



Technical Assessment

Import Competition in the California Strawberry Sector

Prepared for:
The California Strawberry Commission

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Introduction

Basic forces of supply and demand will determine the volume of U.S. frozen strawberry production that moves to China and California fresh strawberries' penetration into the Chinese market. Chief among these forces are:

- *Cost* – the cost of growing and processing strawberries in California vis-à-vis China;
- *Production* – the quality of field operations and processing in California vis-à-vis China;
- *Trade* – China's growing frozen strawberry markets elsewhere; and
- *Domestic Demand* – Chinese consumers' growing appetite for strawberries and strawberry products.

Some of these conditions present challenges for California's strawberry industry; others offer windows of opportunity. While California strawberry processors can not compete with China on cost or in processing quality, California's longer growing season, traceability, and strawberry quality are comparative advantages that will sustain the industry over the longer term. In the next five years, although the gap between California and China in strawberry availability, safety, and quality will narrow, California will continue to have a niche at the higher end of the market for processed strawberries.

Cost

- *Even with substantial increases in the cost of land, labor, and money in China, prices for frozen strawberries from China will be lower than prices in California for the foreseeable future.*

China's grower (for processed strawberries) and landed prices for IQF strawberries are approximately 65 to 80 percent and 20 to 50 percent lower, respectively, than California equivalents. (*Tables 1 and 2*). With such enormous differentials, costs in China are unlikely to rise to the point where California can be competitive with China in IQF strawberries on cost alone. As the U.S. market continues to shift from conventional frozen (CF) to IQF strawberries, a greater share of California frozen strawberry production will be exposed to competition from China.

Table 1: Recent Price Estimates for IQF Strawberries, California and China

	China	California
Grower prices	\$0.05-\$0.10 / lb.	\$0.28-\$0.30 / lb.
Buyer prices	\$0.36-\$0.45 / lb.	\$0.55-\$0.75 / lb.

Sources: China grower prices and California grower and buyer prices are averages based on interviews with California processors; China export prices are also from Tan Changhua, Dai Hanping, Lei Jiajun, 2003, World Agriculture, Vol. 6 [in Chinese].

Table 2: Recent Price Estimates for China Strawberry Exports

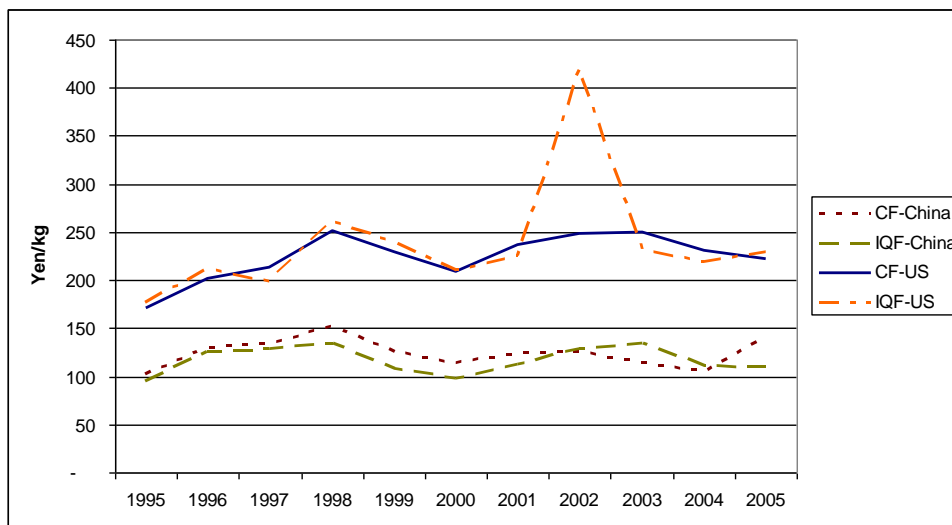
IQF Regular	\$0.27-\$0.45 / lb.
IQF Retail	\$0.36-\$0.45 / lb.
CF (w/ sugar)	\$0.45-\$0.54 / lb.
Organic	\$0.91

Source: Tan Changhua, Dai Hanping, Lei Jiajun, 2003, World Agriculture, Vol. 6 [in Chinese].

Land, labor, and credit costs in China are a fraction of those in California. A significant share of China’s strawberry processing facilities is concentrated in semi-urban areas in China’s north, where real estate and finance are often the prerogative of local government and migrant labor is still plentiful. Until China creates a more functional real estate market for rural land, dramatically strengthens protections for property rights, reigns in its local banks, or establishes a minimum wage, costs for Chinese processors are not likely to show marked signs of increase.

U.S. frozen strawberry exports have not been cost competitive in, for instance, Japan, for the past ten years. Consistently nearly double Chinese prices for CF and IQF strawberries (*Figure 1*), U.S. CF and IQF exports to Japan fell 119 percent and 68 percent, respectively, from 1995 to 2004.¹ (*Figure 2*). The Japanese market is illustrative of California’s present niche in the global marketplace for frozen strawberries. Most of Japan’s frozen strawberry imports from California are used in the jam industry, where processors use a blend of California and Chinese strawberries. To maintain a minimum threshold of flavor and color in their jams, there are currently practical limits to how much companies can source from China and U.S. frozen strawberry exports to Japan are likely to level off in the medium term as companies reach that threshold.²

Figure 1: Per Unit IQF and CF Export Prices (CIF) to Japan, U.S. and China, 1995-2004

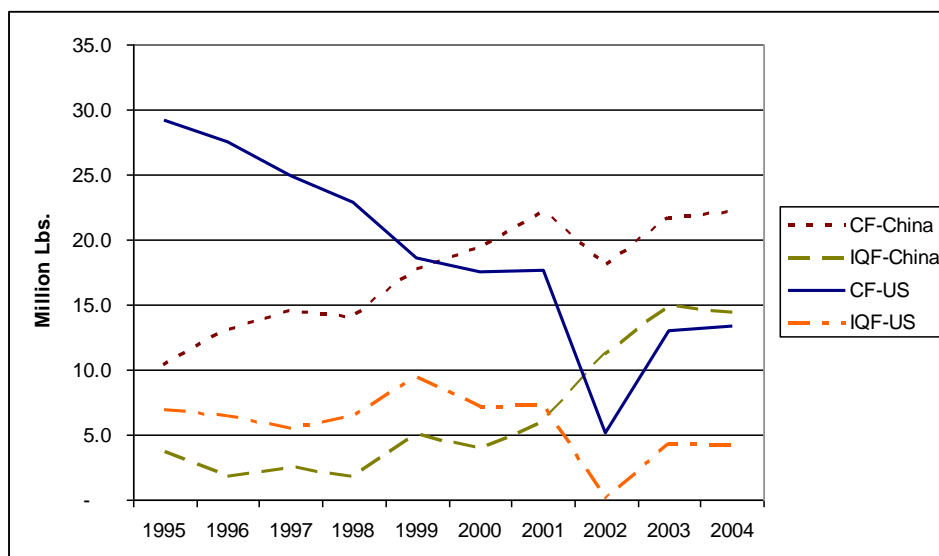


Source: Japanese customs statistics, online at: www.customs.go.jp/toukei/info/index_e.htm.

Figure 2: IQF and CF Exports to Japan, U.S. and China, 1995-2004

¹ Japanese customs statistics, online at: www.customs.go.jp/toukei/info/index_e.htm.

² Interviews with California strawberry processors, July 2005.



Source: Japanese customs statistics, online at: www.customs.go.jp/toukei/info/index_e.htm.

In the U.S., differences in products and buyers' demands for quality have thus far tempered frozen strawberry imports from China. These differences similarly complicate projections of the future rate of increase and volume of imports, and thus the time frame before China becomes a major (e.g., over 100 million pound) frozen strawberry exporter to the U.S. Ultimately, it will likely be U.S. buyers and processors that facilitate the improvements in field operations in China and provide the branding that will shorten this window.

Lower cost production in China may currently be having more of an impact on California strawberry processors through changing buyer-side expectations than actual loss of market share per se. As buyers push prices down, California processors are faced with the prospect of lower revenues and higher regulatory costs.³ While California's attractiveness for investment in strawberry processing wanes, China's lower costs and high quality workforce are encouraging investment in new, state-of-the-art facilities. Over the longer term this trend could present major challenges for U.S. intermediate value-added food processors as Chinese processors move rapidly up the value-added curve.

Production

- *Acreage and yields in China will both rise, but processing quality will be China's real strength. California's comparative advantage will be its longer growing season and the quality of its fruit.*

Twenty-five years ago China had negligible strawberry acreage. Major strawberry growing regions — Heibei, Liaoning, and Shandong Provinces (40 percent of total acreage in 2003, *Map 1*)⁴ — began production in the early 1980s and acreage across China has increased dramatically since, particularly from the early 1990s on. In Mancheng County (Hebei), one of China's largest strawberry growing areas, strawberry

³ Interviews with California strawberry processors, July 2005.

⁴ Ralph Gifford and Zhang Lei, 2004, "China People's Republic Strawberries Annual 2004," USDA FAS GAIN Report No. CH4055.

acreage increased from 81.5 acres in 1978, to 2,968 acres in 1990, and further to 9,244 acres in 1999.⁵ China is now the second-largest — or even possibly the largest — strawberry producer in the world.

Map 1: China's Three Primary Strawberry Growing Provinces



Average strawberry yields in greater China — at around 10,500 pounds per acre — are roughly equivalent to average U.S. yields in the early 1970s. In China's three largest strawberry-producing provinces, extension support through strawberry research institutes and producers associations has pushed yields significantly higher, though still far short of yields in California. (Table 3).

Table 3. Total Acreage, Production, and Yields, Southern California, Northern California, and Top Three Growing Provinces in China, 2001-2003

County / Province	Acreage (acres harvested)	Yields (pounds/acre)
Southern California ¹	16,115	63,200
Northern California ¹	12,116	50,000
Total U.S. ²	48,700	42,800
Hebei Province ³	29,652	26,322
Liaoning Province ³	25,781	24,129
Shandong Province ³	19,521	24,395
Total China ⁴	166,066	10,554

Note: California and U.S. data are from 2003.

Sources: ¹ Processing Strawberry Advisory Board of California, 2005, "2004 Annual Report"; ² National Agricultural Statistics Service, USDA; ³ China Ministry of Agriculture Statistics; ⁴ Gifford and Lei, 2004.

Expansions in China's strawberry acreage have been driven in part by price perceptions, as strawberries fetch three to four times more than apples and pears in China's April wholesale markets.⁶ Given its low yields and small-scale production — the average farm

⁵ Hebei government website, online at www.hebei.gov.cn/economy/topic/trait/mancheng.html.

⁶ China Agriculture Info Web, online at <http://www.zao.com.cn>.

size in China was just over one acre in 2003⁷ — China’s strawberry production likely has significant room to grow both intensively and extensively. The China Strawberry Commission estimates that strawberry production will increase 10 to 15 percent annually from 2005 to 2010.⁸

Table 4: Strawberry Growing Season in China and Japan

Country	Province	Season
China		November to July
	Hebei Province	<i>Outdoor:</i> mid-April through June: <i>Indoor:</i> November through mid-June
	Liaoning Province	<i>Outdoor:</i> mid-April through June <i>Indoor:</i> mid-November to July
	Shandong Province	<i>Outdoor:</i> mid-April through June <i>Indoor:</i> November through mid-June
	Jiangsu Province	<i>Outdoor:</i> mid-April through June <i>Indoor:</i> mid-December through June
Japan		Early December through May

China has a relatively short growing season, with open-air strawberries (around 20 percent of total acreage)⁹ typically harvested from April to June, and strawberries grown in greenhouses and sheds harvested from mid-November through early July. (Table 4). During the August to October period there is scant production in China. Researchers in Beijing recently developed the “all season forest fruit” (林果四季 | *linguo siji*), an experimental strawberry variety that produces year round but with marginal quality.¹⁰ For all intents and purposes China does not produce strawberries in significant volume from July through November.

Health safety and quality issues still plague the Chinese strawberry industry. Overuse of pesticides and heavy metal pollution affect a growing share of farmland in China.¹¹ Even if Chinese producers are able to solve health safety issues, China simply may not have the soil and climate conditions to produce strawberries to a level of quality on par with California.¹² China’s ultimate competitive advantage is in processing quality, where low labor costs spell lower quality control costs for processors.

Trade

- *The relationship among production, exports, and domestic consumption will determine whether China is a net strawberry importer or exporter.*

⁷ Ziping Wu. 2005. “Does Size Matter in Chinese Farm Household Production.” Paper prepared for the Agricultural Economics Society Annual Conference, University of Nottingham, April 4-6, 2005.

⁸ Gifford and Lei, 2004. An updated forecast for 2005 suggests a marked decrease in planted area in 2005 due to inclement weather and low-return-induced production shifts; USDA predicts a 30 percent drop in production in 2006. James Butterworth and Zhang Lei, 2005, “China People’s Republic Strawberries Annual 2005,” USDA FAS GAIN Report No. CH5083.

⁹ Ibid.

¹⁰ Donggang Strawberry Industry Web, <http://www.cmcyw.com> [in Chinese].

¹¹ By one government estimate the acreage affected is larger than China’s total arable land (see www.harbour.sfu.ca/dlam/Taskforce/nonpoint.html).

¹² Interviews with California strawberry processors, July 2005.

China was the world's second largest exporter of frozen strawberries in 2003 (behind Poland), with frozen strawberry exports growing from 18.4 million pounds in 1995 to 171.5 million pounds in 2003.¹³ China is not a major exporter of fresh strawberries. Although its fresh strawberry exports have grown in recent years, 2003 exports were just over one million pounds.¹⁴

Primary export markets for Chinese frozen strawberries in 2003 were the EU-15 (71 percent) and Japan (11 percent), with the U.S. comprising a markedly lower share (3 percent).¹⁵ Each country is a unique market: A majority of China's frozen strawberry exports to the EU-15 and U.S. are IQF, while most of its exports to Japan (55 percent in 2004)¹⁶ are CF. The interplay among export markets has the potential to create tensions in China's strawberry supply; rapid growth in primary and secondary export markets, coupled with growth in domestic demand, could produce shortages.

At roughly 90 percent of China's total production,¹⁷ domestic consumption (*see below*), is a more important factor than exports in determining supply and demand dynamics. In addition, the growing disconnect between agriculture and food processing complicates the more conventional view that national shortages in strawberry production would hinder strawberry processing in China; with innovations in cooling and shipping it is quite possible that China could become the world's food processor for food grown elsewhere. China's recent increase in frozen strawberry imports from, for instance, Chile and Morocco, is a result of domestic shortcomings in strawberry quality and quantity; frozen imports are freeze dried and re-exported to the EU and U.S.¹⁸

Europe, as the largest market for IQF strawberry exports from China, is the unknown variable in China's frozen strawberry trade. On July 7, 2005, at the request of the Polish government the European Commission (EC) launched a nine-month safeguard investigation into Chinese frozen strawberries. An EC decision to apply safeguard measures to Chinese frozen strawberry imports in April 2006, which would serve to lower prices for Chinese frozen strawberry exports in the short term, would increase pressure on the U.S. to do the same. The preliminary response to uncertainty produced by the prospect of EU sanctions was a sharp doubling in U.S. imports of Chinese frozen strawberries in August and September of 2005.¹⁹

Domestic Demand

- *With increasing per capita incomes, domestic demand for strawberries in China will continue to grow. Availability, safety, and quality provide potential avenues for marketing California fresh strawberries in China.*

¹³ United Nations Statistics Division Commodity Trade Statistics Database (Comtrade), online at: <http://unstats.un.org/unsd/comtrade/>.

¹⁴ *Ibid.* Hong Kong is the primary market for Chinese fresh strawberry exports.

¹⁵ *Ibid.*

¹⁶ Japanese customs statistics, online at: www.customs.go.jp/toukei/info/index_e.htm.

¹⁷ Gifford and Lei, 2004.

¹⁸ Butterworth and Lei, 2005.

¹⁹ *Ibid.*

Per capita fresh strawberry consumption in China is less than one-fourth and one-third equivalents in the U.S. and Japan, but on par with Mexico and relatively high given China's per capita income. (See Table 5). Assuming that fresh strawberry consumption continues to grow with higher incomes in China, sustained growth in China's recent annual average gross national income (GNI) at 9.3 percent from 2005 to 2010 would result in fresh strawberry consumption growth of more than 72 percent, or more than 1 billion pounds (more than 200 million pounds per year), over the same period.²⁰ Fresh strawberry consumption is rising faster than income in China, which means that consumers are willing to spend more of their income on strawberries.

Table 5: Per Capita Consumption of Fresh Strawberries, U.S., Japan, China, Mexico, 2003

	Population	GNI per capita (\$/person)	Total Consumption (lbs.)	Consumption Per Capita (lbs./person)
U.S.	290,809,777	\$37,610	1,329,000,681	4.57 ¹
Japan	127,619,000	\$35,453	452,101,731 ²	3.54
Mexico	102,708,000	\$6,230	117,064,260 ²	1.14
China	1,292,270,000	\$1,090	1,410,944,000 ²	1.01

Sources: U.S., Japan, Mexico, and China population and GNI data are from government statistical websites; ¹ Processing Strawberry Advisory Board of California, 2005; ² USDA/FAS PSD Tables.

Estimates by the China Strawberry Commission indicate that roughly 80 percent of China's current production is for the fresh market, but strawberries are now also being used in an increasing variety of jams, juices, liquors, and health and beauty products. New marketing strategies abound. For instance, high-value, government-certified organic strawberries are grown in Zhaotun Township just outside of Shanghai. The local government in Changfeng County, Anhui Province has designed strawberry picking day tours for urban residents.

Rising demand has also driven production of strawberries earlier in the year. Seen as more attractive, flavorful, and valuable, winter strawberries have become a popular gift to give during Chinese New Year (late January / early February). In major cities like Beijing and Tianjin, winter strawberries hit the wholesale market at as much as 26 RMB/kg (\$6.91 per pound) and at 12 RMB/kg (\$3.19/pound) at their lowest in December, and maintain a fairly high premium until early February (as high as 12 RMB) before plummeting to as low as 1.8 RMB/kg (\$0.35/pound) during the June peak season. (Table 6).

Over the past five years, China has begun to develop into a new market for high-end agricultural goods from East Asia. For instance, Japanese fruit exporters have recently found a niche in China's market for high-end gifts; Japanese apples retail in major cities like Beijing and Dalian for US\$17 apiece.²¹ Alternatively, the experience of Taiwanese

²⁰ China population and GNI data are from National Bureau of Statistics of China, 2005, China Statistical Yearbook 2004, China Statistics Press. A rough income elasticity of 1.46 was derived from Gifford and Lei, 2004, based on an annual average increase of 12 percent in fresh strawberry demand.

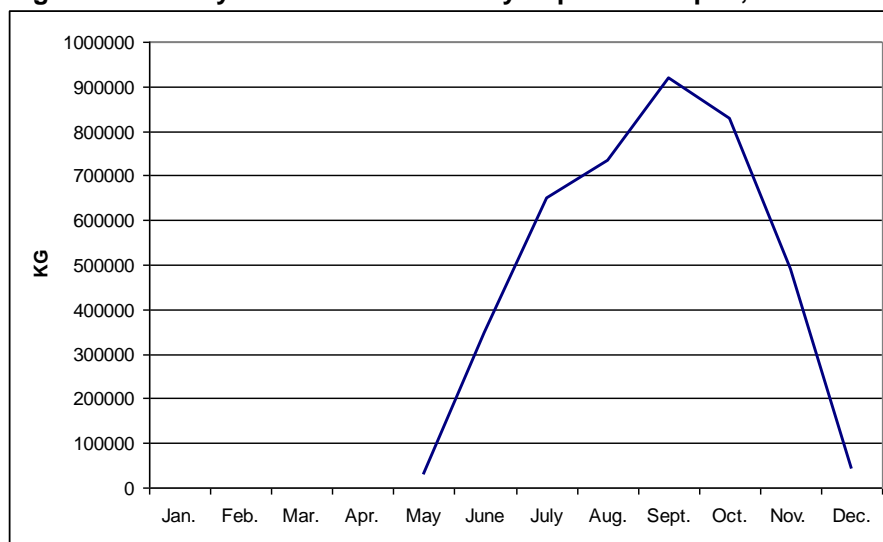
²¹ Anthony Faiola, 2005, "\$17 Japanese Apples For a Ka-Ching Dynasty: China's Newly Rich Gobble Boutique-Fruit Exports," *Washington Post*, December 15.

fruit exporters in China serves as a reminder of the continued travails of the Chinese market. Despite initial successes, tariff removals on 18 kinds of fruit imports from Taiwan in early 2005 were quickly followed by local imitations, and Taiwanese agribusinesses have been frustrated in their efforts to gain market share.

A diversifying market, rather than supply shortages, provides a window of opportunity for California strawberries before China is able to produce safer, higher quality strawberries for a longer part of the year. As China’s consumer preferences for strawberries continue to evolve, California strawberries could be differentiated in China based on these three strengths:

- *Longer growing season* — for instance, a one percent carryover of China’s in-season monthly fresh strawberry demand into the off-season would be equivalent to more than 2 million pounds per month.²²
- *Safety and traceability* — government agencies and consumers in China are increasingly attuned to food safety issues, and supermarkets are in many cases building customer bases in large part by marketing food safety.
- *Quality* — farmers in some areas of China were recently reported to have been using growth hormones to make their fruit more attractive; most of China’s strawberries lack consistency between appearance and taste.

Figure 3: Monthly U.S. Fresh Strawberry Exports to Japan, 2004



Source: Japanese customs statistics, online at: www.customs.go.jp/toukei/info/index_e.htm.

U.S. fresh strawberry exports to Japan (\$32.6 million in 2004) provide an analogue. Fresh strawberry exports begin in the early summer season (May) as the Japanese

²² Based on Gifford and Lei, 2004, and using a seven-month growing season for China.

strawberry growing season comes to a close, and peak during the July through November window where China similarly lacks a strawberry supply. (*Figure 3*).

Presently, China does not allow fresh strawberry imports. Removing this barrier would require the USDA and industry groups' proactive engagement with Chinese agencies, and could lead to difficult choices; a decision to employ safeguard measures to shield strawberry processors in the U.S. from Chinese frozen strawberry imports would likely prove counterproductive to efforts to open markets for fresh strawberries in China.

Despite roughly 97,000 pounds in exports in 2004 and roughly 99,000 pounds through the first three quarters of 2005,²³ China is currently not a major market for U.S. frozen strawberries — even when Chinese processors face supply shortages. As processing capacity has outpaced growing capacity, particularly in the past two years, China has begun to import frozen strawberries to be freeze dried and re-exported to higher value markets. Because of Chinese processors' almost singular emphasis on low cost production, frozen strawberry imports from Argentina, Chile, Egypt, and Morocco are more attractive than higher cost imports from the U.S.

²³ Butterworth and Lei, 2005.

Table 6: Wholesale Strawberry Prices in Some Major Cities, China, 2004-2005

Province	City	Market	Price Inspection Date							
			6.3.05	5.8.05	4.5.05	3.4.05	2.1.05	1.5.05	12.24.04	12.1.04
Beijing	Beijing	Baliqiao (八里桥)	\$ 0.48	\$ 1.86	\$ 1.91	\$ 2.39	\$ 3.19	\$ 3.19	\$ 3.99	\$ 6.91
Beijing	Beijing	Dayanglu (大洋路)	\$ 0.35	\$ 0.53	\$ 1.65	\$ 2.07	\$ 3.08	\$ 2.82	\$ 2.13	\$ 6.38
Tianjin	Tianjin	Hongqi (红旗)	\$ 0.69	\$ 0.98	\$ 1.65	\$ 1.73	\$ 2.18	\$ 2.13	\$ 2.26	\$ 3.19
Liaoning	Dalian	Shuangxing (双兴)	\$ 0.72	\$ 1.06	\$ 1.59	\$ 1.99	\$ 2.13	\$ 3.19	\$ 2.92	\$ 3.72
Shandong	Qingdao	Chengyang (城阳)	\$ 0.53	\$ 1.06	\$ 1.59	\$ 1.59	\$ 1.59	\$ 2.39	\$ 3.72	\$ -

Province	City	Market	Price Inspection Date							
			6.1.04	5.8.04	4.15.04	3.2.04	2.10.04	1.5.04	12.25.03	12.2.03
Beijing	Beijing	Baliqiao (八里桥)	\$ -	\$ 2.23	\$ 1.22	\$ 2.66	\$ 2.13	\$ -	\$ -	\$ -
Beijing	Beijing	Dayanglu (大洋路)	\$ 0.43	\$ 0.80	\$ 0.93	\$ 1.59	\$ 2.92	\$ 3.45	\$ -	\$ 4.25
Tianjin	Tianjin	Hongqi (红旗)	\$ 1.33	\$ 1.30	\$ 1.46	\$ 1.41	\$ 1.67	\$ 2.47	\$ 3.45	\$ 4.52
Liaoning	Dalian	Shuangxing (双兴)	\$ 0.72	\$ 1.33	\$ 1.59	\$ 1.59	\$ 2.13	\$ 2.66	\$ 3.45	\$ 3.72
Shandong	Qingdao	Chengyang (城阳)	\$ 0.80	\$ 0.85	\$ 1.49	\$ 1.28	\$ 2.39	\$ 2.39	\$ 3.72	\$ -

Source: Ministry of Agriculture Information Center, online at <http://www.zao.com.cn> [in Chinese].

The California Strawberry Industry

Competition from China is one of several interrelated challenges facing the California strawberry industry. A combination of labor shortages and lost production to China could force reductions in strawberry acreage and continued changes in industry structure.

Labor Shortages

California agriculture, and the strawberry industry in particular, is currently facing the prospect of a dwindling labor supply. A variety of factors, including higher demand for migrant labor in California's booming construction industry and stricter immigration controls, has contributed to seasonal labor shortages.

For strawberry growers, labor shortages have been felt most acutely in Southern California, where a combination of overlapping harvesting seasons, troughs in new varieties' production cycles, and better economic prospects for picking fresh are driving pickers north before strawberries for processing are harvested.

A shrinking labor pool could begin to have an impact on the state's total strawberry acreage well before China's frozen strawberry exports to the U.S. reach 100 million pounds. Labor shortages could prompt reduced strawberry acreage or innovation in mechanization, both of which might have benefits for the industry.²⁴

Expanding Acreage

California's strawberry acreage grew 24 percent (6,296 acres) between 2000 and 2005, encouraged by growing demand for fresh strawberries.²⁵ Ninety-two percent of acreage increases from 2000 to 2005 was in Oxnard and Santa Maria, which also have significant percentages of their total production (34 percent by volume in Oxnard, *Table 8*) delivered to processors.

Table 7: Fresh and Processed Strawberries as a Percentage of Total Production, 2003

	Acreage	% Fresh Volume	% Processed Volume	% Fresh Value	% Processed Value
Monterey County	8,472	94	2	95	1
Ventura County	8,794	66	34	84	16
Santa Barbara County	3,763	n/a	n/a	78	22

Note: Monterey County excludes organic and some other production from these calculations.

Source: Agricultural Commission Crop Reports, Monterey, Ventura, and Santa Barbara Counties, 2003.

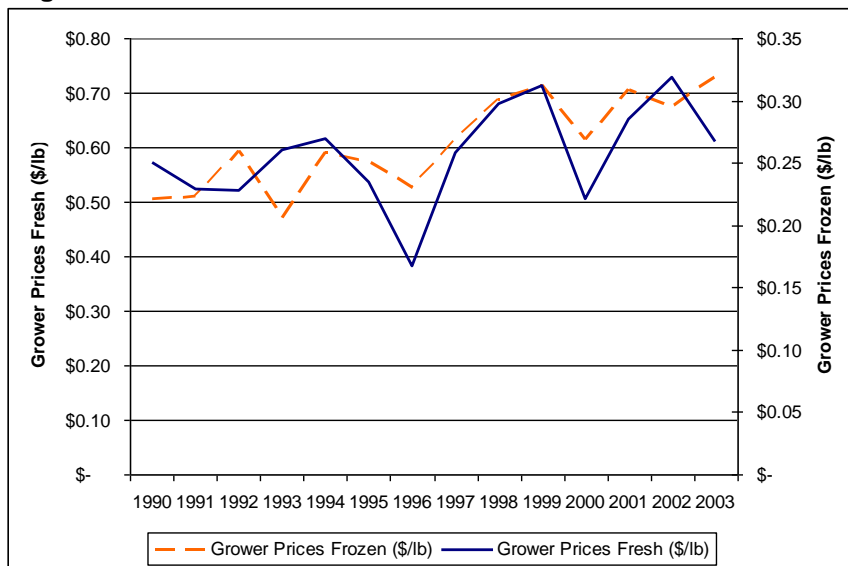
In both Oxnard and Santa Maria, the fresh market is ultimately driving acreage increases. In Oxnard, for instance, the share of processed strawberry volume decreased from 40 to

²⁴ Interviews with California strawberry processors, July 2005.

²⁵ California Strawberry Commission, 2005 Acreage Survey, online at: http://www.calstrawberry.com/fileData/docs/2005_Acreage_Survey_Results_Complete.pdf.

34 percent from 2000 to 2003 as acreage increased by 16 percent.²⁶ While expanding acreage in response to and increasingly using varieties that cater to the fresh market, growers in Southern California are still dependent on sales of processed strawberries to maintain profitability. Percentage increases in processed strawberry acreage are used as a hedging mechanism against fluctuations in the fresh market; processed strawberry prices in California have historically been more stable than prices for fresh strawberries. (Figure 4).

Figure 4: Grower Prices for Fresh and Frozen Strawberries in California, 1990-2003



Source: Processing Strawberry Advisory Board of California, 2005.

Changing Industry Structure

The California strawberry processing industry has undergone significant changes in composition and structure over the past five to ten years. Consolidation — driven both by consolidation further downstream and intra-industry competition — has reduced the number of strawberry processors in California by more than half, and has contributed to changes in industry structure.²⁷

Many strawberry processors previously preferred a more integrated grower-processor model because of its reliability, both in terms of maintaining throughput and ensuring quality. The industry is now more divided, with some processors maintaining the integrated approach and others transitioning toward a short-term contract or spot model.

While the spot model provides greater flexibility and lower inventory risks for processors, it also introduces a new source of volatility and spurs outsourcing when supplies are short, as in 2005. As labor shortages challenge the integrated model and competition from China challenges the spot model, the industry is still searching for a more stable equilibrium in terms of its business models.

²⁶ Agricultural Commission Crop Reports, Ventura County, 2000 & 2003. California Strawberry Commission, 2005.

²⁷ Interviews with California strawberry processors, July 2005.

Conclusions

China's frozen strawberry exports to the U.S. are set to increase as their traceability and quality improve, and as the transaction costs of sourcing from China fall. Strawberry production in China has significant room to grow extensively and intensively as the country transitions from uncoordinated small-scale farming to a more modern farming system. To some degree, Chinese strawberry processors will emerge as increasingly larger competitors for their U.S. counterparts regardless of growth in China's domestic strawberry production. Because of their low costs, it is apparently cost-effective for Chinese businesses to import frozen strawberries, add value to (freeze dry) them, and re-export them.

The potential impacts of lost frozen strawberry market share on the California strawberry industry will depend inter alia on fresh and frozen strawberry consumption and production trends in the U.S., in China, and elsewhere; industry changes in California; and Chinese businesses' ability to supply and access different segments of the U.S. market. Ultimately, it will likely be U.S. businesses that facilitate the improvements in farming and marketing that make greater penetration possible for Chinese frozen strawberry imports. For processors, higher import levels from China will lead to continued changes in business models. For growers, lower frozen strawberry production in the U.S. could lead to reduced acreage without higher demand for fresh strawberries.

Processors

Without more comprehensive, systematic, and proprietary data — including buyer composition and profiles; producer costs, revenues, market share, and decision-making criteria; and monthly prices — more precise industry-wide structural impacts of greater competition from Chinese frozen strawberry imports are difficult to project. Qualitatively, competition from China will likely reinforce trends toward specialization across the California strawberry processing industry.

There are essentially three kinds of strawberry processors in California: brand label producers; mixed brand and private label producers; and private label producers. Of these, private label producers whose primary source of revenue is strawberries will be at greatest risk to competition from China.

In the short to medium term, more risk averse buyers — for instance those that lack a kill step in their production processes — are likely to continue to source from California and create limits for the volume of U.S. frozen strawberry imports from China.

Over the medium to longer term, competition from China will divide the strawberry processing industry along three lines:

- Brand label producers will begin to source more of their frozen strawberries directly from China;
- Mixed producers will begin to source more under their own brand from China, and will begin to act as brokers for small-scale industrial users and food service companies looking to source from China and offset some supply chain risk;

- Private label producers will be forced to increasingly differentiate themselves by quality, or act as brokers for smaller-scale industrial users and food service companies.

In the long run, the food processing industry in the U.S. could follow manufacturing's production sharing model, where U.S. food companies either source a significant share of their processed food or have a portion of their processing facilities in China, and add value through supply chain management and marketing. A limited number of U.S. businesses have already incorporated themselves into strawberry production sharing systems in China.

Growers

Greater competition from Chinese frozen strawberry imports would trickle down to growers through lost market share for strawberries grown for processing. Integrated grower-processors could experience these losses directly; growers could lose intermediary markets for the processed strawberries that allow them to maintain profitability. Because this hedging strategy is largely split north-south, the impacts of greater competition from China on California strawberry growers would similarly be largely regional.

Table 8 illustrates the regional nature of potential impacts on growers, hypothetically assuming no changes in demand, yield, and prices, and ignoring the interplay between fresh and frozen production.²⁸ In Ventura County, which comprised just over 38 percent of California's total processed strawberry production in 2003, a 40 percent reduction in frozen strawberry market share to China would spell a 20 percent reduction in acreage. In Monterey County, the acreage reduction would be less than one percent.

Table 8: Effects of Reduction in Processed Volume on Total Strawberry Acreage, Ventura and Monterey Counties

	% Total Processed 2003	Reduction in Processed Volume	Reduction in Total Acreage
Ventura County	38%	40%	20% (1,776 acres)
Monterey County	1.5%	40%	0.7% (85 acres)

Sources: Based on Ventura County and Monterey County Agricultural Commission Crop Reports, 2003.

Fresh and frozen production and price dynamics have the potential to create significant disturbances for the California strawberry industry as a whole. A surge of Chinese frozen strawberry exports worldwide could depress global prices for frozen strawberries, leading to lower grower prices for fresh strawberries California as southern growers convert acreage from processed to fresh strawberries and saturate the fresh market. How growers respond to variations in frozen strawberry demand will determine the

²⁸ Volume to acreage conversions are based on 2004 California total strawberry acreage (31,639 acres), average yields (52,800 pounds/acre) and frozen strawberry production (476,391,000 pounds). Acreage data is from California Strawberry Commission, 2005; average yields and production data are from Processing Strawberry Advisory Board of California, 2005.



longer-term effects on prices and production. Dynamic modeling of these effects will remain speculative without more complete and up-to-date information on growers to indicate what growers' response might be.