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Peru: An Emerging Exporter of Fruits and Vegetables

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Approved by USDA's World Agricultural Outlook Board

Abstract

Over the past two decades, Peru has emerged as a significant fruit and vegetable exporter. The United States is one of its most important markets. This rise in exports was driven by advantages in climate, low production costs, and preferential trading arrangements with major countries. But because many of the same products exported by Peru are grown in the United States, increased Peruvian exports will continue to affect U.S. growers as well as consumers. In this report, we highlight the success stories of three commodities—asparagus, processed artichokes, and table grapes—that represent different impacts on U.S. growers. Despite Peru's success in developing a fruit and vegetable export industry, challenges remain. In order to continue on its current export trajectory, the country must confront a number of constraints, including water access, land rights, and underdeveloped export infrastructure.

Keywords: Peru, fruit and vegetable exports, asparagus, artichokes, table grapes, California, Michigan, Washington, water management, land rights, infrastructure

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Introduction

Since the mid-1980s, Peru has emerged as an important fruit and vegetable exporter, and the United States is one of the country's top export destinations. The question is whether or not Peru will be able to sustain and expand its role as an important player in the international fruit and vegetable trade. Traditionally, Peru has been known mostly for its exports of metals and ores, but since the early 1990s, Peru's horticultural exports have grown at an annual rate of 16 percent, outpacing any other commodity group (Food and Agriculture Organization of the United Nations (FAO), various years). The early 1990s were a time when a new constitution and new laws encouraged Peruvian engagement in international trade and investment in Peru. These developments, along with Peru's natural advantages, such as a climate ideally suited for production of many horticultural crops, provided the groundwork for ongoing strong economic and export growth in traditional, as well as new, fruit and vegetable products.

The United States also produces many of the fruits and vegetables that it imports from Peru. A second question, therefore, is what impact Peru's increasing importance as a U.S. supplier and competitor will have on U.S. production, trade, and consumption. Although Peru's export boom began with asparagus, the country's export portfolio has since expanded to include such diverse products as processed artichokes, avocados, bananas, various types of citrus fruit, grapes, mangoes, onions, and paprika.

This report presents Peru as an agricultural producer and trading partner, with a special focus on the fruit and vegetable export industry. We highlight the factors that make Peru a successful fruit and vegetable exporter. Peru's main advantages are its (1) investor-friendly business environment and policy framework, (2) free or preferential trade agreements with major importers, such as the United States, the European Union (EU), and China, (3) relatively cheap labor, and (4) good climate.

We then focus on three in-depth commodity analyses of Peruvian fruit and vegetable industries that can be described as success stories, but with differing levels of impact on U.S. growers. Asparagus is an example of a commodity in which Peru competes directly with U.S. producers. Artichokes are another successful export commodity; Peruvian exports to the United States are almost exclusively processed artichokes. U.S. artichoke growers have not produced for the processed market since 2000, so Peru does not compete with U.S. production. This type of trade relationship is also true for a number of other Peruvian export products, such as mangoes (the United States produces very few mangoes) and piquillo peppers. Our third case study concentrates on table grapes. Because of the timing of the Peruvian growing season, exports to the United States compete with U.S.-produced grapes in the U.S. market for only a very short time and Peruvian shipments are very small compared with the U.S. supply. However, grape exports from both countries do compete in third-country markets, which is a concern to U.S. growers.

We point out some challenges to Peru, such as its reliance on a small number of export products and markets, the large distance to its export markets, shortcomings in its export infrastructure, water scarcity in the coastal areas, and unresolved land right issues. We conclude with an assessment of Peru's potential to continue expanding production and trade in the medium term and likely impacts on U.S. production, trade, and consumption.

Peru: An Increasingly Important Exporter of Fruits and Vegetables

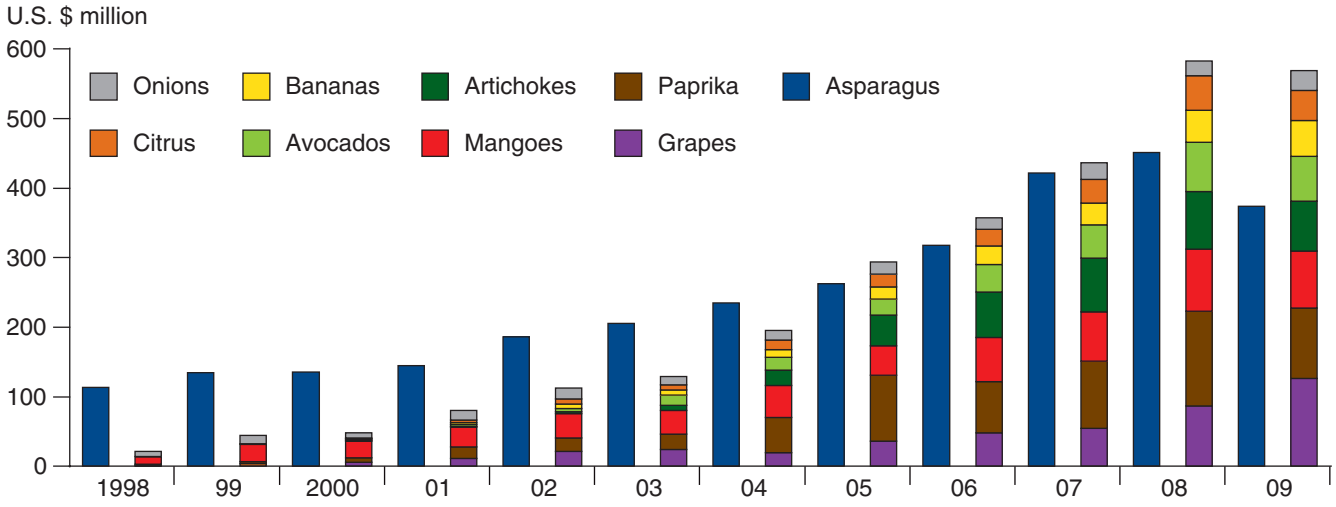
Peru is a country of 29 million people situated on the Pacific coast of South America. It is classified as a lower middle-income country by the World Bank and had a per capita gross national income (GNI) of $3,990 in 2008. Gross domestic product (GDP) grew at 9.8 percent in 2008 (World Bank, 2010), continuing the recent trend of strong economic growth.[1] Exports were an important driver of this growth, with merchandise exports of $31.5 billion in 2008. Exports of goods and services accounted for 27.1 percent of GDP in 2008, up from 25.6 percent in 2007 and only 12.6 percent in 1991. A major part of these exports consists of mineral commodities, which benefited significantly from rising international prices through 2007.[2] Agricultural exports accounted for 7.2 percent of all merchandise trade in 2007 (FAO, various years). Peru has also been successful at attracting foreign direct investment (FDI)—U.S. $5.3 billion in 2007, up from $3.5 billion in 2006—an important source of capital, which, so far, has been mostly going into the petroleum/mining sector. FDI contributes to expanding the export sector and investments in major infrastructure projects (World Bank, 2010).

While coffee remains Peru's most important agricultural export crop, more than 60 percent of all agricultural exports are now fruits and vegetables. Asparagus is the largest fruit and vegetable export item (fig. 1). Peru's fruit and vegetable exports were close to U.S. $1.2 billion in 2009 (Global Trade Information Services, Inc. (GTIS), 2010), up from $60 million in 1990 (FAO, 2009). Since 1990, exports have increased at an average annual rate of 16 percent—a faster growth rate than Peruvian merchandise exports as a whole (FAO, 2009). By comparison, the U.S. share of fruit and vegetable exports was close to half a billion dollars in 2009.

[1]Peru began to feel the effects of the worldwide economic downturn in 2009, with growth projected at only 1.8 percent, recovering to 5 percent in 2010 (*Reuter*s, 2009a).

[2]Many mineral commodity prices sharply declined after 2007 until 2009 when they began to recover.

Figure 1
Growth in the value of selected Peruvian fruit and vegetable exports, 1998-2009



Source: Global Trade Information Services, Inc. (2010).

In general, the United States and Europe are Peru's largest export markets (table 1). In 2009, the United States accounted for 40 percent of Peru's fruit and vegetable exports and Europe accounted for 44 percent (GTIS, 2010). In 2009, over half of all Peruvian exports of fresh asparagus, canned artichokes, and fresh onions were shipped to the United States. Recently, China has emerged as an important export market for Peruvian grapes. For fresh products, it will become increasingly important for Peru to find market niches where it can be the low-cost supplier in a particular seasonal window, as competition from lower cost producers is increasing. For the processed market, seasons are not as important, but keeping costs low is critical.

Table 1
Selected Peruvian fruit and vegetable exports, 2009

Product	Value	Share shipped to selected destinations			
		United States	EU	Northeast Asia	Rest of world
	U.S. $ million	*Percent*			
Asparagus	373.9	50.2	44.1	1.3	4.4
Grapes	126.6	27.8	31.6	18.9	21.7
Paprika	101.3	37.8	39.1	0.1	23.0
Mango	81.2	29.9	62.1	1.4	6.6
Artichoke	72.3	59.7	36.8	0.0	3.5
Avocado	64.1	0.2	95.2	0.0	4.6
Bananas	51.6	24.3	63.4	11.7	0.5
Citrus	43.4	26.7	52.5	0.0	20.7
Onion	28.1	77.4	4.0	0.0	18.5

EU = European Union.

Source: Global Trade Information Services, Inc. (2010).

What Factors Explain Peru's Success in Exports of Fruits and Vegetables?

Peru's fruit and vegetable export industry benefits from a combination of factors that have supported its rapid growth. In the early 1990s, a new constitution and new laws encouraged international investment in Peru, as well as Peruvian engagement in international trade. Peru's export industry benefits from a business climate that welcomes foreign investors and encourages trade. Free trade agreements with all major trading partners, such as the United States, the EU, and China, provide an invaluable stimulus to the export industry. The agricultural sector continues to be very labor intensive, and Peru's fruit and vegetable industry has been fortunate to have had access to abundant and relatively cheap farm labor. Lastly, Peru's climate is very well suited for the production of a range of fruits and vegetables.

Business Environment

Peru's economy stabilized after the Latin American debt crisis in the 1980s. During the 1990s, inflation was kept below 5 percent thanks to structural reforms, deregulation, fiscal restraint, and international loans (The Economist Intelligence Unit, 1997 and 2008). Also, the Government of Peru created a business and investment-friendly environment with its 1991 Foreign Investment Promotion Law, which legalized unrestricted private foreign land ownership and investment and outlawed discrimination between foreign and domestic investors. This law and the Government's campaign of privatization in the fishing, mining, telecommunication, energy, and finance sectors were successful in attracting foreign investors. In 2007, Peru's net FDI was close to U.S. $5.3 billion (World Bank, 2009b).

This favorable business environment and relaxed land ownership rights have supported capable producers and agricultural entrepreneurs who have adopted state-of-the-art technology and organizational standards. Large-scale exporters are fully aware of international market expectations. Many of them have founded or joined associations that can effectively promote their commodity, as the associations have a keen understanding of their respective industries, as well as world market conditions.[3]

Trade Agreements

This investor-friendly business climate has contributed to the signing of several trade agreements. The United States and Peru have a long-established preferential trading relationship, going back to the 1991 Andean Trade Preference Act (ATPA). The ATPA was a multilateral agreement between the United States and Bolivia, Colombia, Ecuador, and Peru that offered these Andean nations trade concessions in order to establish legitimate industries and to reduce dependence on drug production and trafficking. These concessions included preferential access to the U.S. market for a large share of their exports, including duty-free access for most fruit and vegetable products. [4]

However, the ATPA was scheduled to expire in 2006, along with it its preferential access provisions. After annual renewals, the U.S.-Peru Trade Promo-

[3]Examples for such associations are the Instituto Peruano del Esparrago y Hortalizas, which promotes export interests for asparagus and artichoke producers, as well as ProHass, the association of Hass avocado producers, and ProCitrus, the association for Peruvian citrus producers.

[4]In 2005, 44 percent of all U.S. imports from Peru, mostly copper and certain apparel, received preferential duty treatment (Villarreal, 2006).

tion Agreement (PTPA) replaced the earlier, less far-reaching trade agreement in February 2009. The PTPA is a comprehensive free trade agreement that makes Peru's preferential access to the U.S. market permanent. The agreement also immediately eliminated most of Peru's tariffs on U.S. exports, with all remaining tariffs phased out over defined periods (within less than 5 or 10 years, but no more than 17 years) (U.S. Trade Representative, 2009). The agreement furthermore addressed several nontariff issues, such as individual property rights and dispute settlement, and thus eliminated a range of trade-inhibiting obstacles (Villarreal, 2006). Having preferential access to the U.S. market is of great value to the Peruvian export sector, even if some barriers arising from sanitary and phytosanitary problems remain.

Peru is working toward broadening its trade base and has signed free trade agreements (FTAs) with most major trading partners, most notably with China and the EU (Andina, 2010). FTAs with Japan and South Korea are being negotiated in 2010, and further FTAs are planned with Russia, India, Morocco, and South Africa.

Labor

Relatively low labor costs have helped Peru to compete successfully in the world market. As a lower middle-income country with a very skewed income distribution, average wages are far below those of many of its competitors. Low labor costs are partly a consequence of high **under**employment (less working hours than desired), estimated at 64.5 percent in 2005 (Bolle and Villareal, 2007) even though the official **un**employment rate has been around 8 percent in recent years. In 2008, the average nominal wage was only about $388 per month (The Economist Intelligence Unit, 2010), or roughly $2.15 per hour.[5] Agricultural labor costs are much lower than this average. Low agricultural wages are a result of an abundant supply of unskilled rural workers. However, workers employed by agricultural exporting companies earn about 30 percent more than those working for agricultural companies that serve the local market. Growers in Ica reported that labor costs were about $8 per worker per day in 2008, higher than in other parts of the country. Ica has reached the point where labor for the exporting agricultural companies is getting scarce, driving wages higher. Fruit and vegetable production continues to be labor intensive, as many tasks, such as the harvest of asparagus, are not mechanized.[6]

Although labor costs remain low compared with those in competitor countries, jobs in the sector are coveted as they often come with benefits, especially in areas where suitable labor is becoming scarce, such as in Ica. Here, some growers invest in family services, such as health care units, nurseries, and other community services, to retain their workers and thus reduce costly turnover and to keep their employees personally invested in the success of the company. Peru's low labor costs help compensate for high transportation costs to major export markets and thus keep Peru competitive in the world market. Impoverished families living in the highlands (Sierra) often have no other choice than to move to the coastal area for employment even though some programs are underway to provide farmers with support to develop highland-based export industries such as avocado production.

[5]Assuming 180 hours of work per month.

[6]For more information on asparagus harvesting, see Asparagus Growing (2010), http://www.asparagusgrowing.et/asparagus-growing/harvest-asparagus.

Climate

Peru's natural advantage in fruit and vegetable production is its climate. The Peruvian fruit and vegetable export industry is located along the long, narrow coastal plain, which has a maximum width of 75 miles. Peru consists of three very distinct topographic regions that run from north to south (fig. 2): a narrow coastal desert plain along the Pacific Ocean in the west, the Andes in the center (known as the Sierra), and the jungle in the east. The Sierra and the jungle cover about three-fifths of the Peruvian land area, but these regions are sparsely populated. With such variation in climate, Peruvian growers have experimented in alternative growing regions (further north or south on the long coastal plain or up in altitude in the Sierra) in order to increase the export seasons for some commodities.

The coastal plain is a tropical desert. The temperature is relatively constant and mild due to the Humboldt Current, which brings cold water from the Antarctic to most of Peru's coast and thus moderates otherwise hot tempera-

Figure 2
Map of Peru

Source: USDA, Economic Research Service.

tures. The closeness of Peru to the equator gives the country a relatively even length of daylight throughout the year and guarantees the absence of frost. In this spring-like climate, asparagus, for example, can be harvested 12 months out of the year if proper water-management techniques are used. As a Southern Hemisphere fruit and vegetable exporter, Peru has the advantage of being able to supply the high-income and populous Northern Hemisphere markets in their off-season.

The Peruvian coastal region has virtually no rainfall (except during the El Niño phenomenon), and export agriculture depends on irrigation from wells or rivers, which can be problematic.[7] Peruvian exporters claim that, while others (for example, China) may have cheaper production costs for some crops, Peru has the most consistent supply and quality of fruits and vegetables due to its predictable weather conditions. The desert conditions are excellent for growing fruits and vegetables as long as irrigation water is adequate. Recently, however, Peruvian growers have become concerned about the possible effects of climate change, which might threaten the predictability of weather patterns since more extreme weather conditions, such as unusually high and low temperatures and flash floods, have been observed. Peruvian scientists have also expressed concern about the retreat of Andean glaciers, the source of much of the water used in coastal agriculture (Flores, 2007).

[7]These issues are discussed at length in the "Water Management" section.

Peruvian Export Success Stories

Peru's combination of business climate, trade preferences, low labor costs, and climatic conditions helped lay the foundation for developing a competitive and successful agricultural export industry. Many of the fruit and vegetable industries grew out of seasonal demand from Northern Hemisphere trading partners. The conditions and developments described in this report determine, to a large extent, the current success and future uncertainty of Peru's export commodities.

Although each of these commodities has a different story, they also share common characteristics and trends. In examining the successful export product stories of Peru and their effect on the U.S. market, we identified three different groups of products based on their effect on their U.S. counterpart industries. The first group negatively affects the U.S. counterpart industry by directly replacing the U.S.-produced commodity within the U.S. market. Asparagus is the most prominent example, but Peruvian-produced paprika has also negatively affected U.S. production. The second group benefits U.S. consumers while having little or no impact on U.S. producers, primarily due to negligible production of those particular commodities in the United States. Although tropical fruit products, such as mangoes and bananas, also fit this category, we explore in some detail the high-value processed artichoke market.

The last group represents products that are produced both in the United States and Peru but do not compete head to head throughout their seasons, although there is some overlap of seasons, which is the case for table grapes and sweet onions. We examine table grapes in detail. Many U.S. grape growers are concerned about competition between the United States and Peru in important third-country markets. These case studies of asparagus, processed artichokes, and table grapes, therefore, serve as examples for a number of other successful export commodities and for the potential repercussions of the ongoing fast expansion of Peruvian fruit and vegetable exports, not only for Peru, but for U.S. producers and consumers.

Success Story #1: Asparagus

Asparagus was the first, and remains the most prominent, example of Peru's success as a major exporter of fruit and vegetable products. While the emergence of Peru as a year-round global asparagus supplier was good news for U.S. consumers, it had a considerable negative effect on the U.S. asparagus industry. The huge success of this export product is partly due to the variety of forms in which it can be produced and processed.

Production

Peru is the world's second largest asparagus producer after China. The Peruvian asparagus industry started in the early 1950s in La Libertad, the region around Trujillo, as a canned white asparagus export industry. In the mid-1980s, the U.S. Agency for International Development began working with growers in Ica to find nontraditional agricultural exports that could reduce the

country's reliance on coca production. Asparagus looked promising because of the area's deep sandy soil and advantageous climatic conditions. The first commercial exports of fresh green asparagus began in the mid-1980s. Today, most production is concentrated in the departments of Ica and La Libertad, with 39 percent and 44 percent of the total asparagus production area, respectively; Lima (9 percent) and Ancash (8 percent) account for most of the remaining land in asparagus production (Ministerio de Agricultura del Perú (MINAG), 2010). While white asparagus[8] once dominated Peruvian production, in 2008 green asparagus production made up 87 percent of the total (Benson, 2010).

Total planted acreage has nearly quadrupled since 1988, with production area over 29,800 hectares in 2008 (MINAG, 2010) (fig. 3). Peru is the only country in the world that harvests asparagus year round, with two or sometimes three harvests per year per field. The large-scale growers tend to run farms with state-of-the-art technology, such as drip irrigation. They can manipulate the harvest seasons by withholding water to the plants, which enables Peru to target the most profitable market periods. Peru has the world's highest asparagus yields, increasing steadily and almost doubling since 1990 (MINAG, 2010).[9]

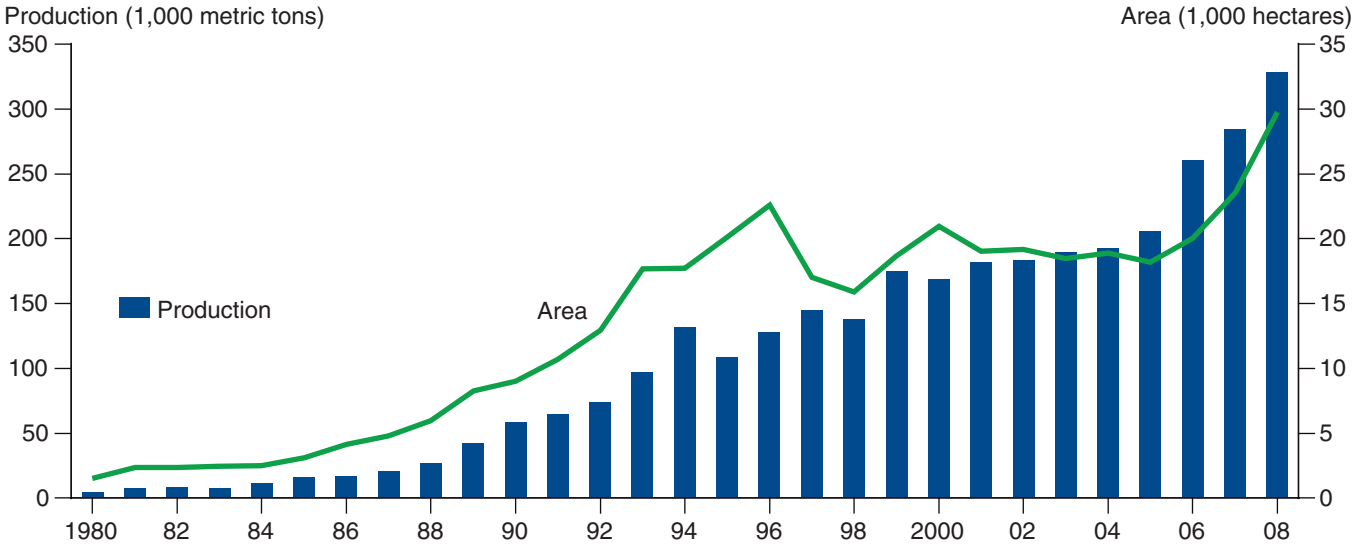
Exports

After coffee, asparagus is Peru's largest agricultural export product at $374 million in 2009. Exports of fresh asparagus in that year were valued at $240.6 million; exports of processed asparagus (such as asparagus in cans or jars but not frozen) added another $109.7 million in value, and frozen asparagus exports totaled $23.5 million. Domestic demand is very low for asparagus, which is not a native vegetable and has not made inroads into the Peruvian cuisine; thus, nearly all of the country's production is exported. A major share of these exports—50.2 percent, or $187.8 million, in 2009—was destined for the United States.

[8]White asparagus is a more labor-intensive crop because the emerging spears must be covered with a mound of soil to keep the sun from turning them green.

[9]Yields vary by region. In La Libertad, average yield in 2007 was 13.4 tons/hectare (ha) (Ministerio de Agricultura del Perú, 2010). Under the right conditions and with the most efficient, sophisticated technologies, yields as high as 20 tons/ha have been reached (Nolte, 2007).

Figure 3
Peruvian asparagus production and area, 1980-2008



Source: Ministerio de Agricultura de Perú (2010).

The share of asparagus going to the three different markets—fresh, processed, and frozen—has changed over time. These shifts reflect not only the changing makeup of Peru's destination markets but also changes in preferences within those markets. The fresh market tends to be more profitable than the processing market, but only in 2002 did fresh export volume finally rise above processed volume (fig. 4). In 2009, the fresh market accounted for 65 percent of export volume and the primary destination was the U.S. market, with 72 percent of all fresh asparagus exports. White asparagus is more popular in the EU and China, while green asparagus is the preferred choice in the United States.

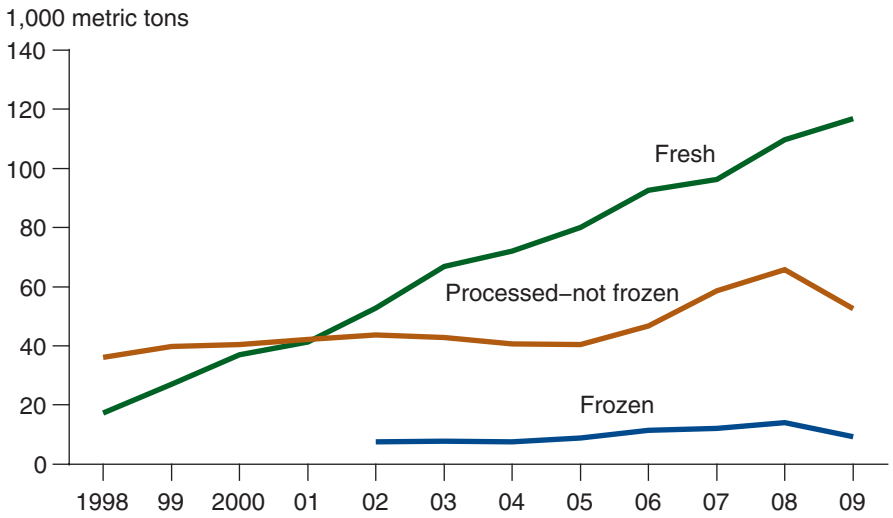
Processed and frozen asparagus accounted for 29 percent and 5 percent of export volume, respectively. Peru also exports processed and frozen asparagus throughout the year. In 2009, Peru exported 71 percent of their *processed* exports to the EU versus 23 percent to the United States (GTIS, 2010). Spain and France were the primary EU destinations. For the much smaller *frozen* asparagus industry, 53 percent of exports went to the United States and 40 percent to the EU in 2009.

Industry Structure

The Peruvian asparagus industry is dominated by large firms, but there are enough of them so that most claim only a small portion of total export share. In 2005, there were 122 asparagus exporters in Peru, 2½ times as many as there were in 1995. The nation's five largest firms controlled approximately 42 percent of the market in 2005—the largest 50 firms shared 95 percent of the country's total fresh green asparagus output (Rios, 2007).

The Peruvian Institute for Asparagus and Horticultural Crops (IPEH) is a nonprofit association of asparagus producers and exporters founded in 1998 to promote research, marketing, extension, and international standard compli-

Figure 4
Peruvian asparagus exports: Fresh, processed, and frozen, 1998-2009[1]



[1]In 2002, a separate Harmonized System code was first introduced for frozen asparagus. Before that, some frozen asparagus was exported, but it was reported jointly with other frozen vegetable exports.

Source: Global Trade Information Services, Inc. (2010).

ance. Grower organizations like IPEH have been critical to industry success since there is very little public agricultural research on fruit and vegetable production issues. These organizations are an example of the entrepreneurship that is evident in the Peruvian agricultural export industry.

Tariffs and SPS Issues

While Peru's asparagus exports face no tariffs in their main markets, including the United States, sanitary and phytosanitary (SPS) barriers affect trade. The U.S. Department of Agriculture's (USDA) Animal and Plant Health Inspection Service (APHIS) is trying to prevent entry of the moth *Copitarsia decolora*, which has been found on asparagus in Peru but not on asparagus in the United States. APHIS requires every shipment of fresh green asparagus to the United States to be fumigated with the pesticide methyl bromide.[10] Fumigation is expensive and reduces the shelf life of asparagus, causing concern among Peruvian producers.

[10]White asparagus is not fumigated because it develops under the soil and is therefore not a host to the pest.

Potential Problems

Peru's growers recognize the inherent danger of relying on a small number of important export items. As the world's largest asparagus exporter, Peru runs the risk of oversupplying the market, which is one reason that most growers want to diversify crops. Transportation is a major cost component, and bottlenecks and rising transportation costs have become increasingly important issues. Most asparagus is exported by air freight. When air freight costs increase, some asparagus is shipped by boat, which is cheaper, but the lengthy transit reduces shelf life—a problem that becomes more acute with the recent addition of methyl bromide fumigation. Transportation costs and shelf life considerations will continue to determine whether long-distance shipments are economically viable.

Peru's main rival in the processed asparagus export business is China. Most Chinese exports consist of processed white asparagus that is shipped into the European market. China's main advantage comes from labor costs. Average production cost per hectare of asparagus in China is half that of Peru. Even taking into account Peru's higher yields, China still undercuts Peru on cost per ton—$317 versus $348 (TechnoServe Peru, 2005). While Peruvian exports enter the EU duty free and China is assessed a 16-percent duty, Chinese asparagus is still cheaper (GTIS, 2010). Dominance in the processed industry can change very quickly since no provider has a seasonal advantage and only the costs of production matter.

Impact on U.S. Production, Consumption, and Imports

Peru's success as a low-cost asparagus exporter played a large part in the recent decline of the U.S. asparagus industry. U.S. average annual asparagus production declined 58 percent between 1990-92 and 2007-09 (USDA, Economic Research Service (ERS), 2010a) (fig. 5). Different sectors of the asparagus industry are facing different levels of competition. In 1990-92, 59 percent of total U.S. asparagus production went to the fresh market, 32 percent to the canning market, and 9 percent to the freezing market. By 2007-09, U.S. asparagus production had declined dramatically; fresh production

Peruvian Asparagus Exports: Impacts on California, Washington, and Michigan

The Fresh Market and California

California specializes in the fresh market and ships asparagus in the spring (box fig. 1). Although Peru is the largest source of U.S. fresh asparagus imports, it is spring imports from Mexico that have lowered prices and reduced early-season profitability for California growers. Competition with Mexico has led to a severe decline in the California fresh asparagus market; however, many growers confirm that, if Mexico were not supplying the market during early spring, Peru could step in with the same result. California asparagus production peaked in 2004 and, by 2008, had declined by 53 percent (box fig. 2). In 1990, the California season ran from late January to early May. In 2009, the season ran from March through early May.

Currently, Peruvian asparagus dominates in the second half of the year. Often, imports in the off season can raise domestic consumption as consumers become more familiar with a product and it becomes a menu staple, not just a seasonal treat. Between 1990-92 and 2007-09, average annual per capita U.S. consumption of fresh asparagus doubled. In the case of fresh asparagus, growers of U.S. imports, not U.S. producers, are benefiting from the increased consumption trends.

The Canning Industry and Washington

Competition from Peru has been most apparent in the canned asparagus market, which was largely concentrated in Washington. Imports first exceeded U.S. production in 2006 and by 2008 Peru accounted for 96 percent of U.S. processed asparagus imports. China was relegated from the most important import supplier to a distant second place with just 3 percent (GTIS, 2010).

The Washington asparagus season follows the California season, with shipments from early April through June. Traditionally, Washington growers could not rely on the early-season price premiums received by the California industry. They instead depended on high yields and concentrated on canned spears, which are particularly labor intensive since they require hand trimming. This reliance made their industry even more vulnerable to lower priced Peruvian imports. Washington asparagus production peaked at 51,200 tons in 1989 and by 2008 production declined 73 percent.

Between 2003 and 2005, the three biggest canners in the State (all multinational corporations) closed their operations and opened new plants in Peru. The now smaller Washington industry has been forced into the fresh market. As a fresh-market producer, Washington is facing less pressure. During its season, imports from both Mexico and Peru are low but could potentially increase. With lower production in the last few years during the Washington season, fresh-market asparagus prices have risen.

Frozen Asparagus and Michigan

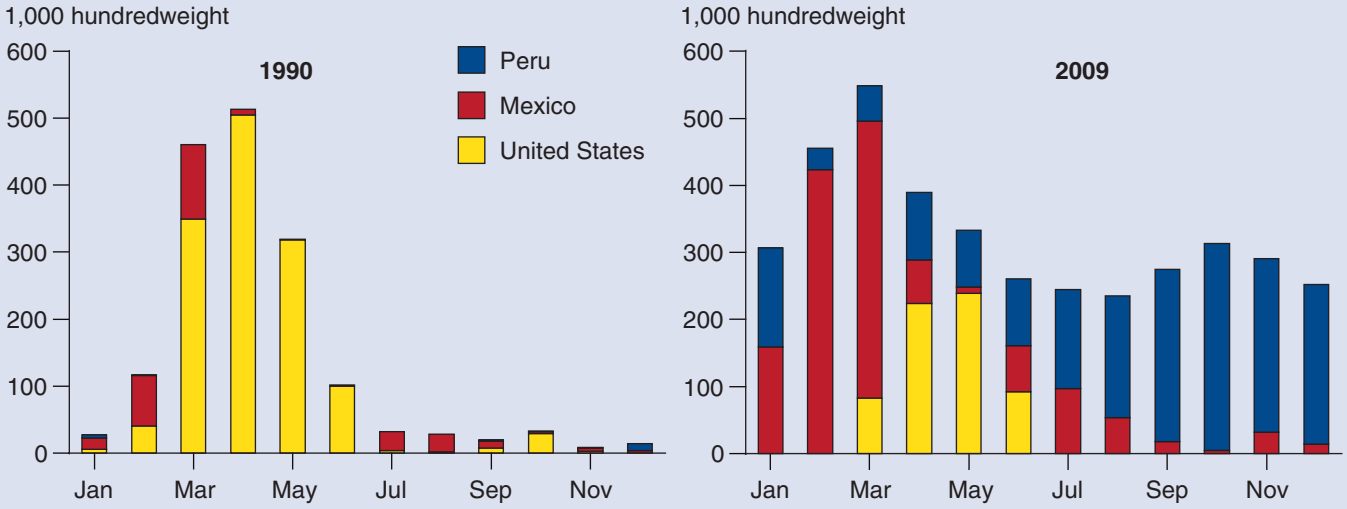
Production patterns in Michigan have changed less than those in Washington, but Michigan growers have also been challenged by competition from Peru. Michigan traditionally focused on canned and frozen asparagus, particularly the product known as cuts and tips, which is less labor intensive than whole spears. Michigan asparagus production peaked in 2003 and, by 2008, had decreased by 19 percent.

Acreage reduction in Michigan is the result of the same factors as in Washington: import pressure with prices just above the cost of production. Michigan was able to avoid Washington's fate due to two factors. First, Michigan's production is more diversified, although canning is emphasized—approxi-

mately 45 percent of their production is canned, 35 percent is frozen, and 20 percent is sold as fresh. U.S. frozen asparagus production has been on a downward trend for decades, and imports first exceeded production in 2002. Peru has been the leading source of U.S. frozen asparagus imports since 1995 and supplied 82 percent of imports in 2008. China was the number two source, with 13 percent of the market in 2008 (GTIS, 2010). Michigan has the only remaining U.S. frozen asparagus industry. The second factor that helped Michigan maintain its processing industry is that many of the processing firms in Michigan are relatively small and locally owned, making them less likely to move operations to Peru than the large, multinational processors in Washington. Many are primarily private-label canners or freezers uninterested in outsourcing their operation because asparagus fills an important seasonal production niche. The Michigan Asparagus Advisory Board is encouraging producers to focus their efforts on production of fresh asparagus.

Box figure 1

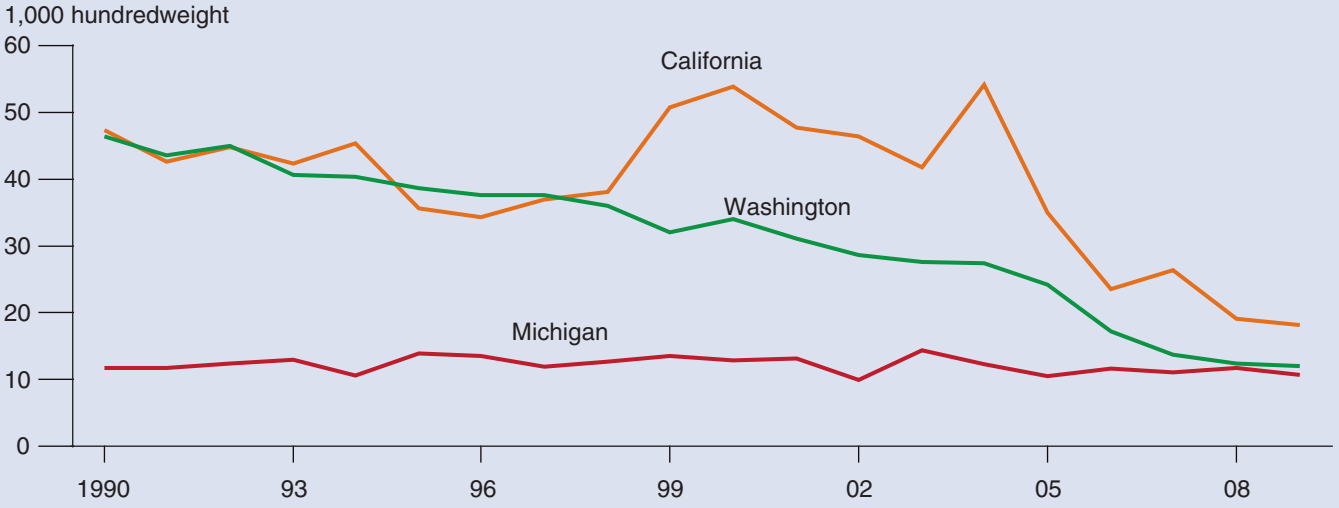
U.S., Mexican, and Peruvian fresh asparagus shipments, 1990 and 2009



Source: USDA, Agricultural Marketing Service (2010).

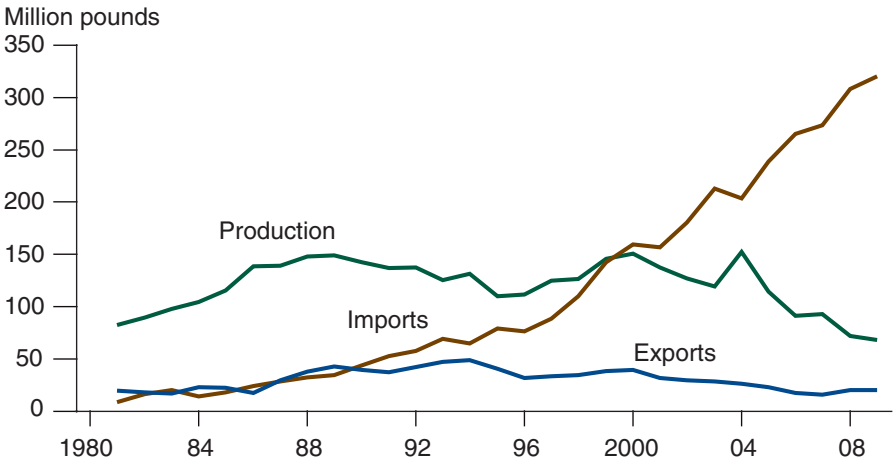
Box figure 2

Total U.S. asparagus production by State, 1990-2009



Source: USDA, National Agricultural Statistics Service (2010).

Figure 5
U.S. fresh-market asparagus production, imports, and exports, 1980-2009



Source: USDA, Economic Research Service, 2010b.

was down 44 percent, and canned and frozen production had declined 84 and 57 percent, respectively. Increasing U.S. imports of fresh asparagus from Mexico in the spring have hurt the U.S. fresh industry, but Peru could play the same role if Mexican asparagus were not available. Peruvian competition was behind the decline in the canned and frozen asparagus industry (see box, "Peruvian Asparagus Exports: Impacts on California, Washington, and Michigan"). In addition to competition from imports, changes in U.S. consumer preferences have affected the U.S. asparagus industry. During the last 20 years, U.S. average per capita consumption of canned asparagus fell more than 40 percent and frozen asparagus consumption remained unchanged. Aided by the new phenomenon of year-round supplies of fresh asparagus, average per capita consumption of fresh asparagus doubled.

The U.S. asparagus industry had long been protected from imports by high tariffs relative to those of other fruits and vegetables. Since implementation of the North American Free Trade Agreement (NAFTA) in 1994, U.S. imports from Mexico have increased as the tariff gradually declined to zero. Since 1991, Peruvian asparagus has entered the United States tariff free. As U.S. production declined, total U.S. fresh asparagus imports increased over 500 percent (fig. 5). Fresh imports first exceeded domestic production in 2000, and Peru has been the dominant supplier since 2002 when it surpassed imports from Mexico. Between 1990-92 and 2007-09, average annual imports of fresh asparagus from Peru increased from 2,835 metric tons to 78,644 metric tons. In 2009, Peru provided 56 percent of U.S. fresh imports, while Mexico supplied 43 percent. Frozen and canned asparagus imports also increased rapidly.

Federal Relief

U.S. producers will get some relief from the Asparagus Market Loss Program, part of the Food, Conservation, and Energy Act of 2008. A total of $15 million will be distributed to producers of fresh, processed, and frozen asparagus based on losses incurred from 2004 to 2007 due to increased

imports. Although payments will help compensate growers for recent losses, many are concerned about whether domestic asparagus production can survive when the larger problem, depressed prices caused by increased foreign competition, remains. The Peruvian and Mexican asparagus industries have established themselves as forces on the world asparagus market.

Success Story #2: Processed Artichokes

While the success of the Peruvian asparagus industry had severe consequences for U.S. growers, the emergence of Peru's processed artichoke industry had no effect on U.S. producers. U.S. growers were not hurt because the United States produces only fresh artichokes; U.S. growers abandoned the processing market because it was not competitive with Spain's exports. When Peru entered the market, its growing exports negatively affected other suppliers to the United States, most notably Spain.

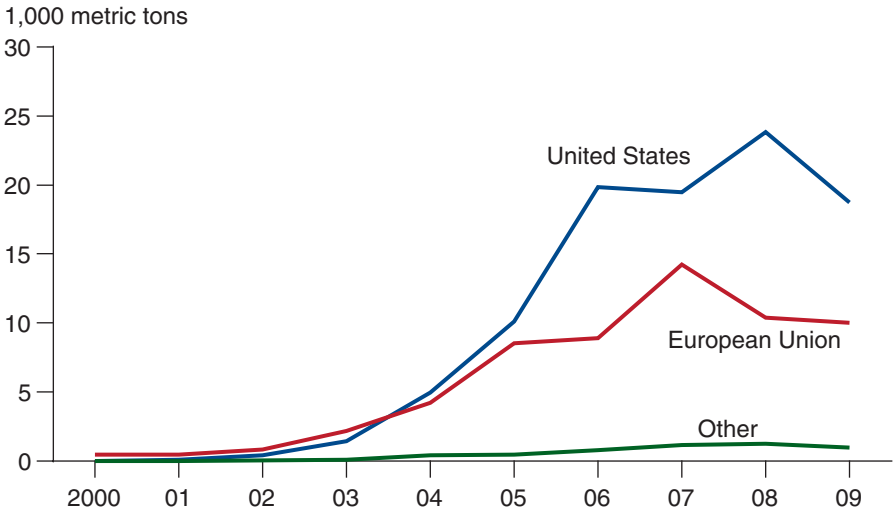
Production

Artichokes were grown in Peru before the boom in fruit and vegetable exports but only on a very small scale. Large-scale production for export began after disease seriously affected the country's asparagus crop between 1998 and 1999, and growers sought to diversify their exports (Vallejos, 2004). On the coast, growing conditions allow for a 4- to 5-month harvest season. Unlike most of Peru's other exported crops, artichoke production is not restricted to the country's arid coastal desert. Artichokes thrive in some areas of the Sierra. Several of the large artichoke producers on the coast tried to expand production to the Sierra, but they encountered many problems, such as limited grower technical skills, more variable weather, and insufficient transportation infrastructure. Several development organizations are currently promoting small-scale production in the Sierra in order to provide employment and income opportunities to impoverished communities.

Exports

After a 1999-2001 trial period, processed artichoke exports increased rapidly, reaching 35,000 metric tons in 2008 (fig. 6). In 2009, artichokes were Peru's fifth highest value fruit and vegetable export commodity at $72.3 million (GTIS, 2010). Almost all of Peru's artichoke exports are processed products. The large export firms of the Peruvian coast concentrate their production on varieties that produce the best processed product, primarily artichoke hearts. These processing varieties are not the familiar green globe variety grown in the United States for the fresh market. Peru does, however, occasionally export a very small amount of fresh artichokes to the United States in the fall if U.S. prices are sufficiently high (the last shipment was in 2007).

Figure 6
Peruvian processed artichoke exports by destination, 2000-2009



Source: Global Trade Information Services, Inc. (2010).

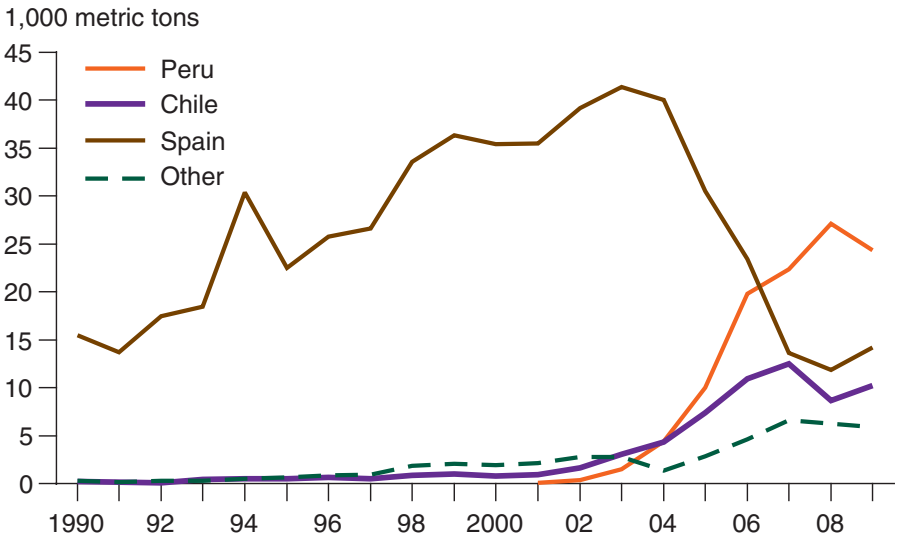
The United States, taking 60 percent of Peru's artichoke export, is Peru's main market, followed by Spain and France, each taking 21 and 8 percent, respectively (GTIS, 2010). Processed artichokes are Peru's second largest fruit and vegetable export in value to the United States. Peru's main competitors are Spain and Chile, although Peru has been gaining part of Spain's market share in the past few years. Artichoke exports to the United States benefit from completely liberalized trade and the total lack of SPS issues. Fresh globe artichokes are permitted entry into all U.S. ports without any special treatment processes, and all processed artichokes are permitted entry.

Impact on U.S. Production and Imports

Almost 99 percent of artichoke acreage planted in the United States today is in California. U.S. artichoke production has vacillated around 100 million pounds for the past decade after 1985's production peak of 134 million pounds. In the past, California growers sent artichokes to the fresh and processing market, but the one processor went out of business in 2000, partly because of competition from Spain. Now, all artichokes go to the fresh market. U.S. fresh artichoke producers are seeing little competition from imports, which account for just 2 percent of fresh consumption, mostly from Mexico.

Since the U.S. artichoke-processing industry was gone before Peru became a major player, Peru has taken market share away from other foreign processors. Imports of processed artichokes from all sources have increased 242 percent since 1990. U.S. processed artichoke imports from Peru increased rapidly from the first shipments in 2001 (fig. 7). While total processed artichoke imports increased 41 percent since Peru began exporting, much of Peru's supply has substituted for U.S. imports of Spanish processed artichokes, which have declined precipitously. In 2009, Peru accounted for 45 percent of U.S. processed artichoke imports, followed by Spain with 26 percent, and Chile with 19 percent (GTIS, 2010).

Figure 7
U.S. processed artichoke imports by country of origin, 1990-2009



Source: Global Trade Information Services, Inc. (2010).

If artichoke-processing countries, such as Peru and Chile, improve quality standards and successfully transition into fresh artichoke production, then U.S. producers could be affected by the threat of cheaper imports. For now, however, processed Peruvian artichokes have benefited the U.S. market by increasing available supplies and decreasing prices for consumers.

Success Story #3: Table Grapes

Whereas asparagus represents products for which the United States and Peru compete in the U.S. market and processed artichokes do not, U.S. and Peruvian fruit and vegetable products can compete in another area: third-country export markets. Table grapes are a good example of third-country competition between the United States and Peru. Although Peru's season is mostly opposite that of the United States, partly overlapping production seasons have caused competition in exports to other countries to rise.

Production

In the late 1990s, Peruvian agribusiness began to investigate the potential of table grapes as a profitable export. Until that time, grapes had been grown on a smaller scale, destined principally for the domestic table grape market, as well as for wine and spirits production. The Peruvian table grape export industry is still relatively young, experimenting with different production areas and varieties. Land is still available that could be brought into grape production but that might not have adequate soils for other crops (MINAG, 2008). Thus, the full potential of the industry may take some time to develop. Grape production in Peru is concentrated in the coastal regions of Ica (42 percent), Lima (26 percent), and La Libertad (23 percent) (MINAG, 2010). New production areas are developing in Piura and Lambayeque, areas in the north that have a very early season, thanks to that region's warmer climate.

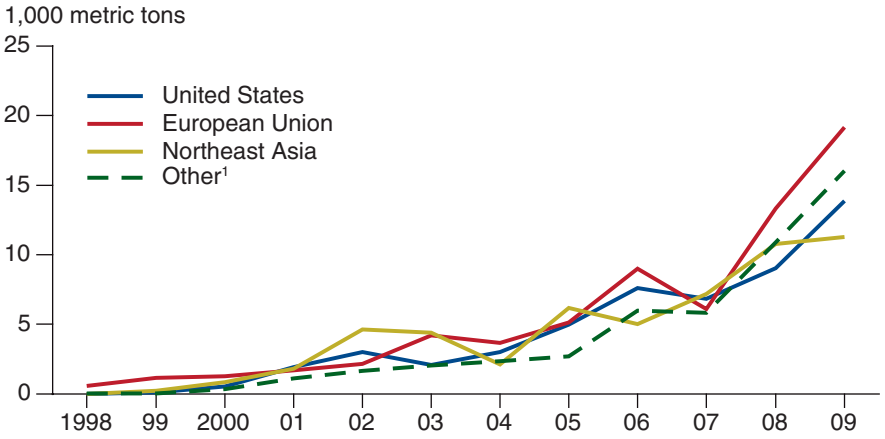
Production is currently concentrated on four varieties—Red Globe (with 75 percent of production), Flame Seedless (9 percent), Sugraone (8 percent), and Crimson Seedless (5 percent) (USDA, Foreign Agricultural Service (FAS), 2009). Peru began with the seeded Red Globe grape, which grows well there. It is a thick-skinned grape that is relatively easy to ship compared with other varieties. However, much of the growth in grape demand worldwide is for seedless varieties, and Peru is responding to this demand trend. Not all varieties produce equally well in Peru; Thompson seedless, the dominant U.S. table grape, has not yet shown much success in Peru (Boriss, 2006).

Exports

Since the first 600 metric tons of table grapes Peru exported in 1998, the industry grew to over 60,000 metric tons exported in 2009 (fig. 8). Peru exported $127 million in grapes to all countries in 2009, making grapes the country's second most valuable fruit and vegetable export, with $31.6 million exported to the United States. Although Peru is not a major grape producer or exporter, only six of the world's top 25 exporters—Chile, South Africa, Argentina, Brazil, Australia, and Peru—are located in the Southern Hemisphere, meaning that Peru is one of only a handful of countries that can supply markets during the Northern Hemisphere's winter. Peru exports grapes mainly from October to March, with the greatest volume from November to February. This export window falls at the end of the U.S. grape season and the beginning of the Chilean season. In addition, the height of Peru's production season coincides with the strong demand associated with worldwide December holiday celebrations, as well as the Chinese New Year.

With 32 percent of volume in 2009, Europe is Peru's biggest export market, followed by the United States with 23 percent, and Northeast Asia (comprised of Hong Kong, China, Taiwan, Japan, and South Korea) with 19 percent. Grapes can be stored and are exported by ship.

Figure 8
Peruvian grape exports by destination, 1998-2009



[1]No country or aggregation of countries is bigger than the EU, United States, or Northeast Asia.

Source: Global Trade Information Services, Inc. (2010).

Tariffs and SPS Issues

Peruvian grapes enter the U.S. duty free, as do grapes from the two other major U.S. suppliers, Chile and Mexico. On the phytosanitary front, table grape imports from Peru are permitted but must be cold treated in order to prevent the entry of the Mediterranean and various other fruit flies into the United States (USDA, APHIS, 2009). Imports are also restricted to certain ports.

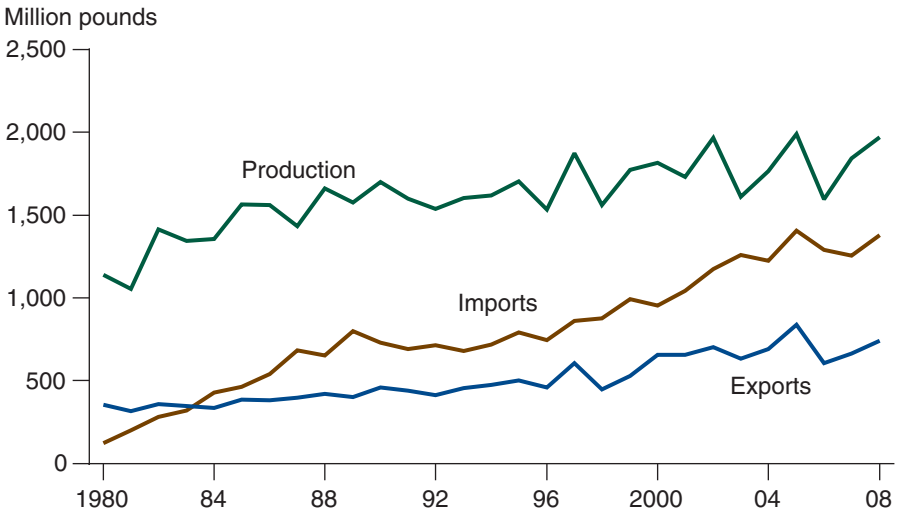
Industry Structure

The table grape export industry is highly concentrated and dominated by the 36 member firms of PROVID, the Peruvian grape producer association. Three Peruvian companies account for approximately 50 percent of table grape exports (USDA, FAS, 2009). The entire membership of the organization now accounts for around 90 percent of Peru's table grape exports (PROVID, 2008). Founded in 2001, the organization is working to open new markets for its members, especially the lucrative Northeast Asian countries of Japan and South Korea. In this pursuit, the association has helped its members adopt stricter phytosanitary standards that benefit the country's industry as a whole and better position Peru's producers for global competition.

Impact on U.S. Production, Imports, and Exports

California is the source of virtually all U.S. table grape production. Annual U.S. table grape production has averaged nearly 1 million tons since the late 1990s (fig. 9). Both imports and exports have grown. Traditionally, the U.S. season ran from May through December; new late-season varieties, such as Red Globe, Crimson Seedless, and Autumn Royal, now enable shipping into January.

Figure 9
U.S. table grape production, imports, and exports, 1970-2008



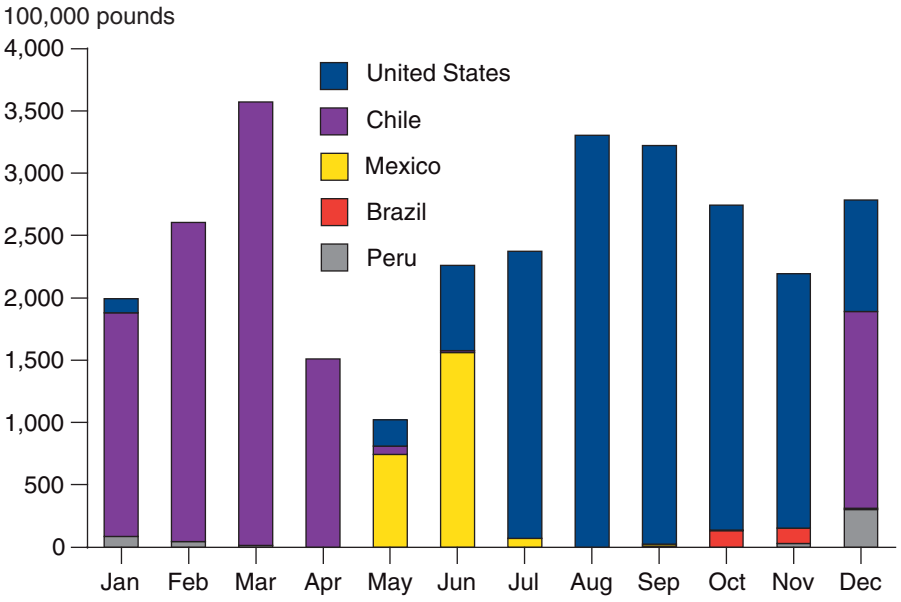
Source: USDA, Economic Research Service (2010c).

The majority of U.S. off-season grape imports are from Chile and Mexico, with small amounts from other suppliers, including Peru, from November through March (fig. 10). Peru is currently not positioned to increase market share substantially in the United States unless it develops a market niche by offering a type or quality of grape that is not available in a particular period or by offering grapes at a lower price than that of the existing competition. Peru's share of the U.S. market totaled just 3 percent in 2009; as U.S. growers find ways to extend their season, Peru's market niche in the United States may decline even further.

Peru may have a better chance to take market share in the United States from its regional competitors. Brazil benefits from a short market niche between September and November. For several years, very few U.S. green grapes were available in October and November, and Brazil could demand a premium for its exports. If Peru can produce the type of green grape that Brazil exports to the United States at a lower cost than Brazil does, Peru may be able to compete successfully. U.S. consumers would then benefit from lower prices. Peru overtook Brazil in 2009 as the third largest grape exporter to the United States after Chile and Mexico. Peru might also pose a challenge to Chile's very early season exports, which have high production costs.

Exports are very important to the health of the U.S. table grape industry. In the 2008/09 marketing season, U.S. grape exports represented 38 percent of production. In 2009, the largest export markets were Canada, Mexico, and China/Hong Kong, which accounted for 45 percent, 8 percent, and 10 percent, respectively (table 2). The United States exported a relatively small amount of grapes to 78 other countries; even a small increase in grapes from Peru could affect these markets.

Figure 10
U.S. table grape shipments by source, 2009



Source: Agricultural Marketing Service, 2010.

Table 2

U.S. and Peruvian table grape exports to selected third-country markets, 2009[1]

Ranking	Country or region	United States		Peru	
		Quantity	Share	Quantity	Share
		Metric tons	*Percent*	*Metric tons*	*Percent*
1	Canada	167,424	45	591	1
2	Hong Kong	30,483	8	7,299	12
3	Mexico	16,392	4	0	0
4	Indonesia	16,129	4	1,575	3
5	Australia	15,397	4	19	0
6	Philippines	14,552	4	187	0
7	Taiwan	14,297	4	856	1
8	United Kingdom	9,775	3	3,610	6
9	Malaysia	7,823	2	333	1
10	Thailand	7,115	2	899	1
11	New Zealand	6,167	2	19	0
12	Singapore	6,092	2	188	0
13	China	6,083	2	3,112	5
14	Guatemala	5,836	2	168	0
15	Vietnam	5,534	1	991	2
16	Colombia	2,937	1	2,063	3
17	Russia	2,322	1	5,244	9
18	Netherlands	494	0	10,902	18
19	Spain	0	0	2,665	4
	Others[2]	40,468	11	19,413	32

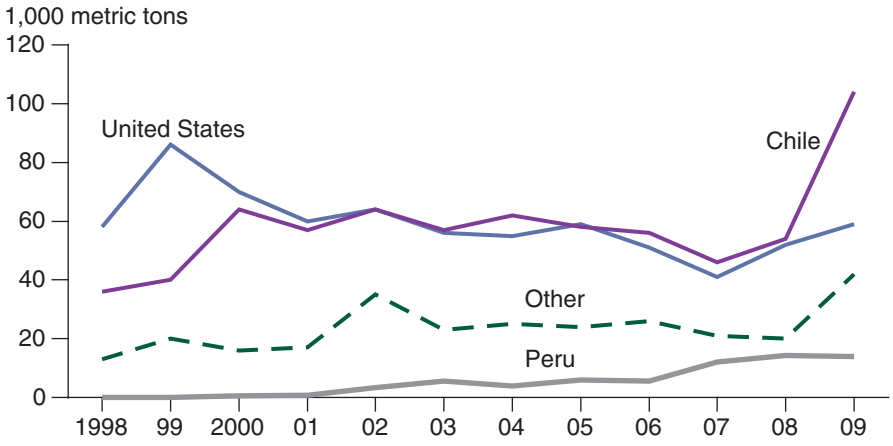
[1]Although this table lists annual market shares, please note that the United States competes with Peru mostly during December and January.
[2]The largest share of Peru's fresh grape "Others" exports goes to the United States at 23 percent.

Source: Global Trade Information Service, Inc. (2010).

Peru has the potential to be a competitor of concern in third countries. For example, China/Hong Kong is an important market for the United States and Peru, and both countries are trying to capture the lucrative Chinese New Year market. U.S. exports have been declining in the last decade, whereas Peru's exports, although small, have been growing (fig. 11). The United States is the largest source of imports in China/Hong Kong from August through January, but Peruvian imports are now competing, particularly in January (fig. 12). Peru is also supplying a large share of the grapes in February. The United Kingdom is another important market for both the United States and Peru (3 percent and 6 percent of their exports, respectively) (table 2). Peruvian exports to that market have been growing steadily. As Peru continues to improve the quality of their grapes, consumer preferences for various grape varieties in third-country markets will likely determine relative market dominance between the United States and Peru.

Figure 11

China/Hong Kong table grape imports by country of origin, 1998-2009[1]

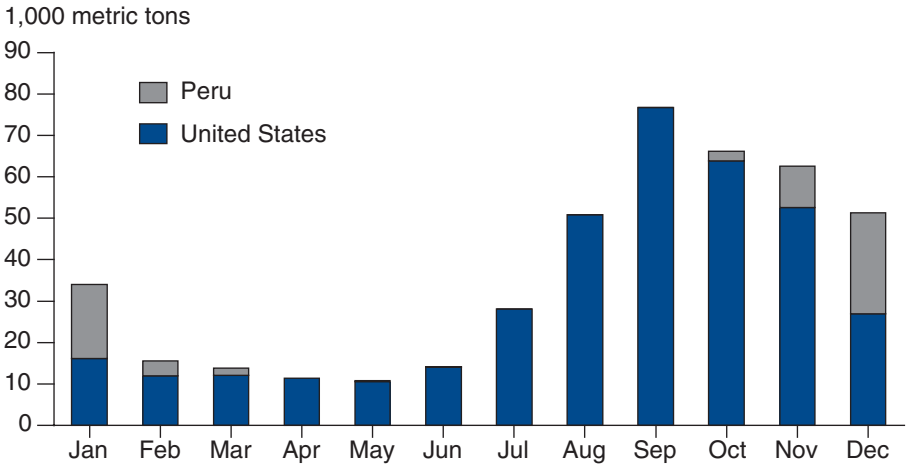


[1]Although this figure lists annual market shares, please note that the United States competes with Peru mostly during December and January.

Source: Global Trade Information Services, Inc. (2010).

Figure 12

Overlap in monthly China/Hong Kong grape imports from Peru and the United States, 2009



Source: Global Trade Information Services, Inc. (2010).

Challenges for Peru's Fruit and Vegetable Export Industry

Peru's continued success as a fruit and vegetable exporter faces a number of challenges. Reliance on a small number of export products increases the sector's vulnerability to international market shocks. Also, the great distance between Peru and its major trading partners makes transportation costs a crucial factor in competitiveness, and export infrastructure, such as roads and port capacity, is not keeping pace with rapidly growing export volumes. Finally, old problems such as water management and land rights also continue to burden the fruit and vegetable export industry.

Reliance on a Small Number of Products and Markets

Asparagus still dominates Peru's horticultural export success. A country that depends on a narrow export portfolio, however, is more vulnerable to shocks. There is no or very limited domestic market demand for some of these products, which puts even greater importance on export markets. Growers, therefore, try to diversify into other crops by experimenting with new export commodities. Once new promising export products are found, however, a lengthy process may be necessary to get them cleared for export to the United States or other countries. APHIS, concerned about the introduction of non-native pests, conducts extensive investigations before it opens the U.S. market to new foreign products, particularly fresh products. Peru is still lagging behind its neighbor Chile, a long-time fruit and vegetable exporter, which has APHIS approval for many more horticultural products than Peru.

Besides efforts to diversify its range of export products, Peru is also trying to diversify its export markets. This effort is particularly important for crops like asparagus for which inadvertent overproduction can lower prices to unprofitable levels. The increasing number of FTAs is a testimony to this effort of market diversification.

Distance

Peru is a long way from the United States and other important markets, and transportation is therefore a sizable cost factor. As a result, Peru must concentrate on high-value commodities. Asparagus was traditionally sent to the U.S. market by air freight. In the early days of the industry, asparagus prices were very high. As export volume increased and prices fell, the cost of air freight became a challenge to the industry. In recent years, air freight accounted for about 45 percent of its total delivered cost. Ocean freight is considerably cheaper than air freight, but more time in transit reduces the product's shelf life. Both air freight and ocean freight costs have increased substantially since the early 1990s, peaking in 2008, when high energy costs raised air freight for U.S.-bound exports by 15 percent over 2007 levels. High transportation costs make Peru vulnerable to competition from suppliers closer to the United States, such as Mexico.

Export Infrastructure

The lack of adequate infrastructure is one of the most serious constraints to Peruvian export expansion. Peru requires substantial investments to improve its roads and ports, and the Government of Peru is working toward this goal. The Pan-American Highway traverses the country from north to south along the coast. Although portions of this road around Lima have four lanes, the vast majority of the highway in Peru is just two lanes, which results in congestion during harvest seasons. Most of the east-west roads to the Sierra are even more inadequate—a serious impediment for growers who might want to expand production to areas beyond the coast.

When the asparagus export industry emerged, growers struggled with inadequate airport infrastructure to maintain the cold chain, which is critical for a perishable product. Growers banded together in 1998 to form Frio Aéreo Asociación Civil, a private nonprofit association, to improve the logistics for fresh asparagus exports by air. This association has been very effective and offers services like cold storage, quality control, and fumigation. As a result, the air freight export process for asparagus and other produce is now much smoother.

Some commodity exports, including fresh grapes and processed vegetables, generally ship by sea. Rapidly growing export volumes of these products have placed pressure on Peruvian port facilities. Callao, just south of Lima, is by far Peru's most important port, handling close to 50 percent of Peru's entire trade volume in 2007, but it is also one of the most expensive ports in the world. The average cost of exporting one container from Peru is $800, compared with an average of $510 in Chile and $660 in Costa Rica. Aside from port capacity, insufficient port logistics (such as insurance, holding, or security) also put Peru at a disadvantage. In 2004, Peru's logistics costs were 32 percent of product value, compared with 9.5 percent in the United States and 18 percent in Chile (Gonzalez et al., 2007). The Peruvian Government encourages private and foreign investment in infrastructure projects, such as the expanding and improving of port facilities, but some workers' unions oppose foreign investment (*Reuters*, 2009b).

Water Management

Peru has ample supplies of renewable fresh water—more per capita than any other country in Latin America—but water distribution is a problem. The Sierra and the jungle receive abundant rains, but the Pacific watershed, where the primary fruit and vegetable exporters operate (and 50 percent of the population live), accounts for only 2 percent of available surface water (Amat y León, 2006).

In the coastal region, water is available from about 60 rivers that flow from the Sierra to the Pacific, although the flow varies seasonally. Agriculture is concentrated in these river valleys. New irrigation projects, using river water, have opened some desert areas on the coast to agriculture. In addition, some fruit and vegetable exporters based in the coastal desert area depend on groundwater.

Since the 1950s, Government investment has brought approximately 1 million hectares on the coast under irrigation, using mostly surface water, 80 percent of which is used to irrigate agricultural production. However, expanded agricultural area, poor infrastructure, and inefficient irrigation methods have led to dwindling water supplies. The more technologically advanced exporters have introduced more water-saving irrigation technologies, such as drip irrigation, but at the same time, the amount of irrigated land is increasing and multiple cropping cycles per year are becoming more common, raising irrigation water demand.

Some of the most important areas for fruit and vegetable export production are suffering from overexploitation of groundwater and salinization. The extraction of groundwater in some parts of the country, such as the Ica Valley, 200 kilometers (km) south of Lima, is progressing rapidly (Olson, 2006). Water supplies in Ica are projected to be exhausted possibly within 15 years unless dramatic action is taken (Rendón Schneir, 2009).

In recent years, the Government of Peru has begun to reform water regulations. At the same time, the Government has also created several new institutions that have a role in water resources management.[11]

Incomplete water rights, as well as the lack of appropriate pricing for water use, are obstacles to investment in irrigation projects. Currently, producers pay just a fraction of the true cost of water—$30 per hectare per year for a medium-sized farm in a coastal valley, when the true cost can be $200 (USDA, FAS, 2007). The Government of Peru plans to increase the area under drip irrigation to 200,000 hectares on the coast (up from 70,000 in 2007) and establish 30,000 hectares with drip irrigation in the Sierra. The World Bank is funding a project that aims to aid the Government in its design of use and discharge fees, and it plans to help the National Water Authority (ANA) set up local river basin offices.

Even if existing water resources are managed efficiently, they still may not be sufficient to supply growing needs in the coastal area. Peruvians talk about tapping the more-than-sufficient water supplies on the eastern side of the Andes and bringing them to the Pacific watershed. The Government is encouraging public-private partnerships to raise the considerable funds necessary for this kind of investment. One example of a successful public-private investment partnership is the Chavimochic irrigation project in La Libertad, 500 km north of Lima, one of Peru's major agricultural production areas. Water provided by the Chavimochic project is sold at a price to defray the cost of the irrigation system, which consists of pipes that run through mountains in order to tap water from a larger river to the south. This redirected water is then distributed through a system of channels.

Land Rights Issues in Peru

Land rights are another salient issue affecting Peru's agriculture export sector. Land reform was implemented in Peru between 1969 and 1975 as a means to achieve greater social justice and to alleviate rural poverty. Before these reforms, the 1961 Peruvian census showed that 75.6 percent of the surveyed land was owned by 0.4 percent of the population (Eguren, 2006). After the Third Agrarian Reform Law of 1969, expropriation and redistribu-

[11]The Government of Peru created the National Water Authority (Autoridad Nacional del Agua—ANA) as part of the Ministry of Agriculture. This agency enjoys financial and administrative autonomy and has a clear mandate for integrated and multisectoral water resource management. The Government also created a new Ministry of Environment, which, among other tasks, is responsible for generating hydrological information. Furthermore, the Ministry of Health is involved in water issues as it is responsible for water quality management. However, having three ministries in charge of water issues has led to confusion and conflict over each institution's set of responsibilities. In May 2008, the Ministry of Environment was put in charge of protecting water resources overseeing their recuperation, and the Ministry of Agriculture was put in charge of distributing water permits. Another concern is the potential conflict of interest from ANA being part of the Ministry of Agriculture while agriculture is one of the major water users (World Bank, 2009a).

tion of land did not bring the intended benefits. The land originally given to agricultural production cooperatives was subdivided and sold to their previous members. While these subdivisions did give land directly to smallholders, the transfers were problematic as most were not accompanied by a legal government-issued title. The lack of well-defined property rights was underscored by the 1994 census. Of the country's 5.7 million farms, 53 percent were not titled (Herrera, 2005).

With the passing years and administrations, the discourse over land rights in Peru has changed from a focus on how "the land belongs to the person who works it" toward an emphasis on efficiency and competitiveness, which often requires a sufficiently large farm size and experienced and active management. President Alberto Fujimori solidified decrees to this effect with the enactment of a new constitution in 1993 that allowed for transfer of land titles to third parties and eliminated all acreage restrictions on landholdings. The Titling Act from 1997 went even further as it contained a provision that uncultivated land holdings would be declared "abandoned" and taken over by the State. This new law created some tension with small landholders who left some of their coastal lands fallow because of lack of water resources and not as the result of land abandonment. Many of the largest farms in Peru acquired their land from the Government after just such a takeover (La Revista Agraria, 2009).

The result of this new land distribution process has been increased concentration of acreage by just a handful of firms producing crops predominantly bound for export. The expansion of arable lands into the desert—made possible by large investments in irrigation schemes financed so far with mostly public funds—is likewise dominated by export firms. More than three-quarters of the 66,000 hectares of land opened up by the Chavimochic irrigation project were bought by 11 investors.

Challenges remain despite the recent success of agricultural production destined for exports. Many larger farms are limited in their potential to expand. A large share of small-scale growers still lack titles for their land and are thus prevented from selling it even though progress has been made in the area of providing land titles.

Conclusions

The fruit and vegetable export industry in Peru has expanded rapidly over the last 20 years and has made Peru an important player in world markets for a number of commodities. Peru is the world's leading asparagus exporter, and other horticultural products may follow suit. Several factors contribute to Peru's success: a favorable business environment, trade agreements, low labor costs, and a climate that favors production of many fruit and vegetable products. Peru was able to capture significant market share in both the United States and Europe (and occasionally Northeast Asia) for a variety of fruit and vegetable products. This increased market share has had varied impacts on U.S. production and exports. In some instances, it has displaced domestic industries, as was the case in the processed asparagus industry. In other cases, such as processed artichokes, new Peruvian supplies in the U.S. market do not compete with U.S. growers. In still other instances, such as in the table grape trade, the United States finds itself competing with Peru in certain months for third-country markets, such as Northeast Asia and the United Kingdom. Peru's continued success in the sector will require overcoming challenges, such as infrastructure bottlenecks, risk exposure due to narrow export portfolios, water management issues, and a complicated land tenure situation.

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