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Value-added Business Profile
Iowa State University

Tree Top: Looking Forward

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It was a cool November morning in Selah, Washington. Tom Stokes grew up near Choteau, Montana and still felt at home in jeans and work boots. He was used to hard work and cold winters but now at the age of 56, he preferred his tea just a little warmer. While Seattle was several hours away, he was not a gourmet coffee or tea drinker unless that was the only alternative. He was proud of his rural Montana heritage. After his degree from Montana State University in industrial and management engineering, Tom went to work for Lamb-Weston and then onto Tree Top, Inc. (“Tree Top”), serving in various operations positions until becoming President and Chief Executive Officer of Tree Top in April 1999. He was getting ready to prepare a report to the board of directors. The previous year had been a difficult one for the apple processing cooperative. Tree Top had expected the 2006 supply of apples available for processing to be greater than in 2005, which would have enabled the cooperative to utilize its processing capacity.

However, for a variety of reasons, the supply of apples was much less than the year before, and Tree Top was not able to fully utilize its processing assets, which meant that it had lower profitability and its field price for processed apples was not as competitive. Apples are grown for the fresh market rather than the processing market. Outside of its small fresh apple slices, Tree Top relies on apples that do not make grade for the fresh market or have hail or weather damage. These apples are referred to as culls. Thus, Tree Top’s business model is to process apples not suitable for the fresh market and add value to these culled apples.

The cyclical nature of apple production meant that Tree Top had plant and equipment capacity for the years when the apple crop was large. In such years, the growers wanted to make sure that value was added to the culled apples. But the “insurance policy” of the capacity adds costs when supply was less. However, in recent years the supply of apples available for processing had declined, and it was thought that the future supply was going to continue to be lower. This had implications for Tree Top’s fixed assets and its product mix. These factors obviously affected the price paid for processed apples. Tree Top’s competitors for processed apples in Washington were much smaller and were evenly matched with regard to supply of apples and product demand. As the leader of Tree Top, Tom had to explain to his board the events surrounding the 2006 apple harvest and put that into the context of other factors that were impacting all firms in the processed apple industry. These factors had implications for Tree Top’s future product mix, processing capacity and profitability.

History

Prior to the development of apple juice, apples that were not suitable for fresh consumption were often disposed of by dumping into landfills or river canyons. The development of the apple juice industry enabled a product that had no value to be developed into one that had value. Tree Top was originally formed by Bill Charbonneau, his wife and two sons who purchased a small apple processing plant in Selah, Washington, in the 1950s and began developing a high-quality brand of apple juice. Mr. Charbonneau held a contest among his employees to choose a brand name for his product, and the winning entry was “Tree Top” because it was widely believed that the very best quality fruit grew at the top of the trees. In 1960, a group of Washington apple growers purchased Tree Top. The cooperative is owned by 1,300 apple growers in Idaho, Oregon and Washington, with almost 95 percent of the membership in Washington.

Tree Top was the first to develop frozen apple juice concentrate in 1963, and the cooperative began slicing and drying apples for ingredient uses in 1968. It is the world's largest producer of dried apple ingredient products, which are used in cake mixes, cereals, cookies and other products. The cooperative began selling cider in 1970 and pear juices in 1975 because many of its members also grew pears.

Tree Top owns six plants, including fresh apple and pear juice concentrate facilities in Cashmere, WA; apple juice and concentrate in Selah; low-moisture, chilled and frozen apple ingredients in Wenatchee, WA; canned, fresh and frozen juice concentrates in Prosser, WA; evaporated, dried, fresh apple slices and other apple formulations in Selah (called the Ross Plant), WA; and a bottling facility in Rialto, CA. Historically, the Yakima River Valley has been one of the most important fruit-growing regions in the United States (Freeman, Miller and Highsmith).

Tree Top is the world's largest dried apple producer and the largest fresh apple juice and cider processor in the United States. It also produces various apple and fruit juice blends, fresh apple slices and apple sauces for the retail consumer. Tree Top is a large manufacturer of dried, frozen and concentrated fruit products (i.e., pie and pastry fillings, etc.) for ingredient buyers. Northwest Naturals (Bothwell, WA) is a wholly-owned subsidiary of Tree Top and produces all-natural fruit juice blends and specialty products.

On average, 50 to 60 percent of all processed apples produced in Washington are marketed through Tree Top. The 2002 to 2006, five-year average was 398,100 tons of apples, with a range of 311,000 (2004) to 497,000 (2005) with an average profit per ton of \$8.57, with a range of \$1.41 (2002) to \$13.62 (2005). Tree Top had processing capacity for 550,000 tons. Its eleven-year average for 1996 to 2006 was 402,000 tons but this was misleading because it had only processed 400,000 tons or more in 1998, 2000 and 2004. In those years, the tonnage was close to capacity.

The cooperative is governed by a twelve member board of directors, with six directors chosen from two districts (North and South) who serve a three-year term and four directors elected annually. Directors were chosen at-large within these two districts and represented a variety of backgrounds from integrated grower and warehouse operations, to growers who sold to warehouses. There was a diversity of size based on volume within the board room, and the board was believed to be behaving in an effective manner with regard to its fiduciary responsibilities.

Tree Top used a base capital equity management plan to provide equity for the cooperative. Every year, the board of directors determined the amount of equity capital that each member was required to own in Tree Top. This equity capital was based on the tonnage of fruit that was delivered to the cooperative based on a rolling average of the previous three to five years. The minimum amount of investment was 60 percent of the average volume of the five previous years, with one marketing right equal to one ton of fruit. A marketing right entitles the grower to the cooperative profits on that one ton. A grower with excess market rights could lease their marketing right to another grower. For example, a grower who delivered 100 tons of fruit per year in each of the previous five years (e.g., 2002 to 2006) was required to have 60 marketing rights in 2007 (100 tons, which was the five-year average multiplied by 60 percent). The value of a marketing right was \$75 per ton. Under this simplistic scenario, the grower must invest \$4,500

in Tree Top market rights. These amounts were not insignificant as a typical grower might have tens of thousands of dollars invested in Tree Top.

Tree Top also issued allocation certificates, which were issued in years when the cooperative did not pay out 100 percent of its membership returns in cash. These certificates did not pay interest and could be redeemed in the future at the discretion of the board of directors. Finally, Tree Top also had membership stock that had a \$1 par value and each member was required to own one share, which had a voting right for the annual election of directors and any other business required of the membership at the annual meeting.

Overview of Apple Production

Washington is the largest apple-producing state in the United States. Apples are grown in orchards and are shipped to warehouses for grading and packed for the fresh market. Apples not suitable for the fresh market (e.g., culls) are sent to processors like Tree Top. The harvest began in August and finished by early November.

A typical cyclical pattern exists for a tree fruit like apples. In a good year, the apple tree has yields with lots of fruit, which causes stress on the tree and the following year, the yields are lower. This pattern of above-average production followed by below-average production is common in apples, citrus, coffee and similar crops. However, despite the variability in yields, which causes variability in total supply, there has been an overall increase in plantings of orchards since 1975, which has led to greater supply over time.

Apple growers have increased the number of apple trees per acre over time. The typical apple varieties processed by Tree Top were Red Delicious (236 trees per acre in 1986), Smoothie Goldens (280), Standard Goldens (196), Granny Smith (510) and Fujis (599). In 2007, these numbers had increased to 370, 895, 632, 828 and 668 trees per acre, respectively. Overall, the number of apple trees for all Washington varieties had increased from 281 to 739 trees per acre from 1986 to 2005. Most of the dramatic increase in yields had occurred since 2000.

This increase in productivity had come from improvements in varieties, changes in planting practices (e.g., closer plantings) and tree care (e.g., better irrigation, improved nutrients, thinning and pruning). Reds, Goldens, Granny Smith and Fuji comprised 67.5 percent of all acres in 2006. However, these varieties were much older than the newer varieties being planted. An apple tree has a life cycle in that it could produce fruit for a very long time. While each variety was different, in general, trees reached maturity at eight years of age with yields doubling from the age of four to eight years. New orchards and replacement of trees within existing orchards had moved toward niche apple varieties for the fresh apple market. New plantings of Reds and Goldens had declined since 2000. Reds were a well-known variety but had a lower yield relative to other varieties, while Goldens and Granny Smiths had the highest yields.

Growers had become more efficient in other ways, as well, in producing apples for the fresh market. Investments in storing and packaging apples in the warehouse meant more apples for the fresh market and less for the processing market. Apple growers who were not vertically integrated into warehousing had seen increases in storage costs due to energy and insurance. Concerns over immigration had resulted in fewer laborers available for the apple harvest. In any

given year, 65,000 part-time laborers were needed for the apple harvest. In some cases, it was cheaper for a grower to leave the processor apples in the orchard instead of collecting them and sending to a processor like Tree Top. There is no mechanical harvesting of apples.

Figure 1 shows the percentage of apples that were processed and the total amount of apples produced in Washington over time. Note that the percentage of apples available for processing averaged 26.3 percent during this time period. However, during the past two years, it had been less than this average and it was thought that the new long-term average was 23 percent. One box contains 40 pounds of apples and there are 20.8 boxes of apples per bin. In a 140-million-box apple crop, this 3.3 percent differential was 2.8 million boxes or 92,346 tons. Assuming Tree Top had 60 percent of the market share for processed apples in Washington, 55,408 tons of the 92,346 tons belonged to Tree Top or 11.08 percent of Tree Top's capacity.

Figure 2 shows the industry yield over the 1996 to 2006 time period. This represented an average of 15.33 fresh pack bins per box but had been steadily increasing, except in 2004, which was a poor harvest year. This yield showed that producers were becoming more efficient at producing apples for the fresh market, which meant that Tree Top had fewer apples available for processing.

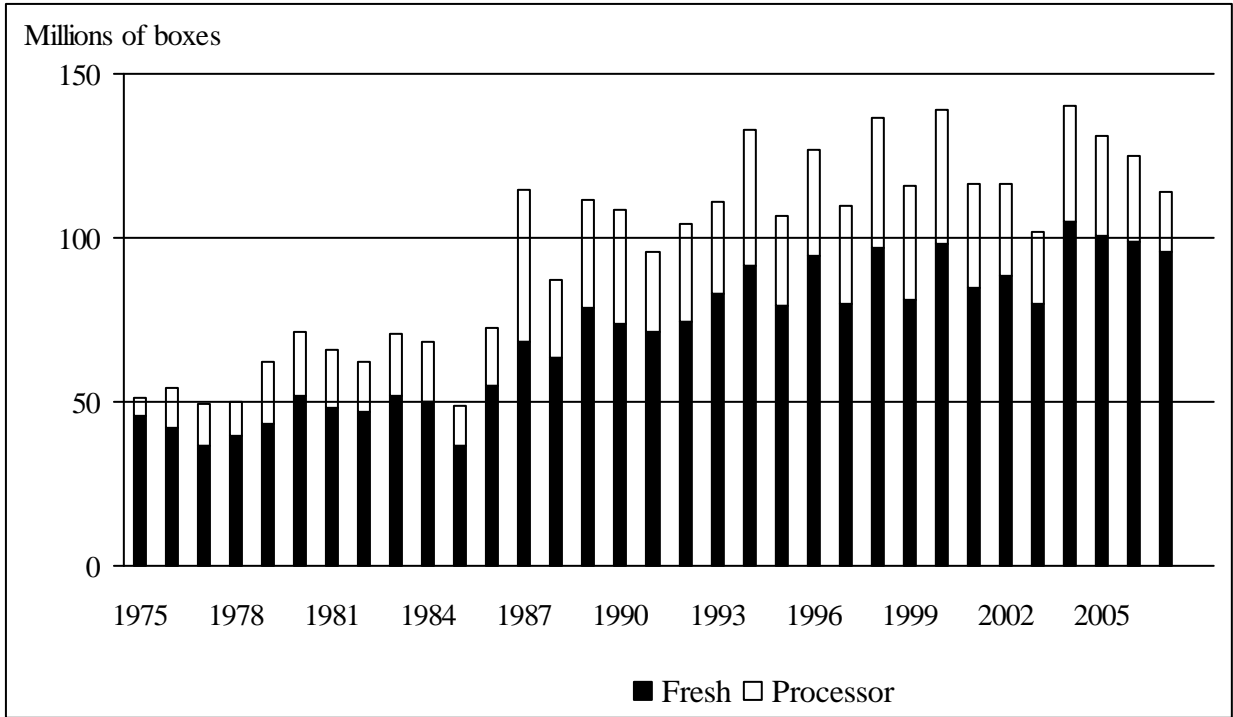


Figure 1. Apple Supply for Fresh and Processed Apple Market in Washington, 1975 to 2006.

Overview of Apple Marketing

The apples are delivered to a warehouse in bins. The apples are graded and stored in controlled atmosphere storage, which controls for humidity, carbon dioxide, oxygen and temperature. Exposure to oxygen enables the apple to convert starch to sugar and the apple ripens. In a controlled atmosphere storage room, this process slows down (e.g., oxygen levels are reduced using nitrogen gas infusion and a constant humidity is maintained) and Washington is the world leader in the use of this technology.

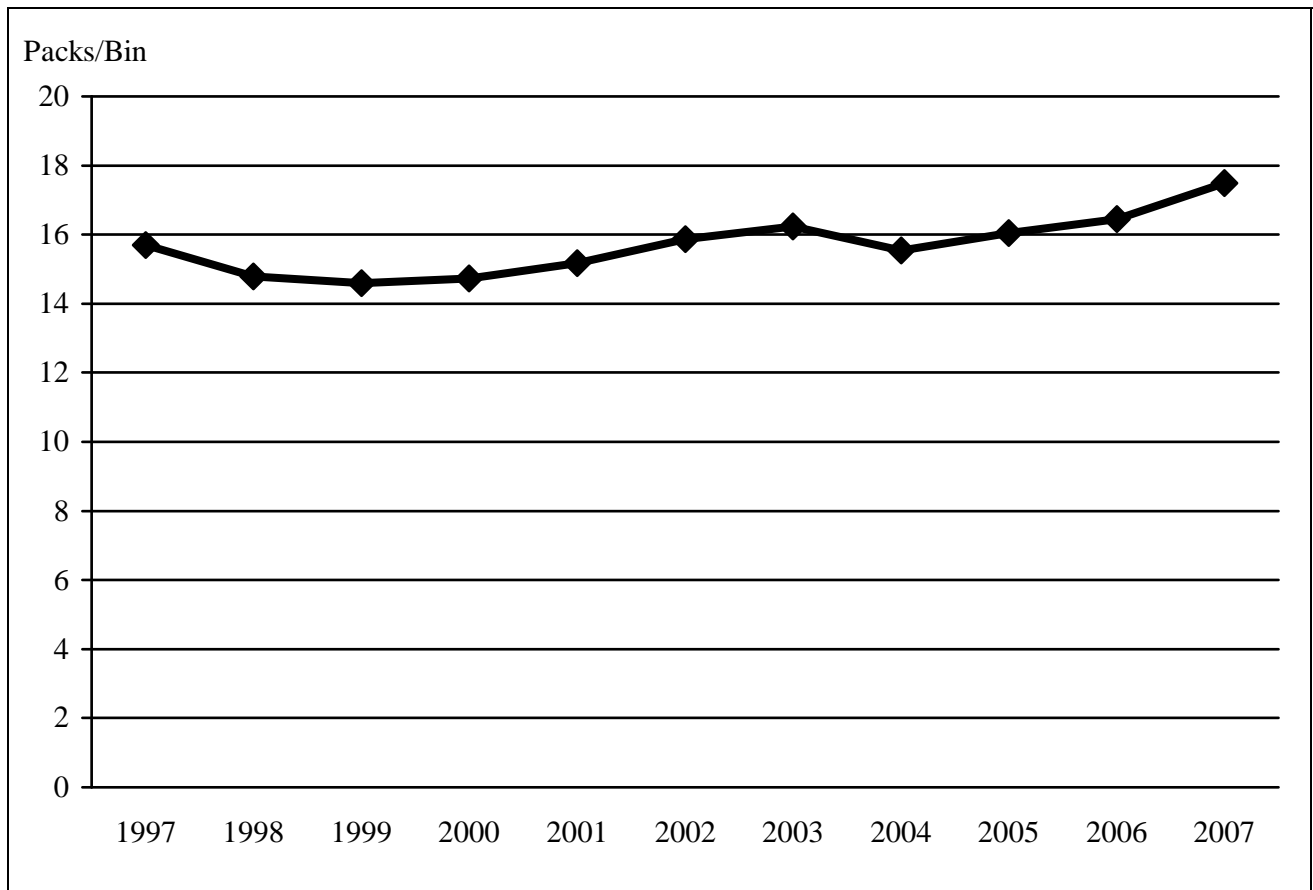


Figure 2. Average Number of Fresh Pack Boxes per Bin (20.8 Boxes per Bin), 1996 to 2007 (estimate).

This technology works best when the apple has the right maturity and apples are tested frequently for firmness, skin color, seed color, sugar level and flesh chlorophyll. Fresh apples can be stored up to 12 months if necessary. Apples stored using this technology are sold between January and September, while apples stored immediately after harvest are placed in refrigerators. A thin coat of wax is applied to apples to help replace the natural coat of wax that is partially removed when the apples are washed to remove dust and residues. The wax helps prevent moisture loss, improves firmness retention and slows down the apple respiration rate.

The demand for apples was driven by increases in the per capita consumption of apples. However, this figure masked the trends in consumption. Dried, canned, frozen and fresh apple consumption had stayed approximately the same between 1986 and 2006, while apple juice consumption had increased from 1.52 single-strength gallons in 1986 to 2.23 gallons in 2006. In 1986 to 1988, the three-year moving average of per capita consumption of fresh apples and processed apples was 17.84 and 26.71 pounds, respectively, while this was 17.47 and 29.49 pounds in 2006. Clearly, some of the increases in apple consumption were due to the increase in apple juice consumption. Also, because population had increased from approximately 240 million to 300 million during this time period, the overall market for apples had increased in size. Red Delicious apples were identified by consumers as their favorite-tasting fresh apple.

Apples are graded based on size, weight, appearance and internal quality. Most Washington apples weigh 5.9 to 6.7 ounces with a 2.84- to 2.93-inch diameter. The Washington red apples require a more uniform and deeper shade of red than other red apples. Green and yellow varieties must have minimal amounts of limb rubs and skin discoloration caused by weather. Apple varieties are also subject to internal quality standards including minimum soluble solids (e.g., sugar level) and firmness standards (e.g., internal pressure). These standards depend on variety. Washington has more stringent requirements than the U.S. apple grades and the firmness standard is unique to Washington.

Tree Top's main competitors in national retail and ingredient markets are Mott's (owned by Cadbury-Schweppes) and private label (e.g., Safeway). Competitors in regional markets across the United States included Martinelli's (Watsonville, CA); Apple & Eve (Roslyn, NY); Indian Summer and Wilderness (owned by CherryCentral Cooperative, Inc., Traverse City, MI); Old Orchard Brands LLC (Sparta, WI); Musselman's, Lucky Leaf, Apple Time (owned by Knouse Foods Cooperative, Peach Glen, PA); Minute Maid (owned by Coca-Cola); and Tropicana (owned by PepsiCo).

Figure 3 shows the historical price for apple varieties and apples used for juice purposes. Note that the difference between the fresh apple price and the juice apple price has gotten wider in recent years. This was due to several reasons. First, demand was higher for fresh apples. Second, China did not begin exporting apple juice concentrate to the United States until December 1996. The amount of apple juice imports from China grew so rapidly that the industry's structure changed permanently. China was the world's largest producer of apples and was believed to have three times the amount of processing capacity for its existing apple supply.

Figure 4 shows the imports of apples from China and Chile, the two largest exporters of apple juice to the United States. The sudden surge of Chinese imports was found to be a case of dumping. The U.S. Department of Commerce and the U.S. International Trade Commission found that the price of Chinese imported apple juice was below the average cost of production and instituted an anti-dumping tariff in June 2000 and it was continued in November 2005 (Carter and Gunning-Trant 2006). The prices for all apples decreased from 1996 to 1998, increased in 2000 when the anti-dumping tariff was added, but China continued to export apple juice over the last six years, which reduced the world price for apple juice. This differential between the fresh apple price and juice apple price was thought to be permanent.

Devising a Product Mix

In late April and early May, when the apples are in bloom, Tree Top begins its first estimate of the fall apple crop. This estimate is used to help project what the fall apple crop will be and what percentage of that apple crop would be converted into the processed apple market. This forecast is used by the management staff to begin developing an optimal product mix and the marketing

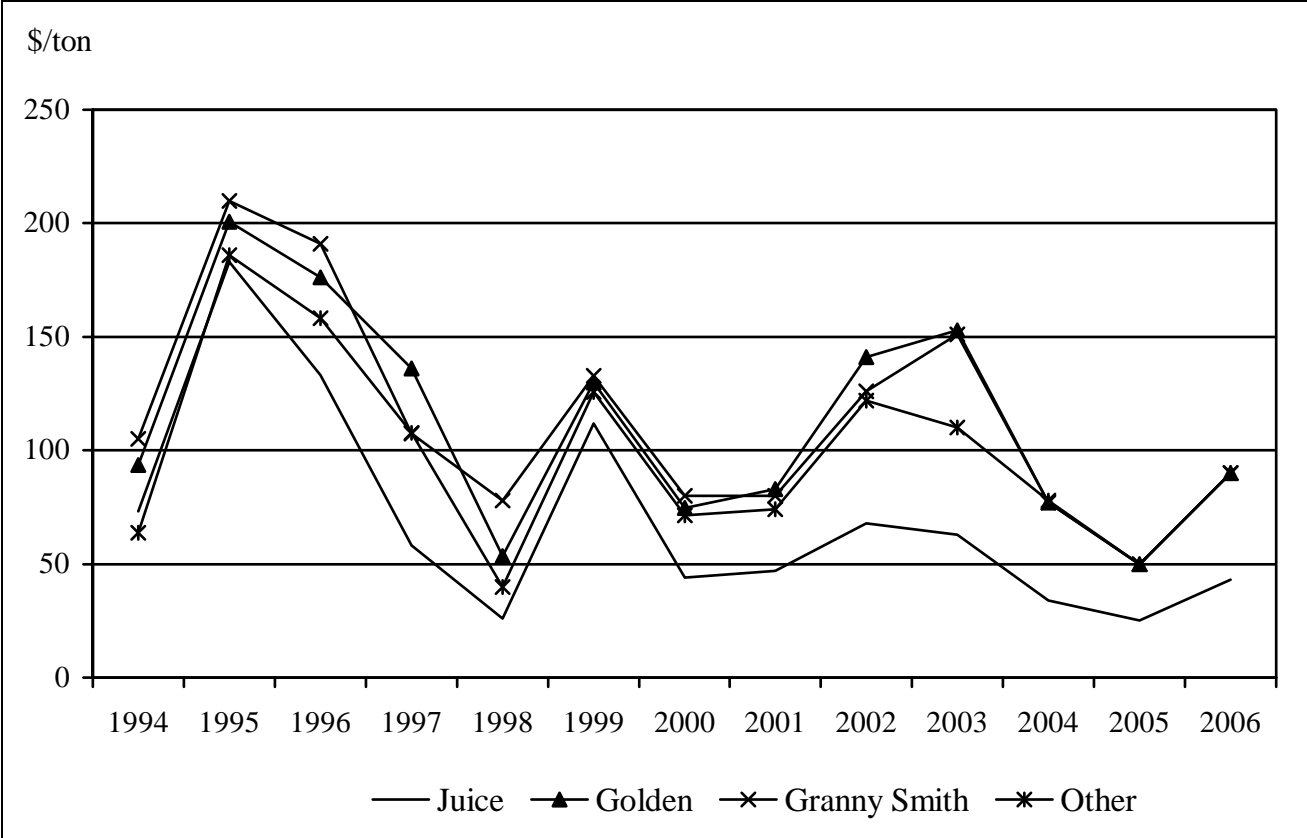


Figure 3. Average Apple Price per Ton for Fresh Apple Varieties and for Apples used for Juice Concentrate.

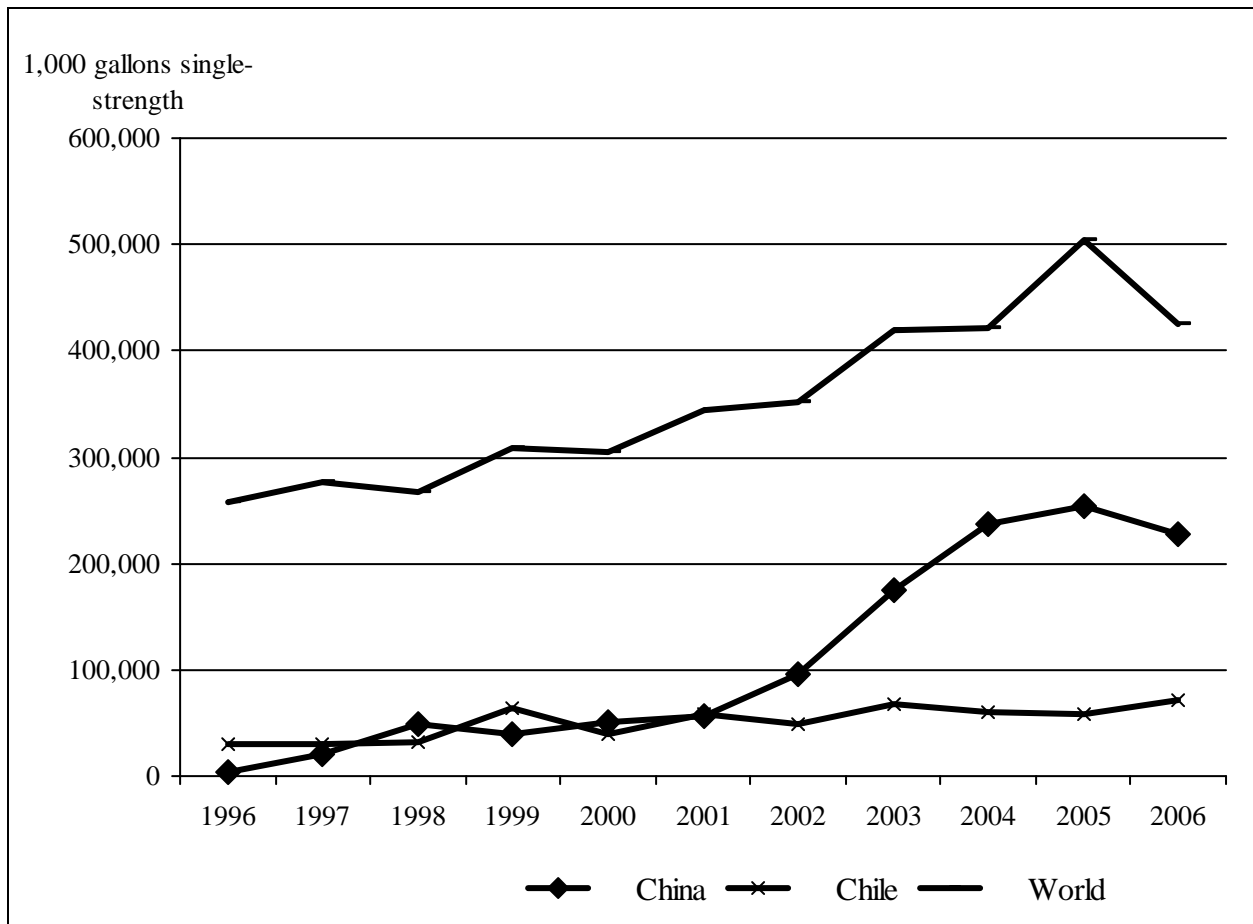


Figure 4. Imports of Single-Strength Apple Juice from China, Chile and World Total, 1996 to 2006.

staff to begin selling the product mix. A preliminary crop forecast is issued August 1. A second preliminary forecast is issued November 1, which has an initial conversion rate determination. A grower field price for the apples designated for processing is determined at this time. On December 31, a warehouse report is conducted to better understand the percentage of apples that Tree Top will receive for processing.

Thus, there are two critical time frames. The first time frame is the period between the estimate and the preliminary crop forecast (e.g., late April to August 1). Risk factors during the first time frame are primarily weather-related, such as frost, hail or a “snowball bloom,” where a heavy bloom appears to suggest a larger crop and pollination occurs but actual fertilization does not occur due to frost damage and a smaller crop results. The second time frame is the period between the first and second preliminary forecast (e.g., August 1 to November 1). Risk factors during the second time frame are primarily weather-related, such as russet, but more importantly, economic factors including the relative strength of the fresh market and costs of collecting and storing processed apples. Increased diversion of apples to the fresh market means fewer apples available for the processed apple market. If producers observe increased storage costs at harvest

relative to the observed processed apple price, they may decide to let the apples spoil on the ground.

Market intelligence is critical in this industry because there is no U.S. Department of Agriculture crop reporting in this industry. The market intelligence is hampered by the industrial organization of the Washington apple industry. Some growers are vertically integrated into warehousing and other growers consign their apples to a warehouse. Warehouses are not obliged to provide timely information to Tree Top regarding inventories. Tree Top has two types of contracts with its growers. A 100 percent contract obligates the grower to deliver all of the grower's apples available for processing. A tonnage contract, which is more common for the vertically integrated grower, obligates the grower to deliver a certain tonnage of apples for processing.

Tree Top developed a product mix that was designed to maximize its processing plant assets. The marketing group had developed a new marketing campaign revolving around the slogan, "Real Juice for Real People," which highlighted Tree Top's apple juices as having no sugar added. Tree Top competed nationally in retail supermarkets and required a full product line of apple juices, ciders and blends, sauces, dried fruit and similar branded products.

The 64-ounce container of apple juice was a mainstay product and Tree Top sold this volume in most metropolitan markets. The juice market was very competitive with virtually every company having a juice brand. However, Mott's and Tree Top had the most market share in this category. Almost 95 percent of all Tree Top sales occurred within a 16-week period each year because large supermarkets always promoted an apple juice each week. Juice was a high-volume, low-margin business with greater margins observed on other apple products. Tree Top was currently devising a reporting system to match apple utilization by variety with its highest margin use to match "the right apple for the right product."

Challenges for Tree Top

Tom wanted to make sure that the board and membership had a firm grasp of the challenges facing Tree Top. If the projections were right and there were fewer apples available for processing in the future, this had implications for Tree Top's operations. At the present time, Tree Top acted as an insurance policy for those years when there was an excess supply of apples for processing. This insurance policy was significant because it forced Tree Top to have excess capacity relative to its competition. In recent years, some growers had complained because Tree Top's field price for processed apples was not competitive with the other Washington processors. Tree Top's capacity worked to its advantage when the supply of apples for processing was plentiful because the cooperative could take advantage of its low-cost structure and create an optimal product mix. However, when the supply of apples available for processing was tight, this capacity resulted in greater costs because it was not being utilized efficiently.

Fewer apples available for processing had implications for marketing. In order to be a full-line retailer of apple juices and blends, Tree Top required a consistent supply of apples, especially since consumption was increasing. Juices and ciders were a high-volume, low-margin activity. If Washington could not supply enough apples for processing, Tree Top might be forced to seek other sources of apple juice concentrate. Tree Top had an excellent marketing staff but it needed

a full product line in major metropolitan markets to protect its brand value. The lack of accurate intelligence in 2006 had resulted in less available product and Tree Top had reduced its inventories to meet the shortfall. The marketing staff was confident that it could market the entire apple products provided by operations if the existing capacity was fully utilized. It would need to look closely at its customer lists if less supply was available in the future. Tree Top had some small-volume, long-standing accounts that were a little more costly to service relative to the large, retail supermarket stores.

At the present time, Tree Top's capital structure was believed by the board to be adequate. However, if the board and management believed that Tree Top needed to be very competitive on the field price of apples and that the additional capacity was needed as an insurance policy, then it was likely that additional equity would be needed to provide a cushion for years when supply was tight and profitability was reduced. Its current ratio of equity to assets was 26.7 percent. An additional 35 percent of assets were long-term debt, which had increased last year because of the new fresh-slice equipment.

In addition to having fewer apples (rather than more) in 2006, Tree Top had seen dramatic increases in its energy and packaging costs, which were unpredictable. Most packaging materials included petroleum-based products. In addition, Tree Top is getting ready to negotiate a new labor union contract with its employees in 2008. With a projected inflation in the U.S. economy, none of these costs were anticipated to decline any time soon.

Summary

Tom knew that the outstanding management team and employees, coupled with a board of directors that understood what drove Tree Top's business model, could maintain Tree Top's profitability. However, he realized that strategic changes needed to be considered. A bigger issue was whether Tom had complete information to make decisions. He needed to know exactly what the cost of operating fixed assets for a 550,000-ton operation with only a projected 400,000-ton apple supply would be. The exact nature of the relationship between average costs and volume per ton was not readily apparent. Tom also needed to know what the profitability per ton was for the different products that Tree Top produced so that better decisions could be made to devise a product mix. Moving to higher margin ingredient products might mean increased competition and marketing costs. Margins per product per ton could be measured, but knowing what those margins per ton would be if Tree Top stepped up its marketing was unclear. And, he needed to know the net impact on profitability from being a full-line supplier of products in every major metropolitan market. While it might be possible to prune Tree Top's customer lists in response to the lower volumes, the overall impact on long-term profitability per ton was unclear. It might be possible to procure apple juice from other sources. Finally, Tom also knew that a record crop might change all of these decisions and such a crop had occurred three times in the last decade.

He jotted down the main issues to visit with the board.

1. What was the long-term outlook for the volume of apples available for processing in the future?
2. Did the members still believe that they needed the additional capacity as an insurance policy?
3. Was it feasible to source apple juice concentrate from other sources?

4. What was the future for the investments in Northwest Naturals and the Fresh Slice operation?
5. Had Tree Top exhausted all “low-hanging fruit” in its efforts to squeeze out costs throughout the organization?
6. Was it possible to get better information about the potential supply of apples available for processing to avoid a repeat of 2006?

Tom sighed because his tea had gone cold. He was a long way from Choteau. While it snowed in Bozeman, his Montana State University economics professors never told him about how to make a crystal ball without any white stuff in it. While he knew he had some information at hand to make a recommendation to the board, he still wished that things were just a little clearer.

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