercial varieties, but many use crab apple trees.[29] In addition to the pollen source, apple growers must provide pollinators during the bloom each season. Honeybees are commonly used, and most apple orchards depend on commercial beekeepers to pollinate their crop. Because of the reduced bee supply caused by colony collapse disorder, the cost of pollinating an acre of apple trees has reportedly more than doubled in recent years.[30]

Proper orchard management practices throughout the entire production period, such as pruning and thinning, can increase yields. Pruning takes place during the winter and involves removing extra wood and branches from the trees. Branches in unpruned trees can become intertwined and limit sunlight, providing an enticing environment for insects and diseases and lowering production. By ensuring that light reaches the leaves and fruit during the growth period, pruning maintains quality, increases yields and fruit size, and plays an important role in pest management. Thinning—the act of harvesting fruit from each tree shortly after they bloom—takes place throughout the spring and is necessary for even fruit growth. Without thinning, the tree can become overloaded with many small

[23] University of New Hampshire Cooperative Extension Service, "Dwarf Apple Trees for Home Gardens."

[24] Michigan Apple Committee Web site. http://www.michiganapples.com/index.asp?Loc=6&Loc2=22 (accessed November 2008).

[25] Full dwarf varieties will grow to 5–8 feet, while semidwarf and standard varieties will grow to 12–16 and 20–30 feet tall, respectively.

[26] For example, in Washington state, the average number of trees per acre rose from 391 in 2001 to 434 in 2006. USDA, NASS, Washington Field Office, *Washington Fruit Survey Highlights*, December 4, 2006.

[27] Phillips, "New York Apple Farmer Keeps Family Orchard Fruitful," *Voice of America News*, August 20, 2007.

[28] Apple trees that require cross-pollination are ideally planted within 50 feet of another variety that can pollinate.

[29] Industry representative, interview by Commission staff, Yakima, Washington May 30, 2008.

[30] Historically, growers paid approximately $60 for a hive to pollinate an acre; recently the cost has increased to $140 per acre. Bjerga, "Blue Orchard Bees Find Favor," *Bloomberg*, October 19, 2007.

and inconsistently shaped apples. Full harvesting begins in the late summer and takes place throughout the fall. Apples are pulled off the trees by hand and placed in picking bags. Because these operations are all done manually, labor for pruning, thinning, and harvesting is an expensive input for orchard operators but is crucial for growing a successful crop.[31]

To decrease their reliance on labor, apple growers have attempted to develop new methods of fruit harvesting and tree maintenance. Mechanical harvesting applications are being researched and tested. New growing and planting methods are also helping to simplify the production process and lessen the industry's need for labor. For example, V-slant trellis systems allow higher-density planting, are often better suited for bee pollination and irrigation, and because of their angle to the ground they simplify manual upkeep procedures such as thinning, pruning, and harvesting, making production less labor-intensive.[32]

Some orchards cultivate five or six different varieties while others focus primarily on only one, with each option having distinct advantages. Producers of one specific variety can take advantage of precise soil conditions and a familiarity with the ideal growing methods for that particular variety. Storage costs, however, can be greater because a single-variety crop is harvested all at once, inevitably producing excess fruit that cannot be sold quickly without flooding the market and jeopardizing prices. As a result, the fruit must be stored in controlled-atmosphere facilities at considerable cost. By comparison, growing different varieties allows producers to stagger the harvest season, which decreases variable costs per unit by limiting storage costs and increasing labor availability, as a longer harvest period provides more employment for workers. Growing multiple varieties is quite common and has the additional benefit of more efficient cross-pollination.[33]

Packing Operations

Once the apples are harvested, they are placed in bins at the orchard and delivered by the grower to the packing facility. The packing process is heavily mechanized and is increasingly reliant on high-tech equipment to limit labor use and increase fruit quality. The packing facilities first place identification labels on the bins so that the fruit can be tracked throughout the packing process and the entire supply chain. The bins are then immediately placed into controlled-atmosphere storage, often by robotic bin sorters, until the packing line is available. Once on the packing line, the fruit is washed in warm water to remove the field dirt, dried mechanically, and coated with a wax that replaces the natural wax removed during cleaning to improve shelf-life. Optical sorters then sort the fruit for defects and by weight, size, and color. These optical sorters minimize the need for inspectors, while still making it possible to meet customer specifications and maintain quality. Apples are directed into a number of different lines by grades, which are generally established and regulated by the state department of agriculture. Finally, the fruit is visually inspected by packinghouse workers before being individually labeled, placed into boxes, and moved into cold storage until sale.

[31] Schotzko, "A Brief Look at the Washington Apple Industry," 2005, 5.

[32] New trellis systems use poles to train trees at a V slant. Industry representative, interview by Commission staff, Yakima, Washington, May 30, 2008.

[33] Industry representative, interview by Commission staff, Yakima, Washington, May 30, 2008.

U.S. Market

Production

National Production

As noted earlier, apples are produced commercially in 36 states throughout almost every region of the country. U.S. production averaged 4.4 million mt annually between 2004 and 2008 (table 1). Production was relatively stable throughout the period, with slight fluctuations occurring in 2004 and 2007 as a result of variable weather conditions.

TABLE 1 U.S. fresh apple production, bearing acreage, and yields by state, 1998-2003 average, 2004–08

State	1998-2003 average	2004	2005	2006	2007	2008
			Production (1,000 mt)			
Washington	2446.2	2789.6	2585.5	2517.5	2358.7	2630.9
New York	459.4	580.6	474.0	571.5	594.2	567.0
Michigan	402.3	331.1	344.7	399.2	349.3	272.2
Pennsylvania	203.2	183.7	226.8	213.2	213.2	199.6
California	284.8	161.0	161.0	161.0	156.5	163.3
All other	712.9	676.8	592.8	593.5	451.1	598.4
Total	4508.7	4722.9	4384.9	4455.9	4122.9	4431.3
			Bearing acreage (1,000 acres)			
Washington	166.8	155.0	154.0	154.0	153.0	153.0
New York	46.2	45.0	45.0	45.0	42.0	42.0
Michigan	46.9	40.5	40.0	38.5	36.0	36.5
Pennsylvania	22.3	22.1	21.8	21.0	20.8	21.0
California	31.0	26.0	24.0	21.0	20.5	19.5
All other	114.1	93.3	84.2	80.5	78.6	78.1
Total	427.4	381.9	369.0	360.0	350.9	350.1
			Yield (mt/acre)			
Washington	14.7	18.0	16.8	16.3	15.4	17.2
New York	10.0	12.9	10.5	12.7	14.1	13.5
Michigan	8.6	8.2	8.6	10.4	9.7	7.5
Pennsylvania	9.1	8.3	10.4	10.2	10.2	9.5
California	9.2	6.2	6.7	7.7	7.6	8.4
All other	6.2	7.3	7.0	7.4	5.7	7.7
Average	10.5	12.4	11.9	12.4	11.7	12.7

Source: USDA, NASS, *Noncitrus Fruit and Nuts 2008 Summary*, July 2009; *Noncitrus Fruit and Nuts 2004 Summary*, July 2005; and *Noncitrus Fruit and Nuts 2001 Summary*, July 2002.

Production volume is a function of acreage and yields. National production levels during the period remained relatively stable as increasing yields offset declining acreage. Acreage fell from a peak of approximately 467,000 acres in the late 1990s to 350,100 acres in 2008 (table 1, figure 2).[34] The acreage decline occurred as less efficient growers left the market following the low apple prices of the late 1990s and early 2000s. Nationally, the average yield between 2004 and 2008 was 12.2 metric tons per acre, an increase of approximately 16 percent from the previous six-year average of 10.5 metric tons per acre (table 1). Again, the departure of the less efficient producers was one reason

[34] USDA, NASS, *Noncitrus Fruit and Tree Nuts 2001 Summary,* July 2002, 10; USDA, NASS, *Noncitrus Fruit and Tree Nuts 2008 Summary,* July 2009, 10.

for the rising yields; in addition, the remaining producers began using more advanced planting and horticultural management practices. The increased use of smaller dwarf trees also allowed producers to increase the number of trees planted per acre.

State Production

The industry in the state of Washington is the largest in the United States and includes the country's most efficient apple producers. Between 2004 and 2008, the Washington crop averaged more than 2.5 million mt annually and accounted for 58 percent of total U.S. production (table 1). Production levels in Washington were generally stable throughout the period. In 2004, a mild spring and ideal growing conditions provided the largest crop of the five-year period. The harvest of 2007 was the smallest of the period as a result of a hard frost late in the fall of 2006 and an unusually cold spring that reduced the bloom, particularly for the Red and Golden Delicious variety crops.[35]

In addition, between 2004 and 2008 the state of Washington had the highest average yield in the country at 16.7 mt per acre, which was 37 percent higher than the national average (table 1). While acreage declined slightly, it was still relatively stable throughout the period and accounted for approximately 43 percent of the total national apple-bearing acreage. As the largest apple-producing state, Washington supplies 65 to 75 percent of all apples sold fresh in the U.S. market. In addition, the apple industry in Washington is the most export-oriented in the United States, with approximately 30 percent of production exported annually.[36] Although roughly three-quarters of Washington's production is sold as fresh fruit, the state is also the country's largest apple processor.[37]

New York, Michigan, Pennsylvania, and California are also major apple-producing states. However, compared to Washington, they sell a larger percentage of their production in the domestic market and to the processing sector. Between 2004 and 2008, production levels were relatively stable in Pennsylvania and California even as acreage declined, since low returns forced less efficient producers out of the market. Significant production fluctuations did occur, however, in New York and Michigan as a result of variable weather conditions (figure 3). In 2005, despite favorable early growing conditions, scattered frost and hail damage late in the spring limited yields in New York;[38] in 2004 and 2007, by contrast, favorable weather and pollination conditions resulted in the state's largest outputs during the study period. In Michigan, yields in 2008 fell dramatically as a result of freeze and hail damage early in the summer.[39] Despite low yields in recent years and declining acreage, apple farmers in Michigan are optimistic about future returns and are becoming more oriented toward the fresh market, with 82 percent planning on maintaining or increasing their acreage over the next five years.[40]

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[35] USDA, ERS, *Fruit and Tree Nuts Outlook 2007, U.S. Production of Most Noncitrus Fruit Forecast Up Except for Apples*, September 26, 2007, 5.

[36] Steward, "Chile Is the Most Competitive," January 1, 2008, 12.

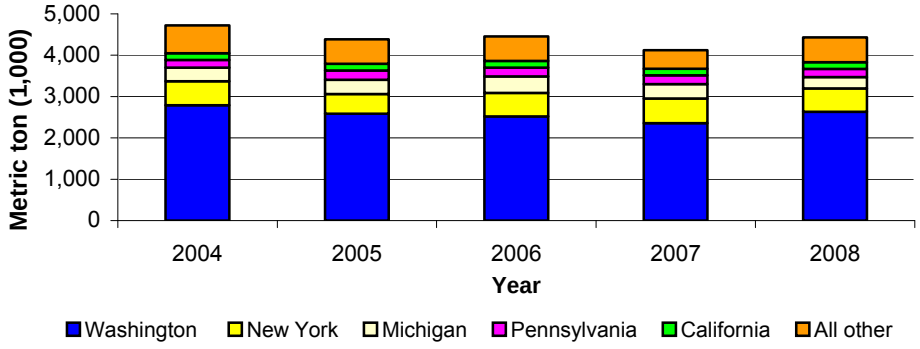
[37] USDA, NASS, *Noncitrus Fruit and Tree Nuts 2008 Summary*, July 2009, 15; USDA, ERS, *Fruit and Tree Nuts Outlook: Citrus Production Down in 2004/05*, March 31, 2005, 23.

[38] USDA, ERS, *Fruit and Tree Nuts Outlook 2005, U.S. Production Reduced for Apples and Pears*, September 28, 2005, 5.

[39] USDA, ERS, *Fruit and Tree Nuts Outlook: Forecast is for Below-Average U.S. Apple and Pear Crops, Grape and Cranberry Production Is Up*, September 26, 2008, 5.

[40] Michigan Apple Committee, "Many Michigan Growers Plan to Increase Apple Acreage," March 26, 2008.

FIGURE 3 U.S. apple production by state



Source: USDA, NASS, *Nonctirus Fruit and Nuts Summary* , various annual publications.

Factors Affecting Production

Varietal Production Trends

While approximately 100 apple varieties are grown commercially in the United States, the 15 most popular varieties accounted for almost 90 percent of total production in 2007 (table 2).[41] However, the composition of the U.S. apple crop in terms of varieties produced is constantly evolving as growers adjust to ever-changing market demands.

Nationally, the trend away from Red Delicious apples continued: its share of total U.S. production dropped from 31 percent in 2002 to 24 percent in 2007. Because U.S. per capita consumption of fresh apples has been level since 2003, growers have been encouraged to offer consumers newer varieties, whose importance has grown significantly over the last decade;[42] the market shares of other varieties, most notably Gala, have risen as rapidly as that of Red Delicious has dropped (table 2).

Although Red Delicious is still the most popular variety produced in Washington and has an especially revered place in Washington's apple growing history, its very popularity became the source of problems during the 1990s.[43] As production of Red Delicious grew, its quality began to suffer. Breeding for early redness made determining ripeness difficult and led to the harvest of immature Red Delicious apples that have limited flavor. In addition, while the thick skin of Red Delicious apples provided for longer storage, it also prevented both growers and consumers from recognizing when the apples were internally damaged. Demand for Red Delicious decreased as consumers turned to other varieties, and oversupply conditions plagued the industry. Consistently low grower prices for Red

[41] 2007 was the latest year for which data on U.S. production by variety were available at the time of publication. U.S. Apple Association Web site. http://www.usapple.org/consumers/applebits/core.cfm (accessed April 2008).

[42] Belrose Inc., *World Apple Review 2008 Edition*, 2008, 58.

[43] Schotzko, "A Brief Look at the Washington Apple Industry," 2005, 16.

TABLE 2 U.S. apple production by variety (1,000 42-lb units), 2004–08

Varieties	2002	2003	2004	2005	2006	2007
Red Delicious	63,232	58,350	69,578	64,968	61,101	53,692
Gala	18,810	20,634	25,807	23,975	28,904	28,519
Golden Delicious	27,766	26,317	31,810	30,014	28,283	24,635
Granny Smith[a]	19,265	18,101	21,884	20,531	22,314	23,021
Fuji[a]	20,357	15,332	22,570	21,000	20,218	18,164
McIntosh	7,866	11,057	12,019	9,913	10,065	10,136
Rome	7,979	10,183	10,463	9,822	8,428	7,082
Empire	2,820	4,498	4,965	4,281	6,553	6,473
Braeburn[a]	3,056	2,955	5,337	4,945	4,330	5,024
Idared	3,225	5,165	4,964	4,677	4,838	4,670
York	3,724	4,186	4,096	4,395	4,090	3,857
Jonathan	3,607	4,979	4,553	4,483	4,527	3,504
Cripps Pink[a]	1,448	1,969	3,602	3,342	2,915	3,322
Cortland	1,761	2,474	2,775	2,298	2,695	2,743
Cameo[a]	1,005	1,303	2,236	2,071	1,969	1,682
Jonagold[a]	1,388	1,347	1,860	1,723	1,601	1,588
Northern Spy	1,121	1,968	1,714	1,712	1,273	1,225
Stayman	1,267	1,394	1,395	1,429	1,410	1,123
R.I. Greening	1,267	1,966	2,260	1,912	1,092	1,106
Newtown	1,319	1,103	1,099	1,032	1,016	974
All others	10,667	14,082	13,599	12,546	18,847	18,524
Total	202,950	209,360	248,586	231,069	236,469	221,064

Source: U.S. Apple Association official, e-mail message to Commission staff, August 24, 2008.

Note: Sum of varieties may not add up to total due to rounding of individual varieties.

[a] Includes only Western production. Eastern and Midwest production is included in other varieties.

Delicious followed, and growers responded by cutting production significantly overtime.[44] As a result of low or even negative profit margins, less-efficient producers were forced out of the market and acreage was bulldozed, some of which was replanted with varieties that command higher prices.

From 1997 to 2007, the share of new major varieties grown in the United States increased from 11.7 percent to 23.8 percent.[45] Initially, domestic production of Fuji and Gala apples was intended to create better opportunities for U.S. producers in some major export markets, such as Southeast Asia. However, lower-priced apples from China entered those markets and created competition for U.S. exports. As a result of lost sales in Southeast Asia due to Chinese competition, U.S. apple growers were forced to expand marketing

[44] In the 1980s, Red Delicious apples represented three-quarters of the harvest in Washington, but by 2000 it made up less than half. By 2006, Red Delicious accounted for only 36 percent of total production in Washington, followed by Gala, Granny Smith, and Fuji. Higgins, "Why the Red Delicious No Longer Is," *Washington Post*, August 5, 2005; Washington Apple Commission Web site. http://www.bestapples.com/facts/facts_crop.shtml (accessed November 16, 2009).

[45] Varieties are often grouped into four categories based their relative commercial significance. The four categories of apples include traditional majors (Red Delicious, Golden Delicious, and Granny Smith), new majors (Gala, Fuji, Braeburn, and Jonagold/Jonared), local varieties, such as Idared, that are grown in limited quantities and regions, and newly developed varieties that still have very limited production volumes, such as Honeycrisp. Belrose Inc., *World Apple Review 2008 Edition*, 2008, 58.

efforts in the United States for these newer varieties.[46] U.S. consumers now prefer and look for many of these newer varieties.

Red Delicious production levels have begun to stabilize in recent years.[47] Industry officials estimate that Red Delicious production will continue to represent approximately one-third of Washington production, as supply and demand are now perceived to be in balance. Many of the quality concerns for Red Delicious have been resolved as well. New quality and ripening control products are able to better manage the natural effects of ethylene, which causes produce to grow and ripen but also to soften and over-ripen. This improvement enables growers and packers to maintain fruit quality while the produce is in storage and has allowed the industry to effectively repair consumer perceptions of the variety.[48]

An apple's likely end use, whether processed or fresh, often determines which varieties are commonly grown in certain regions.[49] In New York and Michigan, the second- and third-largest producing states, the typical varieties produced are slightly different than in Washington because a higher percentage of production is destined for processing. In 2007, approximately 50 percent of New York production and 60 percent of Michigan production was destined for processing, compared to about one-quarter in Washington. In New York, 47 percent of the processed apples were used for canned products such as applesauce, slices, and pie filling, while apples processed for juice and cider accounted for 38 percent. The remaining 15 percent of processed apples were made into frozen slices, vinegar, jelly, apple butter, and dried products.[50] For Michigan processed apples, 41 percent became canned products such as apple sauce, slices, and pie filling, 35 percent was processed into juice and cider, and 23 percent was frozen or sold as fresh slices.[51] McIntosh and Empire apples are the two varieties produced in the largest quantities in

New York because they are ideal for both fresh consumption and processing.[52] In Michigan, Red and Golden Delicious are the most popular apple varieties, followed by Jonathan, Empire, Rome, Braeburn, Idared, and Gala.

Prices

With the exception of a price drop caused by the bumper apple crop in 2004, the prices paid to growers have increased steadily and significantly since the late 1990s and early 2000s. Between 1998 and 2002, the average grower price for apples of all grades and

[46] USDA, ERS *Fruit and Tree Nuts Outlook, Citrus Production Down in 2004/05 due to Smaller Florida Crops*, March 2005, 23.

[47] Industry representative, interview by Commission staff, Yakima, Washington, May 30, 2008.

[48] Ibid.

[49] There are generally three accepted classes of apple varieties: dessert apples (best suited for out-of hand fresh eating), cooking apples (best for processing into apple sauces, pies, and other canned products), and dual-purpose apples (those suitable for both fresh consumption and for cooking). Belrose Inc., *World Apple Review 2008 Edition*, 2008, 57.

[50] New York State Apple Commission Web site. http://www.nyapplecountry.com/fastfacts.htm (accessed April 16, 2009).

[51] Michigan State University Extension, *Michigan Agricultural Statistics 2006–2007*, 35.

[52] McIntosh can be sold in the fresh market and is also ideal for processing into sauce. The Empire apple variety is often high-priced, but its high quality makes it ideal for use in pies, sauces, and other culinary uses as well as for consumption in the fresh market due to its juicy sweet-tart taste. McIntosh and Empire apples are followed by the Red Delicious, Cortland, and Rome varieties in production volume in New York. New York State Apple Commission Web site. http://www.nyapplecountry.com/fastfacts.htm (accessed April 16, 2009).

purposes was $298 per ton, which was a historical low when adjusted for inflation. These low prices—caused, in part, by the oversupply of and declining demand for the Red Delicious variety, as discussed earlier—placed the industry under significant financial stress. In 2002, prices began to recover as the industry restructured. Between 2003 and 2008, the average apple grower price per ton rose to $426, or 43 percent higher than the 1998–2002 average (table 3). After the 2004 price drop, prices rose quickly and consistently due to tighter supply conditions and inflationary pressures. In 2007, apple prices reached a historical high of $576 per ton before declining to $452 per ton after another bumper crop in 2008.

TABLE 3 U.S. apple prices ($ per short ton)

Product	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008
All apples	244	300	254	314	378	412	316	348	454	576	452
Fresh apples	286	426	356	458	516	588	434	488	632	766	592
Processed apples	95	128	102	106	130	131	107	106	129	190	189

Source: USDA, NASS, *Noncitrus Fruit and Nuts 2008 Summary*, July 2009; *Noncitrus Fruit and Nuts 2004 Summary*, July 2005; and *Noncitrus Fruit and 2001 Nuts Summary*, July 2002.

Traditionally, the domestic price has tended to influence export quantities. When domestic prices rose, marketers would generally focus their sales efforts on the domestic market to avoid the risks of shipping abroad. During the study period, however, international prices rose in tandem with domestic prices, causing U.S. exports to grow correspondingly by both value and volume.

Higher-quality apples destined for the fresh market receive significantly higher prices than those marked for processing. Between 1998 and 2008, prices for lower-grade processing apples were approximately one-quarter of the average price for fresh market apples. Apples to be used in canning or as processed fresh slices are generally of higher quality, and therefore receive higher prices, than those intended for juice and cider. Furthermore, there can be price differences within one type of processing. For example, firms that rely on processing apples for juice in some Midwestern and Eastern states are legally bound to negotiate prices with growers each year.[53] Those negotiated prices are often substantially higher than prices paid abroad or even in Washington state. This price disparity may create a competitive advantage for imported juice or concentrate.

The "marketing spread," or gap, between retail and grower prices strongly affects producer profitability and was a factor that contributed to growers' financial losses of the late 1990s and early 2000s. During the late 1990s, increasing costs, such as labor and advertising, forced retailers to lower the prices they paid packers in order to maintain profit margins. Retailers were able to keep grower prices down because of their increasing purchasing power due to industry consolidation and because of high apple supply levels in the market. In addition, the increasingly competitive retail segment and the growing importance of the discount retailer created price resistance, which delayed retailers' ability to raise their prices in response to rising costs. Producer prices began to rise in 2002 as the growing and packing segments consolidated, supply tightened, and newer, higher-value varieties came into production. As a result, the percentage of the

[53] Schotzko, "A Brief Look at the Washington Apple Industry," 2005, 8.

retail price that growers received rose from a low of 20.3 percent in 1998 to a high of 30.4 percent in 2007, helping producer profitability.[54]

Costs

The primary apple production costs include expenditures for items such as labor, chemicals, land, seed, machinery, and fuel. Other costs include taxes; marketing; insurance; interest on the investment in land, buildings, and machinery; and noncash expenses, such as unpaid family labor and equipment depreciation. Labor is the largest direct cost, accounting for more than 60 percent of total apple production costs in the United States; high labor costs differentiate the cost structure of domestic producers from that of low-cost producers, such as China. Chemicals, chiefly insecticides and fungicides, are the second-largest cost for apple producers and account for about one-quarter of total costs.[55]

Labor Availability

Because pruning, thinning, and harvesting must be performed manually, apple production depends on having a reliable labor force. Barriers to immigration have resulted in a decline of available workers, reportedly increasing labor costs by as much as 25 percent for apple growers during the harvesting season when demand for labor is at its peak.[56] In some cases, even after offering higher wages, orchards have not been able to find enough workers and have been forced to leave fruit on the trees.[57] More often, though, fruit is harvested late, resulting in apples that are too ripe and low in quality. Because of the increased labor costs, unharvested fruit, and diminished quality, the lack of labor availability is directly resulting in lost revenue for the apple industry.[58] Industry representatives stated that without immigration legislation the United States could lose much of its domestic apple industry and most of our apples would have to be imported from cheaper suppliers, such as China.[59]

Government Programs

Although no U.S. government programs offer price support for or direct payments to the apple industry, the USDA allocates funding for marketing to various industries through the Commodity Credit Corporation via two programs: the Market Promotion Program (MPP) and the Market Access Program (MAP). The MPP provides funding for domestic, direct-to-consumer promotional activities, such as grants to expand farmers' markets.

The MAP forms partnerships with U.S. agricultural trade organizations, nonprofit state and regional groups, and other cooperatives, and allocates funding to share the costs of overseas marketing and promotional activities that expand foreign export markets by targeting market constraints and new sales opportunities. Examples of activities eligible for MAP funding include consumer promotions for retail products, seminars and workshops to educate overseas customers about U.S. products and food safety, training and assistance to foreign processors and manufacturers on the use of U.S. product

[54] USDA, ERS, *Fruit and Tree Nuts Situation and Outlook Yearbook 2008*, October 2008, 30.
[55] Crassweller et al., *Agricultural Alternatives: Apple Production*, 2005, 6.
[56] U.S. Apple Association, "U.S. Apple Growers Could Lose $572.2 Million," May 2007.
[57] Industry representative, telephone interview by Commission staff, December 30, 2008.
[58] U.S. Apple Association, "U.S. Apple Growers Could Lose $572.2 Million," May 2007.
[59] U.S. Apple Association, "Apple Industry Applauds Introduction of 2009 AgJobs Bill," May 2009.

ingredients, and market research.[60] MAP funding for all commodities increased substantially, from $100 million in fiscal year 2004 to $200 million in 2008. The Washington State Apple Commission and the U.S. Apple Association,[61] two export-oriented apple trade associations, received approximately $4.8 million and $900,000, respectively, in the 2008 fiscal year.[62]

Several other federal and state programs benefit fruit growers through funding for research and development. The USDA's Cooperative State Research, Education, and Extension Service (CSREES) supports research initiatives through partnerships with a number of institutions, including universities and grower associations. The Specialty Crop Research Initiative (SCRI) provides support by developing and disseminating science-based research to address the needs of specific crops. In 2008 the initiative provided $27 million in grants for research in five focus areas: research in plant breeding, genetics, and genomics to improve crop characteristics; efforts to identify threats from pests and diseases; new innovations and technology, including improved mechanization and ripening technologies; efforts to improve production efficiency and profitability over the long term; and methods to address potential food safety hazards in the production and processing of specialty crops.[63] The amount of funding from this program allocated directly to apple research has not been confirmed, but it is very likely that the apple industry has benefited from at least a portion of these funds.

The Food, Conservation, and Energy Act of 2008, known most commonly as the 2008 Farm Bill, contained one of the most important policies for fruit and vegetable growers: it continued the restrictions that prevent commodity program participants from planting fruits and vegetables on base acres for which they already receive direct and countercyclical payments. This provision keeps farmers who receive such payments from directly competing with apple farmers who do not.

The Farm Bill also included a separate title (Title X),[64] covering horticulture and organic agriculture, which provides mandatory funding over the life of the bill and beyond for several new and preexisting programs. The bill continued the programs discussed above, including the CSREES program making block grants to states for research, and it expanded both the MPP and MAP programs. Title X also reauthorized a preexisting program sharing the cost of acquiring organic certification for producers. New programs in the bill included mandatory funding to launch a federal/state partnership for researching and promoting the detection of pests and diseases. Title X also created a

[60] MAP is administered by USDA's Foreign Agricultural Service. Trade associations interested in receiving funding through the MAP program must submit export strategy proposals that undergo a competitive review process based on criteria ensuring that the funding is being allocated to the most efficient promotional programs. Examples of these criteria include the degree to which the applicant contributes resources to the program and the effectiveness of historical programs on export performance. USDA, FAS, *Market Access Program Fact Sheet*, December 2009.

[61] The U.S. Apple Association and the Washington Apple Commission represent the two different types of apple trade associations. The first is a nonprofit membership association that is supported by individual firms, including growers, packers, shippers, and processors, as well as corporate members and state/regional associations. The Washington Apple Commission, on the other hand, is considered a governmental agency, since it is state-mandated. However, it is governed by growers and funded by an assessment rate on growers.

[62] USDA, FAS, *Market Access Program Fact Sheet*, December 2009.

[63] USDA, CSREES, "CSREES Anticipates Specialty Crop Research Initiative Funding Opportunity," June 16, 2008.

[64] Previous versions of the Farm Bill have not included such a separate title.

network of nurseries to grow pest- and disease-free horticultural plants and authorized funding for research on bee colony collapse disorder.[65]

Consumption and Factors Affecting Consumption

While fresh apple consumption in the United States fluctuated between 2004 and 2008, it has declined overall since the late 1990s (table 4).[66] After falling to a low of 7.02 kg per capita in 2002, consumption increased modestly as a result of greater out-of-season availability,[67] wider availability of newer varieties, and the incorporation of more fresh fruits into consumers' diets. U.S. consumption spiked in 2004 due to increased availability as a result of a bumper crop, but then quickly returned to the lower pre-2004 levels.

TABLE 4 U.S. fresh apple apparent consumption

Years	Production utilized in the fresh market	Imports	Exports	Total utilization	Per capita consumption	Import penetration
	1,000 (*mt*)				Kilograms	Percent
1998	2,909.5	142.0	582.2	2,469.3	9.01	5.8
1999	2,706.0	164.2	638.9	2,231.3	8.06	7.4
2000	2,839.2	163.9	662.1	2,341.0	8.36	7.0
2001	2,843.3	157.1	714.9	2,285.5	8.08	6.9
2002	2,434.0	170.4	596.1	2,008.3	7.02	8.5
2003	2,473.6	186.8	546.2	2,114.2	7.32	8.8
2004	3,002.3	207.4	491.1	2,718.6	9.31	7.6
2005	2,765.5	122.8	685.4	2,202.9	7.47	5.6
2006	2,861.5	156.7	649.7	2,368.5	7.95	6.6
2007	2,756.6	206.6	663.5	2,299.7	7.64	9.0
2008	2,859.4	165.3	712.5	2,312.2	7.68	7.1

Source: USDA, NASS, *Noncitrus Fruit and Nuts 2008 Summary*, July 2009; *Noncitrus Fruit and Nuts 2004 Summary*, July 2005; *Noncitrus Fruit and Nuts 2001 Summary*, July 2002; and USITC, Dataweb.

Note: Import and export data may not exactly match the trade data presented in other sections of the report due to the use of different sources.

Despite some signs of growth in recent years, the average U.S. per capita consumption of 8.0 kg between 2004 and 2008 was still slightly below the 8.3 kg average of 1998–2002. This decline is primarily because of increased competition from exotic tropical fruits, such as mangoes and pineapples that have gained wider market acceptance.[68]

Despite slightly lower consumption levels and increased counter-seasonal trade, import penetration—the percentage of consumption that imported apples accounted for between 2004 and 2008—was similar to the average for 1998–02 at approximately 7 percent. Large yearly variations in import penetration occur primarily as a result of fluctuations in two factors—exchange rates and the size of the harvests—in both the United States and the primary supplying countries. For example, in 2007 import penetration was high

[65] CRS, "Specialty Crops: 2008 Farm Bill Issues," June 19, 2008, 1–8.

[66] The formula used to calculate apparent consumption is production for fresh use plus fresh imports minus fresh exports.

[67] Apples in the United States are generally harvested from August through November. Because many U.S. apples are stored, they are generally available through May of the following year. They are considered to be out of season June through August.

[68] USDA, FAS, *World Apple Situation and Outlook,* April 2006, 2.

primarily because a large Chilean crop made additional shipments to the U.S. market available.

Price, substitute products, changes in consumer preferences, and quality are all factors that affect demand for fresh apples. Apples are not a staple food product, and consumption is therefore dependent on price and the availability of disposable income. In a high-income market such as the United States, where the population can afford to consume high-quality fresh fruits, consumers will purchase a certain amount of fresh apples compared to pears, grapes, or other fruits after weighing the price differential and their eating preferences. In addition to demand for other fresh fruits, consumer preferences for substitute products, such as processed apples, affects the demand for fresh apples. The majority (65 percent) of the U.S. apple crop in 2008 was eaten fresh. This percentage has increased over time as the demand for processed apples has declined in the United States.[69]

The composition of the products derived from processing also changed between 2004 and 2008. The use of apples for juicing decreased substantially as a result of the increased availability of low-cost concentrated apple juice, primarily from China. On the other hand, production of fresh apple slices has increased as demand has grown for fresh, healthy snack alternatives (table 5). Such demand trends for processed products impact a grower's production decisions. Although many apple varieties can be processed or eaten fresh, the processors' choice of which specific apple variety to use varies greatly, depending on the type of processed product being produced.

TABLE 5 U.S. apple utilization as a percent of total yearly production

Product	2004	2008
Fresh	63.5	64.5
Processed	36.5	35.5
Juice and cider	18.0	15.7
Canned (sauces)	12.0	12.2
Frozen	2.5	2.1
Dried	1.9	2.1
Fresh slices	0.4	1.3
Other[a]	0.7	1.3

Source: Calculated from data from USDA, NASS, *Noncitrus Fruits and Nuts 2008 Summary,* July 2009; USDA, NASS, *Noncitrus Fruits and Nuts 2006 Summary,* July 2007.

Note: Figures may not add to totals shown because of rounding.

[a]Other uses include the making of baby food, apple butter or jelly, slices for pie making, and vinegar.

Both the quality of apples and the availability of the apple varieties that consumers prefer affect consumption trends. As noted earlier, consumer preference in the United States has moved from the traditional Red Delicious variety to newer varieties, such as Fuji and Gala. Despite the overall high quality of U.S. apples, these shifts have been partially in response to a period of relative poor quality in the late 1990s. As a result, even though

[69] The percentage of apples processed declined from 36.5 percent to 35.5 percent between 2004 and 2008; however, this represents the continuation of an earlier trend. For example, between 2000 and 2003 about 38 percent of U.S. apple production was processed, on average. Calculated from data from USDA, NASS, *Noncitrus Fruits and Nuts Summary,* various annual publications.

new quality and ripening control products have resolved some of the concerns about Red Delicious quality, the industry has shifted production to newer varieties.

U.S. TRADE

Overview

International trade plays an important role for the U.S. apple industry. Imports supply U.S. consumers with apples during the summer months when domestic supplies are limited; on average, imports accounted for approximately 7 percent of annual U.S. consumption between 2004 and 2008 (table 4). At the same time, export markets generate significant demand for high-quality U.S. apples. While only about 16 percent of total U.S. production was exported in 2008 overall, certain states, such as Washington, rely more heavily on export markets.

U.S. imports

Principal Suppliers and Import Levels

Although imports make up a relatively small percentage of its total consumption, the United States is the sixth-largest apple importer in the world. U.S. imports of fresh apples fluctuated between 2004 and 2008 but decreased by 20 percent overall, from 207,380 mt to 165,284 mt. The overall decrease can largely be attributed to a sharp decline in 2008 that occurred as industry officials reported lower demand due to poor economic conditions.[70] In addition, high domestic yields led to a large U.S. harvest, which lowered demand for imports.[71] Import levels often reflect the domestic harvest during the previous year: they peaked in 2004 following low production in 2003, but after the 2004 bumper crop they dropped in 2005 to their lowest level during the 2004–08 period. The value of U.S. imports also fell sharply, going from $180 million in 2004 to $141 million in 2008 (table 6). This decline was largely a result of the 18 percent drop in imports that occurred between 2007 and 2008.

The majority of imports (almost 80 percent on average) are supplied by counter-seasonal producers in the southern hemisphere, primarily Chile, New Zealand, and Argentina, that fill the supply void in the northern hemisphere just before the domestic harvest season in the fall. The majority of imports arrive during the months of May, June, and July, when domestic supplies from the previous year's harvest begin to run short (figure 4). Chile, consistently the primary supplier to the U.S. market, accounted for almost 60 percent of total U.S. imports by volume in 2008 (table 6). Canada, although it is not a counter-seasonal producer, is the second largest supplier and accounts for approximately 20 percent of imports.

[70] Industry representative, telephone interview by Commission staff, March 17, 2009.
[71] USDA, NASS, *Noncitrus Fruit and Tree Nuts 2008 Summary*, July 2009.

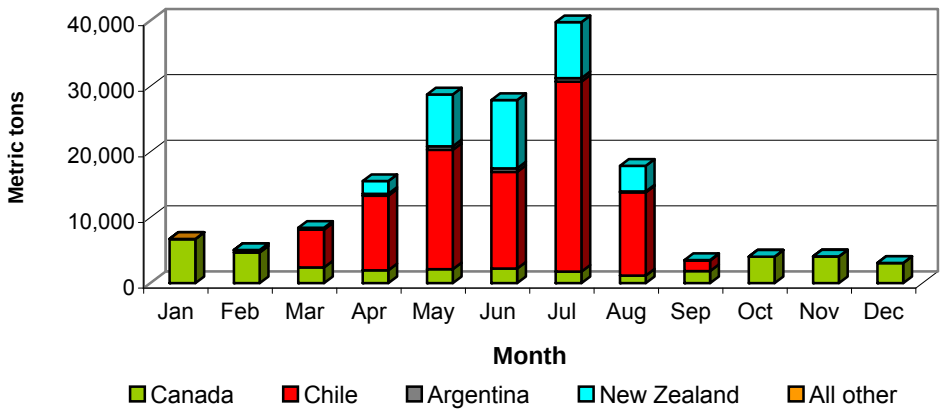
TABLE 6 U.S. fresh apple imports, 2004–08

Country	2004	2005	2006	2007	2008
			Quantity (mt)		
Chile	113,259	54,415	82,619	123,521	93,668
Canada	30,336	33,789	34,855	31,100	36,036
New Zealand	57,708	32,352	37,417	47,210	32,802
Argentina	2,295	1,510	1,512	4,424	2,243
Brazil	2,248	0	0	226	359
Japan	61	407	60	61	144
South Africa	1,434	157	0	11	22
All other	39	142	189	47	10
Total	207,380	122,772	156,652	206,600	165,284
			Value (1,000 $)		
Chile	86,949	40,576	75,765	99,328	83,329
Canada	20,463	21,676	26,788	26,515	26,854
New Zealand	67,119	39,628	31,024	39,320	27,852
Argentina	2,381	1,429	1,323	4,480	2,088
Brazil	1,458	0	0	215	385
Japan	205	225	211	210	218
South Africa	1,464	115	0	33	68
All other	41	84	106	82	17
Total	180,081	103,732	135,215	170,184	140,810
			Unit value ($/mt)		
Chile	768	746	917	804	890
Canada	675	642	769	853	745
New Zealand	1,163	1,225	829	833	849
Argentina	1,037	946	875	1,013	931
Brazil	649	([a])	([a])	949	1,072
Japan	3,344	554	3,481	3,472	1,514
South Africa	1,021	729	([a])	2,929	3,095
All other	1,051	592	561	1,745	1,700
World	868	845	863	824	852

Source: USITC, DataWeb.

[a] Not applicable.

FIGURE 4 U.S. fresh apple imports by month, 2008



Source: USITC, Dataweb.

U.S. Trade Measures

All fresh apples enter the United States free of duty. However, there are numerous sanitary and phytosanitary (SPS) measures with which foreign suppliers must comply. U.S. law and quarantine regulations require that fresh and frozen fruits be certified as free of damaging pests and diseases by the USDA Animal and Plant Health Inspection Service (APHIS) before they are allowed into the United States.[72] The production region of an imported apple must be approved and certified by APHIS after undergoing a risk assessment that identifies the economic and environmental damage that pests might cause if they enter the United States. If market access is granted, a predetermined screening protocol must be followed to ensure that imports are safe. APHIS also establishes the phytosanitary safeguards to be applied in case a shipment needs to be quarantined on arrival. In addition, APHIS's Cooperative Agricultural Pest Survey Program tracks pests throughout the United States so that a quick response and containment can be conducted if a pest of significance is detected in the country.[73]

Of the five most widely traded fruits, apples are the most restricted in terms of access to the U.S. market,[74] and as a result only 19 countries are eligible to export apples to the U.S.[75] These 19 countries represent only 18 percent of global apple production and 39 percent of total exports by volume.[76] Every shipment is subject to inspection at the port of entry, but shipments are generally not inspected for plant pests in the United States if they are certified by authorized foreign regulatory bodies that have been approved by APHIS. The U.S. Food and Drug Administration (FDA) also operates a pesticide-monitoring program that collects and analyzes samples of imported shipments to determine whether illegal pesticides have been used or if maximum residue levels for approved pesticides have been exceeded.

As of late 2009, China, the world's largest exporting country for fresh apples by volume, did not have access to the U.S. fresh apple market.[77] In 1998, the Chinese Quality Control, Inspection and Quarantine Bureau (QCIQB) requested that the United States conduct a pest risk assessment making it possible to (1) determine the existing risks and (2) develop a protocol to minimize that risk and allow China market access. After waiting for further information from the QCIQB, in 2003 APHIS sent the QCIQB a comprehensive list of pests and diseases of concern. After a response from the QCIQB in December 2004 claiming that 33 of the pests from the comprehensive list did not need to be quarantined, APHIS agreed that 6 of the pests and diseases did not need to be quarantined but requested further information regarding the remaining SPS concerns.[78] This exchange has since continued, but information on many of the remaining SPS concerns has not been provided to APHIS.[79] Chinese apples may be able to gain access to

[72] The Plant Quarantine Act of 1912 authorized the Secretary of Agriculture to regulate and restrict the importation of plant products that may harm domestic produce through the introduction of plant pests or diseases.

[73] USDA, APHIS, *Cooperative Agricultural Pest Survey Program*. n.d. (accessed November 18, 2009).

[74] The five most widely traded fruits include apples, bananas, grapes, lemons and limes, and oranges.

[75] Argentina, Australia (including the island of Tasmania), Brazil, Canada, Chile, Ecuador, continental France, Guyana, Israel, Japan, Jordan, Korea, Lebanon, Mexico, New Zealand, South Africa, Spain (both peninsular Spain and the Balearic Islands), Uruguay, and Zimbabwe. USDA, APHIS, "Fruit and Vegetable Import Requirements," n.d. (accessed May 4, 2009).

[76] USDA, ERS, *Phytosanitary Regulation of the Entry of Fresh Fruits and Vegetables into the United States*, June 2008.

[77] U.S. apple exports to China are also restricted; the issues involved will be discussed below.

[78] Government official, telephone interview with Commission staff, May 5, 2009.

[79] U.S. Apple Association, *Chinese Fresh Apple Imports*, August 2008.

the U.S. market once the necessary scientific research is completed and if it is possible to establish SPS protocols that minimize the risk of pests to the domestic industry. If Chinese apples are granted access to the market, many industry representatives do not think that Chinese apples would be competitive in terms of quality. U.S. apple growers are concerned, however, that if the U.S. market is opened, it will be flooded with low-cost Chinese fresh apples and put financial pressure on the industry.[80]

U.S. Exports

Principal Markets and Export Levels

By volume, exports increased from approximately 491,000 mt in 2004 to 713,000 mt in 2008, or by 45 percent (table 7). The largest year-over-year increase occurred in 2005, when exports expanded by 40 percent as a result of large quantities being available for export after the 2004 bumper crop. After production returned to more normal levels in 2005 and 2006, exports decreased slightly due to higher domestic market prices and challenges in some export markets, such as changing customer order specifications in India and the United Kingdom during 2008.[81] In 2008, however, exports continued to increase and reached a record 713,000 metric tons. Meanwhile, the value of U.S. exports rose by a dramatic 96 percent, going from $383 million in 2004 to $749 million in 2008 as global prices increased due to tighter supplies (table 7).

During 2004–08, exports accounted for 10–16 percent (table 8) of U.S. apple production. However, the shares vary significantly by production region. Washington state, the most efficient and export-oriented growing region, exports approximately 30 percent of its annual production yearly.[82] Approximately 85 percent of total U.S. fresh apple exports are grown in Washington state.[83]

Export destinations are much more diverse than the number of import suppliers. The top five export markets by volume (Mexico, Canada, Taiwan, United Kingdom, and Hong Kong) together accounted for approximately 65 percent of total U.S. fresh apple exports in 2008. U.S. exports to Mexico fluctuated significantly due to developments in two antidumping cases affecting U.S. Red and Golden Delicious apples (box 1). Moreover, exports to new markets, such as India and Russia, have increased significantly and contributed to the industry's sustained export growth. Primary factors that contributed to the substantial increase in U.S. exports worldwide were (1) the further development of promotional and marketing efforts as a result of the expansion of the Market Access Program; (2) higher disposable income in Mexico and newer developing markets, which led to increased demand for high-quality U.S. apples; (3) decreasing tariff rates, the resolution of antidumping cases in Mexico, and resolution of other nontariff measures in markets such as India; and (4) the depreciation of the U.S. dollar through most of 2008.

[80] Industry representative, interview by Commission staff, Yakima, Washington, May 28, 2008.

[81] The changing customer order specifications included issues such as the size of the fruit as well the packaging. Industry representative, interview by Commission staff, Yakima, Washington, May 30, 2008.

[82] Steward, "Chile Is the Most Competitive," January 1, 2008.

[83] Washington State University, "The Washington Apple Industry," September 22, 2006.

TABLE 7 U.S. fresh apple exports, 2004–08

Country	2004	2005	2006	2007	2008
			Quantity (*1,000 mt*)		
Mexico	86	159	161	173	197
Canada	110	121	132	144	157
Taiwan	53	52	41	48	50
United Kingdom	30	34	32	36	35
Hong Kong	27	39	29	33	31
Indonesia	34	34	32	26	29
United Arab Emirates	15	27	24	20	21
India	13	26	30	30	18
Russia	5	9	8	11	15
Egypt	2	4	5	7	12
Thailand	5	12	9	12	13
Saudi Arabia	13	21	17	9	13
Dominican Republic	4	7	5	8	11
Malaysia	25	33	25	13	11
Honduras	3	3	5	5	7
All other	65	105	94	87	93
Total	491	685	650	663	713
			Value (million $)		
Mexico	57	100	130	171	205
Canada	105	99	134	155	171
Taiwan	42	44	38	46	49
United Kingdom	31	38	36	36	37
Hong Kong	20	27	24	31	33
Indonesia	23	21	24	24	31
United Arab Emirates	10	16	17	18	22
India	9	18	23	27	19
Russia	3	6	7	11	17
Egypt	1	3	4	9	14
Thailand	4	8	8	12	13
Saudi Arabia	8	13	13	8	13
Dominican Republic	3	5	5	8	12
Malaysia	19	25	19	11	10
Honduras	2	2	4	5	7
All other	47	73	76	80	96
Total	383	500	561	651	749
			Unit value ($/mt)		
Mexico	661	629	803	988	1,040
Canada	954	820	1,015	1,078	1,085
Taiwan	781	845	930	968	975
United Kingdom	1,006	1,104	1,120	1,015	1,063
Hong Kong	733	703	839	935	1,069
Indonesia	684	618	762	929	1,063
United Arab Emirates	656	612	707	899	1,065
India	713	704	755	896	1,049
Russia	611	672	829	938	1,104
Egypt	670	743	832	1,144	1,106
Thailand	746	717	844	944	1,062
Saudi Arabia	568	621	730	844	1,039
Dominican Republic	789	725	942	985	1,103
Malaysia	771	757	771	858	961
Honduras	717	693	819	962	1,012
Total	781	726	863	982	1,052

Source: USITC, DataWeb.

TABLE 8 Percentage of U.S. apple production exported

Year	Production	Export	Ratio of exports to production
	1,000 (mt)		Percent
2004	4,722.9	491.1	10.4
2005	4,384.9	685.4	15.6
2006	4,455.9	649.7	14.6
2007	4,122.9	663.5	16.1
2008	4,431.3	712.5	16.1

Source: USDA, NASS, *Noncitrus Fruit and Nuts 2008 Summary*, July 2009; *Noncitrus Fruit and Nuts 2004 Summary*, July 2005; *Noncitrus Fruit and Nuts 2001 Summary*, July 2002; and USITC, Dataweb.

BOX 1 Mexico-U.S. Fresh Apple Trade Dispute

Since 2002, an ongoing antidumping case has affected U.S. apple exports to Mexico. In August 2002, the Mexican Secretary of Economy (SE) imposed an import duty of 46.58 percent on all U.S. Red and Golden Delicious apples. U.S. apple exports to Mexico then fell by 59 percent, from approximately 210,000 mt in 2001 to 86,000 mt in 2004. The impact of the duties varied, depending on the company and region of the United States the apples were grown in.

The majority of apples exported to Mexico are from the Pacific Northwest and from member companies of the Northwest Fruit Exporters (NFE). After petitions were filed to waive the duty on NFE apples, the SE suspended the 46.58 percent duty on NFE apples in May 2005 to allow the SE to open a new antidumping investigation determining what the appropriate duties, if any, should be placed on Red and Golden Delicious apples from the 84 NFE member companies. With the duties suspended, exports rose almost to the levels that existed before the duties were imposed. In November 2006, however, the new SE investigation was completed. As a result, the antidumping duties were reapplied to most companies within the NFE. The duties now vary, but they range from 0 to 47.05 percent, depending on the firm.

Exports from non-NFE companies were initially subject to the original 46.85 percent duty as well. The dumping case for non-NFE exporters proceeded along a different schedule, and duties were suspended at different times than for the NFE; however, the impact of the duties on non-NFE companies, even when they were in place, was limited.[1]

Despite the fact that the duty for many of the NFE firms is 47.05 percent, U.S. apple exports to Mexico have actually continued to increase since the duty was reimposed.[2] The impact of the antidumping duties on total U.S. exports was primarily short-term, as exports from the few companies that do not have the 47.05 percent tariff applied on their product have gained market share and compensated for the decrease from other exporters.[3]

[1] Following a petition from a small number of Mexican importers in November 2002, the duty on Red and Golden Delicious apples shipped by companies that are not part of the NFE was revoked. However, the SE and the Mexican Apple Producers Association appealed the verdict, and the duties remained in place. The appeals were finally rejected and on July 3, 2007, the SE announced that non-NFE companies were no longer subject to the compensatory duty. Flores and Nawn, *Mexico: Fresh Deciduous Fruit; New Duties on Imported Apples*, July 10, 2007, 2.

[2] Flores, *Mexico: Fresh Deciduous Fruit; Final Dumping Duties for Red and Golden Delicious Apples for NFE Members*, November 3, 2006, 2.

[3] Industry official, interview by Commission staff, Yakima, Washington, May 30, 2008.

Foreign Trade Measures

Tariff Measures

Tariffs in certain markets are a considerable obstacle to market access for U.S. apple exporters. Apple tariffs, whether specific, ad valorem, or compound, vary significantly by country. Some smaller apple-producing countries implement tariff-rate quotas with prohibitive over-quota tariffs. The selected markets reported on in table 9 show the variation that exists in applied tariff rates in important global markets. In some markets, the tariffs vary seasonally and by variety. For example, the EU applies a complex compound tariff that varies based on the time of year the apples are imported and the average unit value of the product. Apples valued below the established entry price are charged a specific tariff in addition to the ad valorem duty. The additional specific rate varies, depending on the difference between the established standard import value and the entry price.

TABLE 9 Tariff rates on U.S. fresh apples, selected countries

Country	Rate	
Canada	Free	
Hong Kong	Free	
Singapore	Free	
Mexico[a]	Between 0% and 46.58%	
Indonesia	5%	
Malaysia	5%	
United Arab Emirates	5%	
European Union[b]	For example, from 1 January to 14 February:	
	With an entry price per 100 kg net weight of:	
	Greater than € 56.8	4%
	Between € 55.7 and € 56.8	6.4% + € 1.1 per 100 kg
	Between € 54.5 and € 55.7	6.4% + € 2.1 per 100 kg
	Between € 53.4 and € 54.5	6.4% + € 3.4 per 100 kg
	Between € 52.3 and € 53.4	6.4% + € 4.5 per 100 kg
	Less than € 52.3	6.4% + € 23.8 per 100 kg
Thailand	10%	
Taiwan	20%	
Republic of Korea	45%	
India	50%	
Turkey	60.3%	

Source: The European Commission Taxation and Customs Union, *TARIC Database,* and U.S. Department of Commerce, U.S. Commercial Service, *Country-Specific Tariff and Tax Information.*

[a] Tariffs on U.S. apples vary depending on the variety and the exporting firm due to antidumping duties that are applied to exports of Red and Golden Delicious apples. All other apple varieties enter Mexico free of duty.

[b] The EU applies a complex system of specific and ad valorem tariff rates that depend on the entry price and the time of year the product is entering. The example displayed shows the applied rates based on various prices for fruit entering between January 1 and February 14. However, the price levels, the specific tariff, and ad valorem tariff rates fluctuate, depending on the time of year.

Nontariff Measures and Other Trade Issues

Many countries control imports of apples by means other than tariffs. In some cases, other import-related taxes and surcharges are applied in addition to standards, testing, certification, and labeling requirements. The nontariff measures that often have the greatest impact on trade are SPS restrictions. SPS concerns vary significantly based on the market, which complicates the process of establishing preventative protocols for domestic producers.[84]

Two specific types of SPS issues—pest management and maximum residue levels (MRLs)—are the primary SPS concerns for U.S. fruit exporters. In some cases, these issues effectively halt exports to specific markets. The two pests that are often the focus of SPS negotiations for trade in fresh apples are codling moth and fire blight.[85] MRLs are standards used to verify whether produce has been treated with authorized pesticides and in authorized quantities. Because they differ between export markets, MRL variation presents another complication for apple exporters. The following sections describe specific nontariff measure issues found in certain markets and the opportunities for U.S. exporters in those markets if the issues were to be resolved.

China

China denies access to all U.S. apple varieties except Red and Golden Delicious varieties from Idaho, Oregon, and Washington state. These specific apples received market access after requests from the U.S. government made during China's World Trade Organization (WTO) accession process. Other U.S. apples, however, are barred due to concerns about the transmission of fire blight.[86] The U.S. industry and APHIS have requested full market access for all varieties since the early 1990s. APHIS has provided supporting evidence about the risks of fire blight that draws on the findings of the *Japan—Measures Affecting the Importation of Apples* WTO case, as discussed below. Even after the submission of the technical evidence that upholds the U.S. industry's claims, U.S. apples have not been granted access to the Chinese market.[87]

Despite the fact that U.S. apples are generally sold at almost twice the price of Chinese apples, the Chinese high-end niche market is promising for U.S. apple exports. Because more than 60 percent of Chinese production is of the Fuji variety, many varieties typically exported from the United States are not readily available in China. Therefore, market opportunities for U.S. varieties may exist because of the lack of direct competition.[88] In fact, despite the fact that they do not have market access, it is reported that some U.S. varieties may be entering China after being transshipped through other markets in the region, such as Hong Kong.[89] Rising demand from a middle class that prefers high-quality fresh fruit, coupled with the lack of domestic production of certain

[84] Industry representative, telephone interview by Commission staff, October 28, 2008.

[85] Codling moth is a moth that lays its eggs on the fruit and leaves of apple trees. When the eggs hatch, caterpillars eat their way into the young apples. Fire blight is a microscopic disease caused by a bacterium that kills twigs, leaves, and blossoms. Its name comes from the burned appearance the trees have when infected. Pesticides are used at various stages of production to minimize the risk of these pests and diseases.

[86] Government official, e-mail message sent to Commission staff, July 17, 2008.

[87] Industry representative, telephone interview by Commission staff, June 4, 2009.

[88] Beckman, et al., *China, Peoples Republic of: Fresh Deciduous Fruit; Annual, 2007*, November 2007; Washington State University, "The Washington Apple Industry: Increasing Competitiveness by Examining Barriers to Trade," *Impact Center E-Newsletter*, September 2006.

[89] Industry representative, interview by Commission staff, Yakima, Washington, May 30, 2008.

varieties, suggests that if SPS barriers can be resolved and the varietal restrictions removed, there may be strong demand for U.S. apples. U.S. industry officials estimate that U.S. exports to China could increase to more than $50 million annually from an average of about $8 million per year between 2004 and 2008.[90]

Taiwan

In 2003, under its import protocol for fresh apples from the United States, Taiwan implemented a "three strikes" policy for detecting codling moths. If codling moth is detected three times in a single marketing year, Taiwanese plant health officials prohibit all apple imports from the United States until the U.S industry improves its screening methods and meets Taiwanese quarantine concerns.[91] Whenever such a ban is triggered, officials from the Taiwanese Bureau of Animal and Plant Health Inspection and Quarantine (BAPHIQ) work with officials from APHIS to reopen the market by improving codling moth screening methods.

On Dec. 21, 2004, Taiwan banned U.S. apple imports after the third detection of codling moth that marketing year. BAPHIQ officials then traveled to Washington State to inspect orchards and review the codling moth detection system. The market was reopened four months later when Taiwanese officials were assured that screening measures were effective in controlling codling moth larvae in apples. Taiwan has similar frameworks in place for other countries, and in 2007 imports from both Chile and New Zealand were suspended due to findings of codling moth.[92]

Taiwan's SPS policy has made U.S. producers more cautious, and screening of domestic production has improved. However, the U.S. apple industry considers Taiwan's three-strike import policy to be overly restrictive and not based on science.[93] Moreover, the risk of a market closure has also undermined exporter confidence in the Taiwanese market, and as a result some exporters have spent less time and effort on sales and marketing in Taiwan.[94] Although exporter confidence has recently begun to rebound, the new screening methods have also added significant costs and limited the profit margin for shipments destined for the Taiwanese market.[95]

Japan

Japan historically had stringent SPS protocols in place to mitigate the risks of both fire blight and codling moth. Japan's import protocol required U.S. growers to register in Japanese phytosanitary program, have an acreage buffer zone between other crops that could be fire blight hosts, and follow a regimen combining required pre-harvest activities, post-harvest cold storage requirements, and methyl bromide fumigation.[96]

In 2002, the United States initiated a WTO dispute settlement proceeding against Japan regarding the SPS measures Japan had imposed on U.S. apples due to concerns about fire blight. During the case, Japan argued that the bacteria could exist and survive inside mature, symptomless apples, which could therefore develop fire blight symptoms later

[90] Industry representative, interview by Commission staff, Yakima, Washington, May 29, 2008.
[91] USDA, FAS, *Taiwan: Fresh Deciduous Fruit; Annual, 2008*, November 16, 2008, 11.
[92] USDA, FAS (Author: Heather Velthuis), *World Apple Situation*, March 2005, 4.
[93] Industry representative, interview by Commission staff, Yakima, Washington, May 30, 2008.
[94] USDA, FAS, *2007/08 Global Apples*, March 2008, 5.
[95] Industry representative, telephone interview by Commission staff, July 14, 2008.
[96] Calvin, "Resolution of the U.S.-Japan Apple Dispute," October 2005, 10.

and cause irreversible damage arriving in Japan. Nevertheless, in December 2003 the WTO Dispute Settlement Body (DSB) found that Japan's phytosanitary restrictions on imported U.S. apples were inconsistent with Articles 2.2 and 5.1 of the *Agreement on the Application of Sanitary and Phytosanitary Measures.*[97]

The protocol that Japan implemented following the case, however, was still seen as burdensome. The United States brought another WTO compliance proceeding against Japan in 2004 to compel it to bring its phytosanitary restrictions for apples fully into compliance with the DSB's initial rulings and recommendations. The WTO ruled on behalf of the United States, and in 2005 Japan relaxed officially some of its fire blight SPS measures for U.S. apples.[98]

Japan still has expensive protocols in place, including 55 days of cold storage and methyl bromide fumigation, to minimize the risk of codling moth.[99] These measures have prevented the U.S. growers from exporting to Japan at all since 2001; in fact, Japan has not imported any apples from anywhere in the world since 2005.[100] The high cost of implementing the phytosanitary protocols needed to comply with the Japanese regulations make it difficult to compete with domestically produced apples and prevent the U.S. industry from marketing apples in Japan. However, if the phytosanitary protocols are further relaxed and some of the costly preventative measures that are required are eliminated, U.S. industry officials estimate that U.S. apples could be competitive in the market.[101]

The WTO rulings have been seen as especially important because of their potential impact on SPS negotiations in other markets that have similar fire blight concerns. For example, Australia considered and included the findings when writing its new fire blight requirements for importation of apples from New Zealand.[102] In addition, in the June 2005 meeting of the WTO's Committee on Sanitary and Phytosanitary Measures, the United States presented the case findings in the review of China's transition into the WTO and encouraged all members to review carefully their restrictions on U.S. fruit products in light of the Appellate Body ruling in the Japan apple case.[103]

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[97] Specifically, the DSB found that some of Japan's phytosanitary restrictions were maintained without sufficient scientific evidence, in violation of Article 2.2, and that Japan's pest risk assessment did not meet the requirements of a risk assessment in violation of Article 5.1. Central to these findings were two sets of conclusions about the scientific evidence regarding fire blight and apples. First, the scientific evidence does not establish that mature, symptomless apples will be infected by fire blight, harbor endophytic populations of fire blight bacteria, or harbor epiphytic populations of bacteria capable of transmitting fire blight. Second, the scientific evidence does not establish that apple fruit would serve as a means, or pathway, for the introduction of fire blight to a fire blight-free area.

[98] The panel found certain requirements to still be in violation, including, among others: (1) that the export orchard be free of plants infected with fire blight; (2) that the orchard and the surrounding buffer zone be inspected once per year at the early fruit let stage; and (3) that detection of a blighted tree in the orchard or buffer zone by inspection will disqualify the orchard as a whole. USTR, "U.S. Dissatisfied With Japan over Apple Dispute," July 19, 2004.

[99] Calvin and Kissoff, *Resolution of the U.S.-Japan Apple Dispute,* October 2005, 11.

[100] GTIS, Global Trade Atlas Database.

[101] Industry representative, telephone interview with Commission staff, December 1, 2009; USDA, FAS, *Japan: Fresh Deciduous Fruit; Annual, 2005,* September 15, 2005.

[102] USDA, ARS, "Apples—Fire Blight Free and Headed to Japan," March 2007, 3.

[103] WTO, Committee on Sanitary and Phytosanitary Measures, "Report to the Council for Trade in Goods on China's Transitional Review," November 1, 2005, 3.

South Korea

U.S. apples are considered to be of higher quality than Korean domestic apples, and they should also be very price-competitive, given the high apple prices in the Korean market. However, U.S. apple exports to Korea have been negligible in recent years, averaging only 43 mt annually between 2004 and 2008. SPS issues—specifically, certain alleged pests and diseases, particularly codling moth and fire blight—have severely restricted U.S. apple exports to Korea. The U.S.-Korea Free Trade Agreement (FTA), which was signed in June 2007 but has yet to be ratified by the United States, established a framework that may allow resolution of these issues. If the FTA is implemented, it will provide an opportunity for the two countries to develop a phytosanitary agreement and establish SPS protocols. If these SPS issues are resolved and pest risk assessments are undertaken for U.S. apple exporters, apple exports to Korea reportedly may grow substantially.[104]

India

India has been a tremendous growth market for U.S. apple exporters, with exports expanding by approximately $10 million between 2004 and 2008. However, nontariff measures have restricted market access. [105] For example, India's wax regulations and associated labeling requirements were, until recently, a primary concern for apple exporters.[106] Many waxes commonly used in the United States were not approved for use on apples imported into India. On December 29, 2006, however, India authorized the use of carnauba and beeswax as coatings for fresh fruit, effective March 30, 2007. The new regulation still did not authorize one of the most commonly used waxes by U.S. exporters, shellac. After further negotiations between the U.S. industry and the government of India, shellac was approved for use in 2008.

India's 2006 regulations also implemented strict labeling requirements that would have required every package of fresh fruit, as well as "loose" or individual fruits, to be labeled with the name of the wax and a "best before" date.[107] Again, after negotiations with the United States and other apple exporters, India delayed implementation in order to review the regulation. An amended regulation was implemented by India's Ministry of Health and Welfare on March 1, 2008, specifying that only cartons and not each individual fruit would require a label with the name of the wax used. The best-before date was still required but, as negotiations have continued, the regulation has not been enforced.[108] The labeling requirements are still considered by the U.S. industry to be onerous, but manageable.[109] Shipments during 2008 were down significantly compared to 2007, but reportedly because of pricing and other product demand issues rather than waxing or labeling requirements. [110]

[104] Industry representative, telephone interview with Commission staff, July 1, 2008.
[105] USITC, *India: Effects of Tariffs and Nontariff Measures*, 2009.
[106] Waxes are applied on the packing line by most apple packers to replace the natural wax that was removed during cleaning. The wax protects the apple's high water content and allows the fruit to stay crisp and juicy.
[107] USDA, FAS, *2007/08 Global Apples*, March 2008, 5.
[108] USDA official, interview by Commission staff, March 5th, 2009.
[109] Industry representative, telephone interview by Commission staff, July 14, 2008.
[110] Ibid., July 10, 2008.

FOREIGN INDUSTRY PROFILES

Overview of Global Market

The largest global markets for fresh apples are China, the European Union, and the United States. There has, however, been some shift away from the large traditional markets of the United States and Europe to developing markets, such as Russia and Southeast Asia. The major global markets tend to have one or two dominant, often counter-seasonal, suppliers in addition to domestic production. For example, the U.S. market is supplied primarily by Chile, while China and Poland are the primary suppliers to the Russian market. The major global markets are also the world's largest apple producers.

Between 2003 and 2007,[111] global apple production increased from approximately 58 million metric tons to over 64 million metric tons, or by approximately 10 percent (table 10).[112] The Chinese apple industry increasingly dominated global production, with its share of global output increasing from 30 percent to 43 percent during this period. The EU and the United States were the world's second- and third-largest apple producers, respectively. Other large producers include Iran, Turkey, Russia, India, and Chile.

The world's largest apple producers are also its primary apple consumers and traders. Since the early 2000s, global per capita consumption has stabilized, but at a level slightly below that of the late 1990s (table 11). In 2007, the markets with the highest consumption per capita were Turkey, the EU, New Zealand, Canada, and China. Between 2001 and 2007, Russia was one of the few markets to experience growth in per capita consumption. Significant variations in consumption occur in countries and between regions according to fruit availability (which depends on production levels) and changes in per capita income.

Without considering internal EU trade, apple exports worldwide increased from 4.2 million mt in 2004 to 5.0 million mt in 2008, or by 18 percent (table 12).[113] The four largest exporters (China, the EU, Chile, and the United States) accounted for 70 percent of global trade in 2008. The export growth experienced by these producers represented 100 percent of the growth in global exports between 2004 and 2008. China, the largest global exporter, accounted for 23 percent of global exports in 2007, up from 18 percent in 2004 (figure 5). China was followed by the EU, Chile, and the United States, each of which experienced significant export growth during the period.

[111] Although the trade statistics discussed in this section are from 2008, the publication of international production statistics generally occurs more than a year later than trade data: 2007 production data were the latest available at the time of publication. As a result, only production trends between 2003 and 2007 are discussed in this section.

[112] FAO, FAOSTAT Production Database. (accessed June 2009).

[113] These figures consider the 27 countries of the EU as one entity. There is a tremendous amount of internal EU trade, however, and when the EU countries are considered individually, the export picture looks much different. Germany and the United Kingdom are two of the world's largest importers. The primary suppliers to those markets are France and Italy, respectively, and when internal EU trade flows are considered, France and Italy are two of the world's largest exporters. GTIS, Global Trade Atlas Database.

TABLE 10 Apple production by country (1,000 mt)

	2003	2004	2005	2006	2007
China	21,108	23,685	24,020	26,066	27,500
EU total	11,917	12,956	11,402	11,407	9,846
France	2,137	2,204	1,857	1,705	1,800
Germany	818	980	891	948	912
Italy	1,954	2,136	2,192	2,113	2,073
Poland	2,428	2,522	2,075	2,305	1,039
Spain	881	691	774	661	672
United States[a]	3,948	4,700	4,409	4,569	4,238
Iran, Islamic Republic of	2,400	2,179	2,662	2,662	2,660
Turkey	2,600	2,100	2,570	2,002	2,266
Russia	1,690	2,030	1,773	1,617	2,211
India	1,470	1,522	1,739	1,739	2,001
Chile	1,250	1,300	1,350	1,350	1,390
Argentina	1,307	1,262	1,272	1,272	1,300
Brazil	842	980	851	861	1,094
Japan	842	755	819	832	850
South Africa	702	765	680	640	650
Mexico	495	573	584	602	605
Canada	379	370	409	340	405
New Zealand	501	546	524	524	380
Australia	326	255	327	276	221
All other	6,620	6,635	6,630	7,046	6,631
World	58,396	62,612	62,027	63,805	64,249

Source: FAO, FAOSTAT Production Database (accessed November 11, 2009).

[a]U.S. production totals in this table may differ slightly from the production totals discussed in previous sections to due to the use of different sources.

TABLE 11 Fresh apples: per capita consumption by selected countries (kg)

Country	1997−99	2001−03	2004−06	2007
Austria	24.03	24.04	25.04	25.23
Belgium	20.09	17.58	17.76	18.27
Bulgaria	7.14	3.61	4.16	4.31
Denmark	20.28	19.99	19.81	19.60
France	16.74	16.50	15.23	16.12
Germany	19.98	18.50	18.93	19.35
Hungary	17.77	14.11	17.71	15.42
Italy	22.67	19.89	17.67	16.68
Netherlands	20.16	20.12	20.66	20.38
Poland	14.74	14.42	13.27	8.06
Romania	16.00	14.24	16.86	13.32
Slovakia	13.62	7.64	12.21	10.52
United Kingdom	10.15	9.35	10.06	10.14
Selected EU countries (*average*)	17.18	15.38	16.11	15.18
Canada	12.18	11.41	12.91	12.56
Mexico	5.48	5.41	6.46	6.27
United States[a]	8.59	7.22	7.60	7.53
North America (*average*)	8.75	8.01	8.99	8.79
China	14.43	12.86	13.10	11.28
Japan	6.00	5.82	5.10	5.48
Taiwan	6.88	5.53	6.08	6.06
Turkey	36.71	32.43	28.70	31.68
Asia (*average*)	14.56	13.07	13.07	11.69
Argentina	9.05	8.51	5.27	4.40
Australia	8.41	6.54	7.14	7.38
Brazil	4.71	4.72	4.28	4.64
Chile	6.46	7.30	7.19	9.58
New Zealand	21.24	16.58	14.33	14.57
South Africa	4.49	3.83	3.68	4.11
Southern Hemisphere (*average*)	5.67	5.48	4.78	5.10
Russia	4.54	6.05	6.79	8.11
All 27 countries listed above	13.80	12.38	12.52	12.26

Source: Belrose, Inc., *World Apple Review 2008,* 2008.

[a]U.S. consumption data in this table varies from the apparent consumption calculated by ITC staff in table 4 due to the use of different sources.

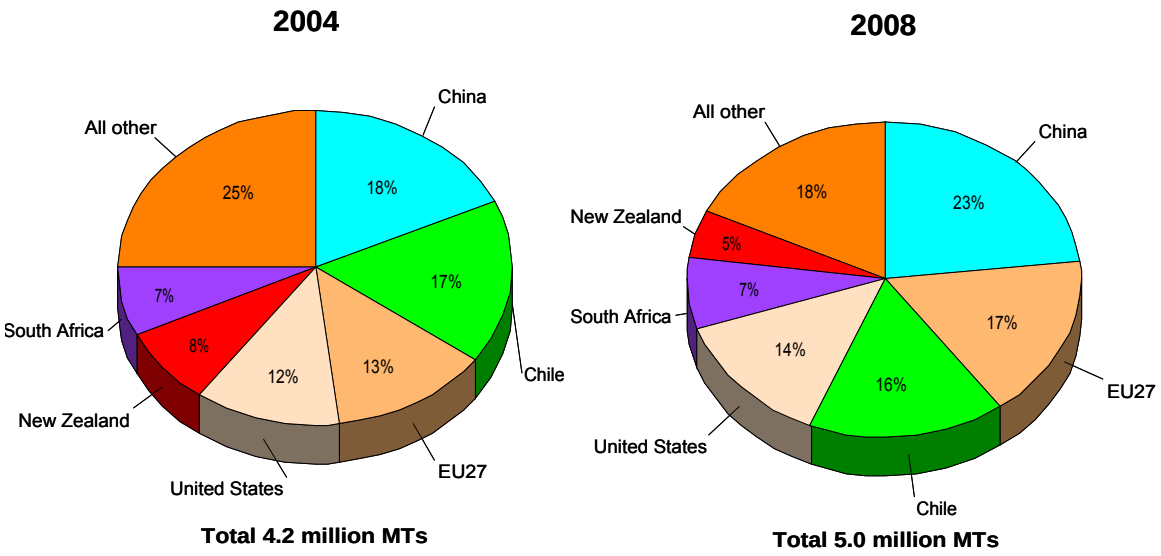
TABLE 12 Fresh apples**:** global exports by principal sources, 2004–08

Source	2004	2005	2006	2007	2008
			Quantity (1,000 mt)		
China	774	824	804	1,019	1,153
EU27 (external trade)	557	688	867	908	861
Chile	739	640	725	775	776
United States	494	690	650	664	712
South Africa	306	265	268	335	359
New Zealand	358	319	265	292	261
Argentina	206	274	237	283	236
Azerbaijan	37	63	58	72	122
Brazil	153	99	57	112	112
Moldova	135	136	87	78	78
All other	460	610	685	585	328
Total	4,223	4,610	4,707	5,125	5,000
			Value (million $)		
China	274	306	373	513	698
EU27 (external trade)	271	336	476	602	713
Chile	338	304	382	489	564
United States	386	501	561	652	749
South Africa	179	153	159	211	249
New Zealand	301	280	203	265	260
Argentina	91	125	117	158	175
Azerbaijan	11	20	19	25	49
Brazil	73	46	32	69	81
Moldova	25	20	14	22	25
All other	202	288	349	323	247
Total	2,152	2,379	2,683	3,330	3,811
			Unit value ($/mt)		
China	355	372	463	503	606
EU27	487	489	549	663	828
Italy[a]	801	669	785	947	1,205
France[a]	918	774	835	994	1,128
Poland[a]	261	282	311	394	510
Chile	457	474	526	631	727
United States	781	726	863	982	1,052
South Africa	585	579	592	631	694
New Zealand	841	876	765	908	995
Argentina	441	457	492	560	743
Azerbaijan	306	311	332	353	404
Brazil	475	462	560	613	723
Moldova	185	147	161	282	321

Source: GTIS, World Trade Atlas Database.

[a]The average unit values for individual EU27 exporting nations include internal EU trade**.**

FIGURE 5 Global fresh apple exports by volume



Source: GTIS , World Trade Atlas Database.

Russia and the EU, despite having high domestic production, were the world's two largest importers of fresh apples in 2008, accounting for 21 and 16 percent of global imports, respectively (table 13). Other demand for imports is spread across a wide variety of markets. Some markets, such as Ukraine, have experienced tremendous growth in imports as both demand for fresh fruit and the availability of cold storage for imported apples has increased.

Major Supplying and Consuming Markets

Many of the world's largest fresh apple producers are also the world's largest traders and consumers. As a result, the country profiles in this section cover China and the EU (specifically, Italy, France, and Poland), both of which are large producers, exporters, and consumers of fresh apples. Also covered are Chile, a large global exporter, as well as Turkey and Russia, two large producing and consuming markets.

China

China's share of world exports increased significantly by both volume (from 18 to 23 percent) and value (from 13 to 18 percent) between 2004 and 2008. While China's largest growth market was Russia during this period, it also expanded into many Southeast Asian markets that have traditionally consumed large quantities of U.S. apples. For example, between 2004 and 2008, Chinese exports to Indonesia more than doubled from approximately 75,000 mt to 114,000 mt (table 14), while U.S. exports to Indonesia decreased from 34,000 mt to 29,000 mt during the same period.

TABLE 13 Fresh apples: Global imports by principal markets, 2004–08

Partner country	2004	2005	2006	2007	2008
	Quantity (1,000 mt)				
Russia	705	721	815	931	1,063
EU27 (external trade)	923	964	834	970	814
Mexico	154	195	204	220	188
Ukraine	1	2	121	141	177
Canada	154	159	157	180	166
United States	207	123	157	207	165
United Arab Emirates	0	94	0	148	158
Indonesia	114	127	122	145	140
Taiwan	117	137	118	122	132
Hong Kong	91	88	82	87	112
All other	1,252	1,525	1,648	1,589	1,883
Total	3,718	4,135	4,258	4,740	4,998
	Value (million $)				
Russia	237	294	352	453	521
EU27 (external trade)	909	931	889	1,045	1,102
Mexico	137	163	206	248	241
Ukraine	0	3	26	28	55
Canada	123	115	148	177	189
United States	180	104	135	170	141
United Arab Emirates	0	59	0	112	136
Indonesia	63	66	90	112	112
Taiwan	91	102	102	107	142
Hong Kong	63	57	59	68	87
All other	624	732	876	1,023	1,056
Total	2,427	2,626	2,883	3,543	3,782
	Unit value ($/mt)				
Russia	336	408	432	487	490
EU27 (external trade)	985	966	1,066	1,077	1,354
Mexico	890	836	1,010	1,127	1,282
Ukraine	149	173	215	199	311
Canada	799	723	943	983	1,139
United States	870	846	860	821	855
United Arab Emirates	N/A	628	N/A	757	861
Indonesia	553	520	738	772	800
Taiwan	778	745	864	877	1,076
Hong Kong	692	648	720	782	777

Source: GTIS, World Trade Atlas Database

TABLE 14 Chinese fresh apple exports, 2004–08

Partner country	2004	2005	2006	2007	2008
			Quantity (1,000 mt)		
Russia	113	125	141	206	236
Vietnam	95	98	65	52	128
Indonesia	75	88	82	111	114
Kazakhstan	32	61	41	67	93
Thailand	53	59	58	74	87
Philippines	62	61	75	79	81
Malaysia	49	48	43	50	47
Saudi Arabia	14	13	18	31	43
Bangladesh	15	28	27	44	42
United Arab Emirates	11	11	18	34	42
All other	255	232	236	271	240
Total	774	824	804	1,019	1,153
			Value (million $)		
Russia	31	40	52	90	125
Vietnam	24	25	20	15	50
Indonesia	35	39	50	67	81
Kazakhstan	7	16	13	25	47
Thailand	22	27	33	44	62
Philippines	23	26	39	46	57
Malaysia	20	22	25	29	33
Saudi Arabia	8	7	11	19	31
Bangladesh	4	8	11	23	25
United Arab Emirates	6	6	11	21	31
All other	94	90	108	134	156
Total	274	306	373	513	698
			Unit value ($/mt)		
Russia	274	320	369	437	530
Vietnam	253	255	308	288	391
Indonesia	467	443	610	604	711
Kazakhstan	219	262	317	373	505
Thailand	415	458	569	595	713
Philippines	371	426	520	582	704
Malaysia	408	458	581	580	702
Saudi Arabia	571	538	611	613	721
Bangladesh	267	286	407	523	595
United Arab Emirates	545	545	611	618	738
All other	369	388	458	494	650
World	355	372	463	503	606

Source: GTIS, World Trade Atlas Database.

Although China is the largest exporter by volume, apples exported from the United States, France, and Italy receive prices almost twice high as Chinese apples (table 15). This price disparity exists for two reasons. First, the cost of production in China is significantly lower, despite the fact that yields are generally half those of U.S. orchards.[114] Second, despite recent improvements, Chinese apples are of generally of lower quality than those from Western Europe and the United States. These large price disparities help to explain global trade flows as well as the specific markets in which exporters tend to sell their product.

[114] Workman, "Top Ten Apple Countries: Russia Pays the Lowest Average Unit Price for Apple Imports," October 7, 2007.

TABLE 15 Fresh apples: Export unit values for major global producers, 2004–08

Reporting country	2004	2005	2006	2007	2008
	US $/mt				
Italy	801	669	785	947	1,205
France	918	774	835	994	1,128
Canada	720	660	790	880	790
United States	781	726	863	982	1,052
China	355	372	463	503	606
Chile	457	474	526	631	727
New Zealand	841	876	765	908	995
South Africa	585	579	592	631	694
Poland	261	282	311	394	510

Source: GTIS, Global Trade Atlas Database; USITC, DataWeb.

China is the world's largest producer (28 million mt in 2007) and one of the largest consumers of apples.[115] Because of the sheer size of its production, China drives global production trends. Chinese production has expanded significantly since the late 1990s, growing by more than 60 percent between 1997 and 2007. By 2007, Chinese production accounted for 43 percent of global production, up from 30 percent in 2003. Chinese production has grown in recent years by volumes greater than the total annual production of some of the world's largest producers. For example, the absolute increase in Chinese production between 2005 and 2006 was larger than the total production of 17 of the 20 largest global producers.[116]

Chinese growers have made significant strides in improving orchard management methods in recent years, but overall production efficiency and quality are still well below international standards.[117] Most orchards in China still consist of low-density plantings, do not use dwarfing rootstocks, and are not irrigated.[118] The primary source of water is rainfall and groundwater. The average apple farm size is between 1.5 and 2.5 acres, although the industry has begun to consolidate apple orchards and the average farm size is expected to increase.

Despite the tremendous increases in production, total Chinese apple acreage actually decreased between 2003 and 2007. However, after 2005 acreage stabilized due to higher prices for both fresh and juicing apples.[119] China made progress in concentrating apple production in the more favorable growing areas of Shandong and Shaanxi provinces. And while total acreage declined slightly, yields grew significantly as growers began implementing improved orchard management methods and planted more high-density orchards. In 2006, yields surpassed the international average (table 16) but are still significantly below average yields of the major international exporters. In 2007, for example, yields in China were still only 50 percent of the average yield in the United States.[120]

[115] As noted earlier, 2007 was the latest year for which comprehensive international production data were available at the time of publication.

[116] The increase in Chinese production between 2005 and 2006 was greater than all other countries' total production besides the United States, Iran, Italy, and Poland.

[117] Industry representative, telephone interview by Commission staff, November 14, 2008.

[118] Wahl, "China's Apples Go West," June 2007, 2.

[119] Beckman, et al., *China, Peoples Republic of: Fresh Deciduous; Annual, 2007,* November 15, 2007, 5.

[120] FAO, FAOSTAT Database (accessed May 14, 2009).

TABLE 16 Fresh apples: production yields, selected countries

Country	2003	2007
	Metric tons/hectare	
Canada	17.6	22.9
Chile	35.3	36.6
China	11.1	13.8
France	35.7	39.1
Germany	26.3	28.8
Iran	16.0	13.2
Italy	34.3	33.9
Poland	15.2	5.9
Russian Federation	4.3	6.0
United States	25.0	27.2
World	12.2	13.1

Source: FAO, FAOSTAT Production Database (accessed May 14, 2009)
Note: 2007 was the most recent year for which data were available for certain international yields at the time of publication.

The Chinese government does not provide direct-payment subsidies to apple growers, but it does provide an export tax rebate and assistance with some input costs, such as the cost of trees, equipment, and international quality certifications.[121] The government has also implemented an apple bagging subsidy program in production areas with export potential[122] and eliminated agricultural land taxes in 2006.[123] The Chinese government provides substantial technical support to growers in order to increase quality, efficiency, and the value of Chinese apples in international markets through improved orchard management. This has resulted in both higher yields and better quality. Nonetheless, Chinese exporters still do not produce apples that can compete with those from the United States, Italy, and France in terms of quality. The comparative advantage of China's apples is their low cost of production; however, input costs and prices are reportedly rising.[124]

Over 60 percent of China's apple production is of the Fuji variety. This heavy reliance on one variety makes the industry vulnerable to shifts in consumer preferences, both in the domestic market and in export markets.[125] It also provides export opportunities for the United States and other exporters who can provide other high-quality varieties. Although U.S. apples are generally sold at twice the price of Chinese apples, they have a growing niche market among wealthy consumers.[126]

Consumption of fruit in China represents an increasing share of total food expenditures by urban households. Rising income and enhanced consciousness about health and

[121] Wahl, "Is China the Low-Cost Producer?" July 2006, 39; Zhang,"Linking Small Scale Farmers in China with the International Markets," 2009, 4–5.

[122] The apple bagging subsidy program was initiated in 2005. Bags are placed over the apples on the trees to improve quality by preventing weather damage. The program provides cash subsidies for the purchase of apple bags and in 2006 it covered a total of 8,067 hectares of apple orchards in key producing provinces. In 2006, a total of $3,125,000 was allocated to these provinces. Bugang and Sanchez, *China: Peoples Republic of: Fresh Deciduous; Annual, 2006*, September 22, 2006, 6.

[123] Beckman, et al., *China: Peoples Republic of: Fresh Deciduous; Annual 2007*, November 15, 2007, 9.

[124] Lohmar, et al., *China's Ongoing Agricultural Modernization*, April 2009, 11; Beckman, et al., *China: Peoples Republic of: Fresh Deciduous; Annual 2007*, November 15, 2007, 9.

[125] Belrose Inc., *World Apple Review 2008 Edition*, 2008, 36.

[126] Beckman, et al., *China: Peoples Republic of: Fresh Deciduous; Annual 2007*, November 15, 2007, 10.

nutrition in cities has increased demand for fruits;[127] apples, in particular, are a traditionally popular fruit. However, there is a large disparity between consumption levels in the higher income cities and the rural regions of China. And despite the trend towards integrating more fresh fruit into the Chinese diet and the growth in production, per capita consumption of fresh apples has actually stagnated or even declined as a result of lower availability due to significant growth in the apple processing sector and rising exports.[128]

Chile

As a counter-seasonal supplier to many developed Northern Hemisphere markets, Chile has become one of the world's largest fresh apple-exporting countries. In 2008, Chile was the third-largest exporter by volume (776,000 mt) and fourth-largest by value ($564 million).[129] Chilean exports to the United States and European markets have expanded as counter-seasonal demand for apples increased. Chilean exports to other South American markets, such as Venezuela, Ecuador, and Colombia, also expanded during 2004–08 (table 17). As a result of historically low domestic per capita consumption levels, most producers in Chile are highly export oriented, filling the seasonal supply voids in the United States and the EU; in 2007, more than half of Chile's production was sold abroad (table 18).

Between 2003 and 2007, Chilean production rose by 10 percent to approximately 1.37 million mt, largely because the area harvested increased from 30,400 hectares (ha) to 32,049 ha during the same time period.[130] Yields have been relatively static since 2003, but because of ideal climate conditions, world-class industry-wide infrastructure, and advanced orchard management, Chilean production is among the most efficient in the world.[131] Yields, on average, are generally more than 20 percent higher than those in the United States (table 16).[132]

Red apple varieties constitute over 75 percent of production and account for about two-thirds of exports. Similar to the production trends seen in the United States, producers have been diversifying their orchards and planting newer varieties, such Fuji and Gala, and decreasing their production of Red Delicious to meet demand changes.[133] For example, production of Granny Smith apples has been increasing—the majority of which is destined for export markets, primarily the United States.

[127] Ibid.; *Annual 2008*, November 15, 2008, 6–9.
[128] Belrose Inc., *World Apple Review 2008 Edition*, 2008, 84.
[129] These rankings do not consider EU countries individually. GTIS, World Trade Atlas Database
[130] Hennicke, *Chile: Fresh Deciduous Fruit; Annual 2005*, December 28, 2005, 5; Hennicke, *Chile:Fresh Deciduous Fruit; Semi-Annual 2008*, May 14, 2008, 5.
[131] Steward, "Chile Is the Most Competitive," January 1, 2008, 12.
[132] FAO, FAOSTAT Database (accessed May 14, 2009).
[133] Hennicke, *Chile: Fresh Deciduous Fruit; Annual, 2008*, November 20, 2008, 3.

TABLE 17 Chilean fresh apple exports, 2004–08

Partner country	2004	2005	2006	2007	2008
	Quantity (*1,000 mt*)				
EU27	224	224	219	208	211
Netherlands	88	81	76	76	84
United Kingdom	26	30	36	41	38
Spain	39	39	33	29	28
United States	118	57	84	125	94
Colombia	45	42	48	60	63
Saudi Arabia	52	48	56	47	51
Venezuela	11	25	35	39	45
Ecuador	40	43	41	42	43
Russia	38	34	23	26	38
Taiwan	21	34	42	33	35
Peru	26	26	28	26	28
United Arab Emirates	20	14	20	24	26
All other	144	93	129	145	142
World	739	640	725	775	776
	Value (million $)				
EU27	97	97	101	115	136
Netherlands	34	30	30	36	47
United Kingdom	13	15	20	27	29
Spain	18	19	18	19	22
United States	48	23	48	70	57
Colombia	20	17	23	37	42
Saudi Arabia	31	28	29	31	35
Venezuela	6	16	24	45	76
Ecuador	17	18	19	23	28
Russia	16	15	11	15	29
Taiwan	20	33	42	37	39
Peru	7	9	10	11	15
United Arab Emirates	11	7	11	15	15
All other	65	41	64	90	92
World	338	304	382	489	564
	Unit value ($/mt)				
EU27	433	433	461	553	645
Netherlands	386	370	395	474	560
United Kingdom	333	385	606	931	1,036
Spain	692	633	500	463	579
United States	407	404	571	560	606
Colombia	444	405	479	617	667
Saudi Arabia	596	583	518	660	686
Venezuela	545	640	686	1,154	1,689
Ecuador	425	419	463	548	651
Russia	421	441	478	577	763
Taiwan	952	971	1,000	1,121	1,114
Peru	269	346	357	423	536
United Arab Emirates	550	500	550	625	577
All other	451	441	496	621	648
World	457	475	527	631	727

Source: GTIS, World Trade Atlas Database.

TABLE 18 Fresh apples: percentage of production exported for major producing countries, 2007

Country	2007 production[a]	2007 exports[b]	Ratio of exports to production
	1,000 (mt)		Percent
EU27 (external trade)	9,845,708	908,438	9.2
France[c]	1,800,000	685,339	38.1
Germany[c]	911,900	146,560	16.1
Italy[c]	2,072,500	784,887	37.9
Poland[c]	1,039,100	434,506	41.8
Spain[c]	672,400	99,337	14.8
Argentina	1,300	283	21.8
Australia	221	5	2.1
Brazil	1,094	112	10.2
Canada	405	39	9.6
Chile	1,390	775	55.7
China	27,500	1,019	3.7
India	2,001	31	1.5
Iran, Republic of Islamic[d]	2,662	227	8.5
Japan	850	26	3.0
Mexico	605	0	0.0
New Zealand	380	292	77.0
Russian Federation	2,211	4	0.2
South Africa	650	335	51.5
Turkey	2,266	4	0.2
United States of America[e]	4,238	663	15.7
World	64,249	7,418	11.5

Source: GTIS, Trade Atlas; FAO, FAOSTAT production database (accessed November 11, 2009).

[a]2007 was the latest year for which international production data were available at the time of publication.
[b]2008 trade statistics are available throughout this report; however, they are not used here, since 2007 production data are unavailable for comparison.
[c]Export totals for individual EU countries includes intra-EU exports.
[d]Data for Iran are 2006 data. Data for 2007 had not been reported at the time of publication.
[e]The U.S. data differ from the data referred to in earlier sections due to the use of different sources.

There are 700 fresh fruit exporters in Chile; most are diversified and produce multiple fruit products. Between 2004 and 2008, apple exports increased 5 percent by volume while acreage increased only slightly. Despite the recent success, however, grower returns have declined as production costs, specifically labor costs, have risen dramatically.[134] As a result of lower profit margins, acreage is expected to decline. At the same time, returns in export markets dropped substantially due to the strong appreciation of the Chilean peso. In 2007, for example, the Chilean peso appreciated dramatically compared to the U.S. dollar—a particular problem, given the United States' role as Chile's primary export market.[135] Even though exports to the U.S. increased in 2007, profitability for Chilean apples growers was reduced. In response, the fruit industry argued for government action to stabilize the exchange rate.[136] However, the Chilean peso remained highly valued compared to the dollar until late 2008, when the dollar began to

[134] Brown, "Removing International Constraints in order to Increase Exports." n.d.
[135] Demand for Chile's primary export, copper, drove the appreciation.
[136] Belrose Inc., *World Apple Review 2008 Edition*, 2008, 45.

appreciate against the peso as concerns about the global economy boosted demand for low-risk averse assets such as U.S. currency and treasuries.

European Union

The EU is the one of the world's largest apple exporters, importers, producers, and consumers. There are significant differences in the price and quality of production and consumption, as well as industry structure, among the various countries within the EU.

Exports from the EU increased 55 percent by volume between 2004 and 2008 (table 19). The two largest growth markets for EU exports were Ukraine and Russia. Exports to Ukraine were minimal in 2004 but grew to almost 150,000 mt in 2008, while exports to Russia grew from 279,000 mt to 403,000 mt, or 44 percent, during the same time period. The growth in exports to Ukraine and Russia primarily involved cheaper, lower-quality apples from Poland (which became an EU member on May 1, 2004).

The majority of EU country exports are destined for other EU markets. For both France and Italy, over 80 percent of exports are for intra-EU trade. The quality demanded in certain EU markets generally determines which producers supply the market. For example, Italian and French apples are of much higher quality than Polish apples, so they tend to supply high-income EU member countries with more purchasing power, such as Germany and the United Kingdom. Germany, as a major producer and importer, plays a pivotal role in EU trade. German production fluctuates significantly because the noncommercial (backyard) sector is larger than its commercial sector. Since yields vary dramatically from year to year in the noncommercial sector, production quantities fluctuate significantly and import volumes change correspondingly in order to meet the large domestic consumption needs.[137]

The EU is the world's second largest apple importer as a result of heavy per capita consumption in high-income countries. Average per capita consumption in the EU is one of the highest in the world; however, it varies significantly by country, ranging in 2007 from approximately 4 kg per year in Bulgaria to about 25 kg in Austria (table 11). Differences in European per capita consumption vary significantly by region as well. In 2007, average per capita consumption in Western European countries was about 35 percent higher than that in Eastern Europe. Despite high EU production levels, total EU imports grew between 2004 and 2007, before falling in 2008 as a result declining discretionary income and demand from the onset of the global economic recession (table 13). The largest import markets within the EU are Germany and the United Kingdom, which both have high levels of purchasing power and disposable income. The largest suppliers of EU imports are the counter-seasonal producers New Zealand, Chile, and South Africa.

[137] Ibid., 40.

TABLE 19 EU fresh apple exports, 2004–08

Partner country	2004	2005	2006	2007	2008
	Quantity (1,000 mt)				
Russia	279	316	392	409	403
Ukraine	2	12	102	162	148
Algeria	58	64	74	70	74
Norway	25	32	31	35	33
Belarus	33	38	66	47	28
Saudi Arabia	18	21	23	24	23
Libya	6	9	21	19	21
Albania	27	30	24	19	14
Croatia	18	20	19	14	13
United Arab Emirates	6	11	10	14	12
All other	85	135	105	95	92
World	557	688	867	908	861
	Value (million $)				
Russia	106	138	232	284	347
Ukraine	1	3	24	42	53
Algeria	31	33	34	47	51
Norway	24	27	29	42	46
Belarus	17	18	24	28	29
Saudi Arabia	6	6	17	19	25
Libya	7	11	19	19	24
Albania	5	9	11	16	16
Croatia	8	9	9	10	15
United Arab Emirates	10	11	9	8	9
All other	56	71	68	87	98
World	271	336	476	602	713
	Unit value ($/mt)				
Russia	380	437	592	694	861
Ukraine	500	250	235	259	358
Algeria	534	516	459	671	689
Norway	960	844	935	1,200	1,394
Belarus	212	289	288	404	857
Saudi Arabia	944	857	1,043	1,167	1,261
Libya	1,000	667	810	1,000	1,190
Albania	370	367	375	421	643
Croatia	444	450	474	714	1,154
United Arab Emirates	833	818	1,100	1,143	1,333
All other	659	526	648	916	1,065
World	487	488	549	663	828

Source: GTIS, World Trade Atlas Database.

Production in the EU fluctuated between 2003 and 2007 as a result of acreage shifts and dramatic yield variations in certain countries due to weather conditions. Between 2003 and 2006, total EU apple acreage declined by approximately 7 percent before increasing again slightly in 2007. The decline was partially driven by an EU program that subsidized apple acreage removal in order to minimize over-supply.[138] The most significant acreage decline occurred in France. Production in the EU was relatively stable between 2003 and 2006, as increasingly yields compensated for declining acreage. Despite stable production in Western Europe, production actually decreased by 14 percent between 2006 and 2007, as harsh spring weather in both Poland and Hungary significantly affected yields. On average, EU yields are generally 30 percent lower than those in the United States, but they increased slightly between 2003 and 2007. There is a dramatic difference between yields in the traditional Western European producers, such as Italy and France, and Eastern European producers, such as Hungary and Poland (table 16). Italian and French production generally has yields comparable to those found in the state of Washington and above the U.S. national average.[139]

There is very little two-way trade of apples between the United States and Europe. The United States does export significant quantities to the United Kingdom, but generally only competes with Italian and French exporters in a few markets that demand high-quality apples outside of Europe.

France

Most apple production in France occurs in the southern and southwestern regions of the country, which have some of the highest yields in the world. However, partly owing to the subsidized acreage removal program already mentioned, apple acreage in France declined by almost 25 percent between 2003 and 2007, and the decline is expected to continue.[140] Acreage also fell due to decreasing returns domestically, in other EU markets, and in other overseas export markets, partly because of the strength of the euro. Competing demand for land for development and other purposes also contributed to the acreage decline. The large decline in acreage, despite increasing yields, has resulted in consistently reduced production volumes. The French apple industry has responded to declining industry profits by increasing plantings of newer varieties and expanding marketing efforts. The industry has also consolidated, as cooperatives have become fewer and larger.[141]

Italy

Italy's acreage, yields, and production remained relatively stable between 2003 and 2007. Overall, Italy produces high-quality apples, though quality varies significantly by region. The Alpine regions of Alto Adige and Trentino are the primary growing areas, accounting for more than 60 percent of total Italian apple production. Apple growing in these regions is concentrated on rolling hills, ideal for production. Italian quality and production efficiency have improved recently due to the increasing use of modern farming practices and improved selection and packaging techniques. The Alpine regions are very well integrated, use sustainable production methods, and are renowned for

[138] Withnall, "English Growers Battle EC for Market Share," *Good Fruit Grower***,** February 2007.
[139] FAO, FAOSTAT Database.
[140] Ibid.
[141] Belrose Inc., *World Apple Review 2008 Edition*, 2008, 40.

aggressively introducing and marketing new product varieties. Most Italian production still takes place on small landholdings with relatively high production costs.[142]

Poland

Polish apple production has expanded significantly since the late 1990s. In 2006, Poland was the largest producer of apples in Europe, but in 2007 production dropped by 55 percent due to severe weather in the spring. Poland is a low-cost producer, and its exports have gained market share in the growing Eastern European markets by competing on the basis of price. Polish apple production consists of many small growers with outdated orchards and very low yields.[143] At approximately 400,000 acres, acreage in Poland was larger than in the United States in 2006 and approximately three times that of Italy and France; however, Polish output was still less than half of the output in the United States. [144] In order to compete more successfully, Poland reportedly needs to modernize its orchards, storage facilities, and packing facilities, and transition from small orchards to a more concentrated industry structure with modern orchards.[145]

Because it can compete on price, most of Poland's fresh apple exports are destined for the growth markets of Ukraine, Lithuania, and Russia. Polish exports, including intra-EU trade, grew by 24 percent between 2003 and 2007. Unlike Italy and France, where more than 80 percent of fresh apple exports are destined for other EU markets, only 44 percent of Poland's exports are intra-EU,[146] a result of the demand for primarily high-quality apples in Western European markets.

Turkey

At over 31 kg in 2007, Turkey's per capita apple consumption was the highest in the world. Because Turkey is a large producer and not a major exporter, apples are widely available for domestic consumption. Turkish consumers prefer the Red or Golden Delicious variety, which are both widely available.

Turkey's apple production averaged 2.3 million mt between 2003 and 2007 and was stable throughout the period. The majority of Turkish production is of traditional varieties, with Red and Golden Delicious accounting for almost 85 percent of total production.[147] Apple production in Turkey takes place primarily on small scale family-run farms that do not use modern horticultural techniques. Growers also face a lack of packing, storage, and transportation facilities. A few bigger commercial orchards have been established in recent years that have implemented more advanced production techniques, such as better quality seedlings, dwarfing rootstocks, and drip irrigation. These new production techniques are expected to increase yields and quality.[148]

Despite being one of the five largest producers in the world, Turkey does not export large quantities of apples due to concerns about their quality and high barriers to trade in the

[142] Biasetti, *Italy: Fresh Deciduous Fruit; 2007*, January 3, 2008, 2.
[143] Belrose Inc., *World Apple Review 2008 Edition*, 2008, 39.
[144] FAO, FAOSTAT Database.
[145] Belrose Inc., *World Apple Review 2008 Edition*, 2008, 39.
[146] GTIS, World Trade Atlas Database.
[147] Erkut, *Turkey: Fresh Deciduous Fruit; Annual Report, 2007*, December 7, 2007, 5.
[148] Ibid.; Erkut *Turkey Fresh Deciduous Fruit Annual Report 2008*, November 24, 2008, 5; and Higginston, *Turkey: Fresh Deciduous Fruit; Annual Report 2005*, August 26, 2005, 4.

region.[149] In addition, export volumes are insignificant because Turkey grows limited quantities of the newer, more popular varieties.[150] Imports also remained low throughout the period because of high domestic production and a tariff on apples that, at 60.3 percent, is one of the highest in the world.[151] The protection given by the high tariff is one reason the industry has not had an incentive to modernize.

Russia

Russia is the world's largest apple importer after the EU. Russian imports of fresh apples have risen dramatically from approximately 705,000 mt in 2004 to 1,063,000 mt in 2008, or by 51 percent (table 15). These massive import volumes occur despite a tariff that ranges from 100 to 200 euros per metric ton, depending on the time of the year the apples are imported and the apple variety.[152] Russia primarily imports lower-quality and -priced apples, which keeps their average import unit value well below the international average (table 13). The competitive balance in the Russian market generally favors whoever can offer the lowest price, as importers tend to be less concerned with quality.[153] China and Poland supply almost half of all total Russian apple imports. China's exports of its low-cost apples to Russia have grown significantly since China expanded its role in the global apple trade. However, Russia is also the EU's largest export market, buying primarily low-cost apples, mostly from Poland.

Russia is one of the few markets to experience strong growth in apple consumption since the late 1990s (table 8). This growth occurred as per capita income and Russian purchasing power increased due to economic development and the influx of capital from rising prices for Russia's energy exports. Correspondingly, consumer spending on fresh produce and imported apples increased. Most of the increase involved lower-quality apples, but demand for higher quality apples also rose between 2004 and 2008.[154] High-quality U.S. apples are primarily sold in the specialty and high-end retail outlets to consumers with more disposable income. However, the importers that have bought increasing quantities of American products may become more cost-conscious if energy prices decline, which may force buyers to demand lower prices or look for lower-quality alternatives.[155]

Russia, in addition to being a major consumer and importer, is a large producer of apples (table 6), with commercial production concentrated in the south and southwest. Production averaged 1.9 million mt between 2003 and 2007. However, output is highly variable from year to year because of limited use of modern horticultural techniques.[156] While Russian apple acreage and production have expanded significantly as demand for fresh fruit has increased, production is inefficient in comparison to international averages. Russia produces almost 90 percent of its fruits on household plots in low-yielding older orchards. The majority of trees producing apples are more than 35 years old, well beyond

[149] Belrose Inc., *World Apple Review 2008 Edition*, 2008, 41.
[150] Erkut, *Turkey Fresh Deciduous Fruit Annual Report 2008*, November 24, 2008, 8.
[151] Republic of Turkey, Prime Ministry Undersecretariat of Customs, *Tariffs.*
[152] Customs Tariff of the Russian Federation, Chapter 8: General Provisions Pertaining to Customs Registration.
[153] Industry representative, telephone interview by Commission staff, July 7, 2008.
[154] Evdokimova, et al., *Russian Federation Fresh Deciduous Fruit; Annual 2007*, December 4, 2007, 1.
[155] Johnson and Ilyina, *Russian Federation Fresh Deciduous Fruit; Annual 2008*, October 11, 2008, 3–4.
[156] Evdokimova, et al., *Russian Federation: Fresh Deciduous Fruit; Annual 2007,* December 4, 2007, 3.

their most productive life stages. Some of these orchards are being replanted with dwarf trees that may increase yields and bring the orchards closer to international standards.[157]

[157] Johnson and Ilyina, *Russian Federation Fresh Deciduous Fruit; Annual 2008,* October 11, 2008, 3–4.

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