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TECHNICAL AND ECONOMIC ASPECTS OF THE HARVESTING, PACKING, AND TRANSPORTING OF AVOCADOS IN THE UNITED STATES OF AMERICA

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INTRODUCTION

Avocado growers in every growing area around the globe have their own cultural challenges based on factors such as soil types, weather conditions, and production costs. The elements of nature constantly challenge the grower as he tries to produce an economic crop from his trees. And then, the prevailing market conditions of supply and demand will determine the actual return to the tree and determine the ability of the grower to achieve a profit from his production.

The period of transition from the tree to the customer is crucial in the short and long term. During this period, the final quality of the product that will be presented to the consumer is determined. Under the correct conditions, the consumer will receive a quality product that will result in repeated purchase of avocado in the future. Incorrect handling of the product will result in poor fruit quality and a consumer that will be turned off to avocados.

This lecture will discuss the technical and economic aspects of the harvesting, packing and shipping of avocados. I will focus on the Hass variety in the United States, which represents almost 90% of the avocado crop in California.

BACKGROUND OF CALIFORNIA AVOCADO INDUSTRY

Growers

The California avocado industry of 1996 is a result of growth that took place in the 1970s and 1980s. Producing acreage increased from 20,000 acres in 1970 to an estimated 84,000 by 1993. Current acreage, as estimated by the California Avocado Commission, is 60,000. The growing community is almost as diverse as the society in general. The following are the key divisions of the grower community:

- *Location: South and North*

Approximately 68% of the acreage is located south of Los Angeles. The remainder is north of Los Angeles and in the San Joaquin Valley. The southern districts have a high

percent of 1) small groves; 2) absentee growers, 3) large farm management companies; 4) business professionals new to farming, 5) retired professionals, 6) high production costs/ lower yields, 7) harvest is during the peak weeks of the season.

North of Los Angeles lie approximately 35% of the avocado trees. While some of the growers fit into the southern description, this area has mainly first or more generation farm families. Most of the largest groves are located in this area. Production costs are lower than in the south and average annual yield is higher. Harvest can be stretched out to the end of the season.

- *Grove Size*

The average avocado grove in California is just 10 acres—the majority, less than 5 acres. Groves can be identified as:

Level One Groves:	Over 40 Acres	4,355	6.7%
Level Two Groves:	20 to 39 Acres	3,250	5.0%
Level Three Groves:	10 to 19 Acres	6,760	10.4%
Level Four Groves:	5 to 9 Acres	8,775	13.5%
Level Five Groves:	Less Than 4 Acres	41,925	64.5%

- *Pre-harvest Production Costs*

Low Cost Producers:	Less than \$2,000/Acre
Medium Cost Producers:	\$2,000 to \$2,999/Acre
High Cost Producers:	\$3,000 or more/Acre

- *Affiliation*

Approximately 40% of the growers and volume are members of cooperative organizations. These are basically "share holders" who are under contract to provide the cooperative with 100% of their fruit. The remainder of the fruit is in the hands of independent growers who, typically, do not have a contract with their marketer and have the option to choose one or more marketers for their product.

The Market

- *Packing House / Marketing Organizations*

There are currently 13 marketing organizations in California. Except for Chiquita, all are California-based companies that have been in business for up to 71 years. Two of these organizations are cooperatives, the remainder are private companies. I have estimated the following market share comparison:

	Market Share	# Houses	Total Mkt Share
Major Market Share:	Over 12%	2	49.0%
Medium Market Share:	6% to 11.9%	4	27.0%
Minor Market Share:	1% to 5.9%	7	18.0%
Limited Market Share:	Less than 1%	50	6.0%
Grower/Stockholder Ownership		3	
Private Ownership		10	

In addition, there are approximately 50 other marketers of minimal volume—less than 25,000 lugs.

In order to maintain market continuity, almost all of the major marketers supplement their California volume with imports from Chile either directly or through brokers.

- *The Buyers*

The era of "down-sizing" in the United States has resulted in an immense consolidation of the retail supermarket chains. Margins have decreased, and the need to make a profit from every sale has intensified. Produce continues to be the store profit center, as canned products are sold at close to cost.

In the southern California market, the place that around 25% of the domestic avocado volume is sold, this situation is even more intense. The major retail chains are in battle for their existence daily. From the end of World War II until the late 1980s, these chains benefited from the great growth in the state of California. If you were able to monitor your cash flow, it was easy to make money in this growing market. New consumers were entering California daily. However, huge club stores and other retailers have reduced their ability to grow in the '90s. Major chains—doing business in the California market for over three decades—are merging. With fewer buyers competing for fruit, the leverage has transferred from the grower and the marketer to the buyer.

HARVESTING

Physiological - Regulatory Issues

The harvest of the Hass avocado, which represents almost 90% of the production, begins in November. The packing of avocados is regulated by the California Department of Food and Agriculture-Standardization. Studies by the University of California at Riverside have resulted in the development of minimum maturity standards based on dry weight matter by variety.

These studies have further shown that "release dates" can be determined well in advance of the season for the Hass and other varieties.

The following bullet points summarizing the Avocado Inspection Program have been

provided to me by the State of California:

- The Avocado Inspection Program was created by the 1972 State of California statutes which were introduced at the request of the avocado industry in California. This legislation required each container of avocados to be inspected and certified as meeting the minimum state standards defined in the law.
- In 1983, regulations regarding avocado maturity standards and testing procedures were amended. In general, the regulations changed the method of testing for maturity from the Halowax Oil Extraction Method to the new Dry Matter Method.
- Avocados are inspected for maturity, defects, standard container and pack, container markings and weight, and size/count regulations.
- Each lot is tested for maturity, until a packing release date for each size and variety. After the release date, maturity testing is no longer required.
- While factors of quality and weights are extremely important, the most essential part of inspection is to assure that only mature avocados will reach the end consumer.
- The establishment of minimum maturity standards for avocados is a relatively simple and straightforward process. The three-year study on Minimum Maturity Standards, the relationship between physiological maturity and percent dry matter, has resulted in specific levels of minimum maturity for each variety and release dates set for the major varieties.
- The Avocado Inspection Committee (AIC) was created under the authority of the Department of Food and Agriculture by legislation. The AIC is advisory to the Secretary of the Department of Food and Agriculture on all matters pertaining to the program.

The entire program is funded by the avocado industry— not the taxpayers. The charge is currently \$0.03 per lug. This cost is paid directly to the C. D. F. A. by the packing house and, in most cases, is reflected in the final grower return.

Costs

All farm employees in California are governed by some of the strongest labor regulations in the world. These regulations govern wages, safety issues, benefits, and termination procedures. All small business owners, including family farmers, have a very difficult time competing in this environment. Therefore, a large percent of the avocado crop is harvested by harvest labor contractors.

Harvest costs are calculated in per kilo cost. In order to harvest as much fruit as possible during the maturity seasons and to maximize the growth of the fruit, much of the harvest is executed as a size—pick harvest. Depending on the volume and the height of the trees, a size—pick harvest can cost as much as \$0.25 per kilo or \$1.00 for a 4 kilo carton. The average cost for a regular harvest is \$0.10 per kilo or \$0.40 per 4 kg carton.

Depending on the market, the normal industry practice is to make two size picks—one at the beginning of the season and the next three months later. The grower then usually finishes his harvest with a final "strip pick" of the remaining crop.

Market Timing

One factor that influences growers returns is market timing. The correct harvest strategy can result in higher than industry average returns. Obviously, the grower must choose to market his crop with the marketer who he or she feels does the most competitive job in the market. Secondary reasons for choosing a marketer are the service and information provided by the marketer to the grower. The level of service and the quality of information can help the grower make a more informed decision on his harvest. Growers who are members of cooperative packing and marketing entities are required by contract to market their fruit through their co-op. In addition, the trade association, the California Avocado Commission (CAC), which is funded 100% through a grower assessment, provides general information for the growers and marketers.

The end goal of the growers and the marketers is to have a harvest that has the minimum of peaks and valleys. A steady flow of fruit to the market will always result in the maximum return to the tree. In that regard, the CAC and the individual marketers attempt to provide the grower with the best market outlook. On an individual basis, each marketer informs the grower of specific short—term needs to fill orders and advertising commitments.

However, other factors determine the harvest strategy the grower must undertake. These include weather conditions (cold, wind, heat, etc.), general fruit quality and maturity, tree condition, labor availability, and timing of annual state and federal tax payments.

PACKING

Almost all of the packing houses in California are also the marketing arms for that fruit. The only exception is in the case of Chiquita. We have a packing arrangement with one of the independent packing houses. This allows us to focus on our core—competence which is, of course, the marketing of branded produce. In general, the principal non-growing margins in the avocado deal are in the packing of the fruit.

Regulatory

As discussed above, the Avocado Inspection Program enforces the regulations set by state statute. Inspectors are responsible for checking the weights and fruit size in each packing house, each day. This assures the trade that when they purchase California avocados from any packing house the avocados will be within regulation in regard to weights and fruit size. This has been instrumental in maintaining the indisputable name for California avocados and has forced competitors, such as Chile, to reach California standards for their domestic products.

Labor Costs

Labor costs are the most significant expense in the packing operation. Again, state and federal regulations add additional costs in this area. For example, workers are required

to be trained in safety issues, payroll taxes must be paid, and very strict rules regarding overtime payment are enforced. In addition, there are very strict rules in California regarding immigration. As with all levels of farming, many of the labor force are from Mexico. The intensive documentation of legal status in the United States, as required by law, adds additional cost to labor.

The packing house manager needs to constantly juggle to provide the needs of the sales department and, at the same time, maintain a cost-effective operation.

Machinery

All the major avocado packing houses in California have computerized sizing and packing capabilities. These machines provide the following:

- Cost Effective Packing
- Ability to reach or exceed regulatory requirements
- Strict and accurate accounting of grower fruit

Materials - Stickers

The materials involved in avocado packing—as in all produce—include the carton, stickers, tie strips, and pallets. Marketing entities, such as Chiquita, which have a trade and/or consumer recognized name also label each avocado to identify the brand. This has become even more imperative as the retail chains are now demanding "PLU" numbers on avocados, as well as on other fruit. "PLU" means "price-look-up." It allows the store to program its computers so that when the checkout clerk inputs the number on the avocado, the computer automatically generates the correct charge.

Cooling

To assure maximum shelf life and product quality, it is imperative that the fruit arrive at the packing house as soon as possible after harvest. Factors such as hauling efficiencies and truck availability can result in delays in getting the fruit to the packing facility.

Upon arriving at the facility, the fruit is stored in a "pre-cooling" room where the field heat is brought down *before* packing through a "forced-air" system. This process can take up to 24 hours. Immediately after packing, as full pallets are completed the fruit is brought into the main cooler for storage until truck pick up.

Ripening

Providing ready to eat, or "ripe," avocados to consumer provides a tremendous advantage in moving the fruit out of the stores. Avocados are an impulse purchase, and research has proved that providing the housewife with a product that can be used that evening increases sales threefold.

Ripening can be done at 1) the packing house in California, 2) at the customer's distribution center, or 3) via a local wholesaler who provides preconditioning service. It is not recommended to send preconditioned fruit long distances.

The California avocado industry has invested heavily over the past several years through the grower-funded CAC and individual marketers. Encouraging the customers to carry ripe avocados has made a major impact in the consumption of avocados, resulting in an increase in grower returns over time.

The process for preconditioning, while not very complicated—needs to be followed in order to arrive at a good product.

Shipping

Some packing houses have trucks to ship full-load (20 pallets) long distances. As the avocado market is mainly a partial load business, the norm is for the customers' trucks to pick up the fruit at the packing house loading dock.

TRANSPORTATION

Regulatory

Both the United States Department of Agriculture and the Food and Drug Administration (FDA) have jurisdiction over the regulations pertaining to the transportation of food products. The FDA approves material for truck construction if it will be in direct or indirect contact with a food product and there is a possibility that the material will impart a toxic substance, cause off-color or odors, or otherwise contaminate the food. Examples of materials needing approval are plastic—covered plywood, fiberglass—reinforced plastic, and prefabricated wall panels, and any coating materials used on interior surfaces.

In addition, there exist state and federal regulations regarding weight limitations that must be followed. For example, the trade agreement with Mexico, one of the areas yet to be implemented is in regard to trucks as the regulations in Mexico do not mirror the U. S. regulations.

Pallets

The industry norm is now metric pallets of 40"x40" containing 80 25—pound (11.4 kilo) cartons.

Costs

Freight is one of the major costs in produce. Factors impacting the cost are 1) prevailing fuel costs, 2) weather conditions, and 3) truck availability.

Cooling

Avocados are recommended to be transported in temperatures ranging from 4-6°C. The rate of ripening increases as temperature rises. It is imperative to precool the product before loading. Avocados are very cold sensitive and common symptoms of chilling damage are a grayish-brown discoloration of the flesh, scalding and/or pitting of the skin, and failure of the fruit to ripen satisfactorily after storage or transit. At higher temperatures, anthracnose or black spot can become serious disorders.

Duration

While the tree life of an avocado is one of the longest in produce, once off the tree the ripening process begins immediately. After all the correct steps have been taken in the harvest, hauling, and packing of the fruit, it is imperative that the fruit arrives at its destination in the swiftest possible time frame. In the U.S. A., most of the avocados are sold within a three-day driving time from the packing houses.

CONCLUSION

I hope that my short talk has helped inform you of the processes used in the United States to harvest, pack, and ship avocados. I was only able to touch on some key points in the time we had today.