

ESTIMATED COSTS OF PACKING
AND SELLING TEXAS CITRUS,
1982/83 SEASON

TEXAS AGRICULTURAL MARKET
RESEARCH & DEVELOPMENT CENTER



Department of Agricultural Economics

**Estimated Costs of Packing and Selling
Texas Citrus,
1982/83 Season**

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Abstract

Packing costs for fresh Texas citrus for the 1982/83 season were estimated to be \$2.01 per 40 pound, 7/10 bushel carton. This estimate was based on accounting data obtained from nine Texas packinghouses. This was the first study to estimate Texas packinghouse costs, thus, no trend information is presented.

Key words: Fresh Texas citrus packing costs, labor costs, container costs, fixed costs, variable costs.

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Summary

A Texas A&M University committee, conducting a study of the Texas citrus industry, discovered that no database existed which reported costs of packaging or harvesting and handling citrus. The committee recommended that such a database be developed. Through a joint industry - university study team the initial study was conducted late in 1986.

Texas citrus packing costs, per 40 pound, (7/10 bushel) carton equivalent, were estimated to be \$2.01 for the 1982/83 season (table 1). Harvest and hauling costs averaged \$24.46 per ton. These estimates are based on accounting data and related information obtained from nine packinghouses in the Texas Rio Grande Valley. These nine firms packed 41 percent of the fresh citrus shipped from Texas during the 1982/83 season. The costs, when further broken down, show a fixed component of nearly 38 cents, (19 percent of total costs) (table 2) and a variable cost of \$1.63 per carton, (81 percent of total costs). These are the first estimates of Texas citrus packinghouse costs; thus, no trends regarding previous season costs can be presented.

The latest Florida data, which is for the year 1981/82, reports packing and selling costs for a 8/10-bushel of grapefruit and oranges to be \$1.79 and \$1.90. California-Arizona costs for the 1982/83 season for grapefruit were \$2.36 per 37.5 pound carton and \$2.62 for oranges. Florida data reports fixed cost to be 13 percent of total cost for grapefruit, and 16 percent of total cost for oranges. No breakdown of fixed and variable costs was available from the California-Arizona data.

The process of projecting these 1982/83 data to current year 1986/87 costs is very difficult due to inflation and volume factors. Insurance, fringe benefits, etc., have risen at a rate greater than the Consumer Price Index. If inflation is to be adequately accounted for in the projections, each item should be adjusted individually.

Low production volumes of the years succeeding this study must also be taken into account. Average fixed costs are a function of volume; therefore, they rise and fall on a per carton basis. The 1982/83 season was measured as a 100% capacity year. The 1986/87 season will be 15 to 20% of that capacity. This suggests that the per carton fixed costs this year could be in the neighborhood of 5 to 6 times greater than the 1982/83 costs prior to adjustment for inflation.

Introduction

The Texas citrus industry is an important component to the state's agriculture. During 1983, estimates by the Texas Agricultural Extension Service suggested that this agribusiness contributed about 233 million dollars to the state's economy. (Reference 5.)

The freeze of 1983 dealt a severe economic blow to citrus producers, packinghouses, independent contract harvesters, grove care operators, box manufacturers, lending institutions and municipalities supplying electricity, water and sewage services, as well as hundreds of laborers. Industry leaders requested the Texas Agricultural Extension Service and Texas Agricultural Experiment Station to conduct a baseline study to determine the extent of tree damage and to make an assessment of the future potential for citrus production and marketing to the Lower Rio Grande Valley. (Department of Agricultural Economics, Texas A&M University). During the planning and development phase preceding the actual study, investigators found no industry database on the costs of packaging or harvesting and handling Texas citrus. Very good industry databases exist for these functions in California-Arizona and Florida. A recommendation of the Texas industry assessment was the development of this type of data for industry use.

Through the efforts of producers, packers and industry association leaders, a proposal to gather harvesting and packing costs was made to the extension service and the experiment station. Joint funding was arranged, and a study was authorized

to gather the costs associated with packaging, harvesting and handling fruit from the orchard through preparation for shipment. In this report, we summarize the results of this project.

Purpose

The purpose of this study was to collect and summarize all costs of packinghouse firms related to the harvesting, hauling, packing and merchandising of fresh citrus produced in the Rio Grande Valley of Texas. The most obvious benefit is that it provides a benchmark for comparative purposes--both in magnitude and relative cost percentages. Such data can be utilized by managers for planning and control purposes. Examples of such uses are:

- 1) Project future costs based on historical trends and knowledge of projected cost increases.
- 2) Allow comparisons of similar operations in other states.
- 3) Focus on identification and allocation of packing costs into direct labor, indirect labor, overhead expenses and sales expense categories.
- 4) Provide data required to investigate the sensitivity of cost-volume relationships in picking, hauling and packing fresh citrus.

It is anticipated that several additional uses of the data will evolve from this initial project.

Methodology

The success of this project was dependent on the scope and accuracy of the cooperators' cost data. Industry cooperation was provided by means of an advisory committee which gave valuable

suggestions and support in formatting data, data gathering procedures and assisting in the analysis of results. The advisory committee consisted of nine members. Five were executives of packinghouses and four were representatives of various industry trade associations.

The initial problem presented to the committee was lack of meaningful data since the freeze of 1982/83. Packinghouses had either not opened or had been opened very short periods of time since then. The committee decided to forego the most recent years and to utilize the 1982/83 marketing year for purposes of this cost analysis.

The committee was next asked to assist in obtaining cooperators for the study. To insure maximum participation, the committee suggested that data gathered be handled in such a manner that the cooperator's responses be kept in confidence. This was accomplished by reporting only industry averages and gathering the data on site by an economist working on the project.

The committee obtained permission from 10 packinghouses to provide the necessary data. Discussions with these firms reduced the number to nine as one firm's accounting system could not explicitly separate its costs of packing citrus from the costs of packing other products.

During initial discussions, it was discovered that numerous cost accounting procedures and formats existed among the firms being surveyed. The advisory committee was asked to assist in designing an instrument which would gather specific costs in the

categories deemed most important. This instrument is attached in appendix I.

During the 1982/83 season, 23 packinghouses shipped fresh citrus from Texas, of these 23, nine provided data from their 1982/83 records. According to Texas Valley Citrus Committee records, these nine firms shipped 41 percent of the fresh Texas citrus during the study period. Some could not participate because of the nature of their accounting system. Many citrus packers also packed a variety of other fruits and vegetables. However, their accounting system is not designed to capture the costs associated with the individual variety of the product being packed. Thus, they could only provide data on costs per unit packed for all the products packed. Others had simply gone out of business during the interim, as there was essentially no fruit to pack for a 2- to 3-year period.

Data Collection

The study team was responsible for obtaining and recording all information and cost data from each of the nine cooperating packinghouses through on-site visits. It had been agreed that an employee of each cooperator, such as the general manager, comptroller or head accountant, would work with a member of the team when compiling its cost data. Several of the cooperators' data were obtained from their annual auditors' reports. Others provided data directly from their accounting records. Supplemental data and information were obtained from internal records (minutes of meetings, management or monthly board meetings). Confidentiality was maintained as the data were tabulated and analyzed only by the research team. No one outside

the team had access to the raw data.

The accounting systems used by the nine cooperating firms varied dramatically and were more indicative of financial accounting than that of cost accounting. This is not unusual, but many firms will incorporate a cost system into their general accounting system which allocates specific income and expenses to cost or profit centers. This allows one to uniformly reflect various expense items to a specific product or process. The nine cooperators all tended to allocate many expenses, such as materials, selling and administrative costs, by similar methods. Other expenses were allocated by a sundry of methods.

None of the cooperators equated annual costs by type of fruit, package size, type, or inventory fluctuations.

Texas citrus most often is packed in 40 pound, 7/10 bushel cartons. There are purchasers of citrus, however, that request other packs. Among these are 5 and 8 pounds of fruit packed in a plastic bag, and then either 8 or 5 of these bags are placed in a master carton. Packing in this manner is more labor intensive. Thus, the overall packing cost of one firm could be elevated if they pack a substantial number of cartons in this manner.

Since the packing costs are based on the number of cartons shipped, the percentage of total product that is processed, but not shipped (product eliminations due to quality reasons) is another source of variation. The firm that packs 80 percent of the fruit processed will have a lower cost per carton than a firm that packs only 50 percent of the incoming fruit. This is due to the cost associated with partially processing and hauling fruit not shipped to the fresh markets.

Lack of adjustments for packing material inventory is also a potential cost variation. The analysis was performed on a cash basis. A firm that bought more cartons than used would show a higher material cost on a per carton shipped than one who had excess cartons and purchased a fewer number than were shipped.

As a result of the variations encountered, the cost categories outlined in the data instrument were not applicable in all cases. These limitations prevented analysis of several variables; for example:

- 1) Cost of packing grapefruit versus oranges.
- 2) Cost of packing various package sizes.
- 3) Cost of handling eliminations.
- 4) Adjusting packaging material costs for inventory levels.

Due to the data constraints, packing costs are reported as cost per 40 pound, or 7/10 bushel, carton equivalent with no distinction as to type or pack of citrus.

Results

Based on this research effort, the weighted average of cost of receiving, handling, packing, shipping and selling fresh Texas citrus during the 1982/83 season was \$2.01 per 7/10 bushel carton. (table 1). The weighted average cost reflects the effect of volume on individual average costs of the participating firms.

The weighted average harvesting and hauling costs of \$24.46 per ton are also shown in table 1. These costs include picking and hauling fruit to the plant plus all supervisory expenses associated with these activities.

Examination of the individual cost items reveals that the

largest factor is shipping materials--amounting to about 35 percent of the total, table 1. This factor is subject to error as no provision for differences in beginning and ending inventory of packing materials was taken into account. Plant labor is the next largest category at approximately 25 percent. These two items, therefore, comprise over 60 percent of the packing costs.

When the expense summary is broken down into fixed and variable components, the fixed component amounts to about 38 cents per carton, table 2. This analysis is important if pricing of the packing services is made on the basis of costs generated at 100 percent capacity. If costs were based on a volume of one-half that of the 1982/83 flow, for example, the fixed costs per carton would have been twice as high, or 76 cents per carton. Fixed costs represent a fixed dollar amount, and the cost per carton will increase or decrease in proportion to the volume packed over any season. Use of packing costs to establish charges, therefore, must be adjusted to reflect the volume if it differs substantially from normal capacity standards.

Due to the fact that Florida and California-Arizona report separate packing costs for both oranges and grapefruit, the numbers in table 1 cannot be compared exactly to those data generated from other states. The latest Florida data (Institute of Food and Agricultural Sciences, University of Florida) available for the 1981/82 season, (a year prior to this study), shows the cost of packing and selling a 8/10 bushel of oranges at \$1.90 and a 8/10 bushel of grapefruit at \$1.79. (table 2). Comparable data, gathered by the University of Arizona on packing and selling California-Arizona grapefruit during the 1982/1983

season, was \$2.36 for a 37.5 pound carton. (Cooperative Extension Service, University of California). The cost for Valencias was \$2.62 per carton. (Department of Agricultural Economics, University of Arizona). They provided no breakdown of specific cost categories in their study.

Recommendations

The foundation of a reporting system for packing and selling costs has been established. The experience gained should provide a valuable base in establishing an ongoing process of cost gathering and reporting. For comparative purposes, it seems fruitless to gather data for the 1983/84, 1984/85 and 1985/86 seasons. Production figures suggest, however, that the current season will be of sufficient volume to warrant data collection. It is recommended that data for the 1986/87 season be gathered and analyzed in a manner similar to the process used on the 1982/83 information.

It is further recommended that firms participating in the study move toward a more standardized cost accounting system chart of accounts. This certainly will make the data collection and analysis much easier. It also would be beneficial to the cooperators for management purposes, as comparisons would be much more meaningful if the cost accounts were more uniform. A suggested format is presented in appendix II.

Finally, the nine firms, who provided data, made this study possible. The cost data reflect only these firms' experiences. If the amount of data could be increased by obtaining additional cooperators, the information obtained and the benefits derived should enhance future study results.

Table 1. Estimated Weighted Average Costs of Harvesting, Hauling & Packing Texas Fresh Citrus, 1982/83 Season

Cost Category	Cost Per Carton (7/10 Bushel)	% of Total
Shipping Material	\$.697	35
Plant Labor	.516	26
Utilities	.048	2
Plant Repairs	.040	2
Insurance	.035	2
Taxes	.022	1
Depreciation & Rent	.124	6
Administrative Expense	.196	10
Sales Expense	.153	8
Other Expense	.175	9
Total per Carton	<u>\$2.006</u>	<u>100</u>

	Cost per Ton
Harvest & Hauling	\$24.46

Table 2. Estimated Weighted Average of Fixed and Variable Costs of Packing and Selling Texas Fresh Citrus, 1982/83 Season with Comparison to Florida Costs.

Cost Category	Cost per Carton (7/10 Bu.)	Cost per ¹ Carton (8/10 Bu.)	Cost per ² Carton (8/10 Bu.)
Fixed Expense			
Insurance	\$.035	\$.010	\$.015
Taxes	.022	.013	.023
Depreciation & Rent	.124	.065	.090
Administrative	.196	.142	.135
TOTAL FIXED EXPENSE	<u>\$.377</u>	<u>\$.230</u>	<u>\$.263</u>
Variable Expense			
Shipping Material	.697	.530	.515
Plant Labor	.516	.520	.580
Plant Repair	.040	.078	.082
Utilities	.048	.041	.047
Other Expense	.175	.262	.289
Sales Expense	.153	.128	.123
TOTAL VARIABLE EXPENSE	<u>\$1.629</u>	<u>\$1.559</u>	<u>\$1.636</u>
TOTAL FIXED & VARIABLE EXPENSE	<u>\$2.006</u>	<u>\$1.789</u>	<u>\$1.899</u>

¹ Estimated Weighted Average of Fixed and Variable Costs of Packing and Selling Fresh Florida Grapefruit, 1981/82 Season.

² Estimated Weighted Average of Fixed and Variable Costs of Packing and Selling Fresh Florida Oranges, 1981/92 Season.

References

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2. Department of Agricultural Economics, University of Arizona, Tucson, and Cooperative Extension Service, University of California, Riverside "Cost of Picking, Hauling, Packing, Marketing and Advertising California-Arizona Valencias" December 1984.
3. Department of Agricultural Economics, Texas A&M University, College Station "Report on the Rio Grande Valley Citrus Industry--Analysis and Evaluation" June 1985.
4. Institute of Food and Agricultural Sciences, University of Florida, Gainesville "Estimated Costs of Packing and Selling Fresh Florida Citrus, 1981-82 Season" Economic Information Report #196, April 1984.
5. Texas Agricultural Extension Service, Texas A&M University, College Station, Texas, "Texas Agriculture 1983, An Economic Review," March 1984.

APPENDIX I

Response Instrument Developed and Utilized to Summarize Cost Data
from Participating Firms.

Shipping Materials

This category is to include all cartons, containers, bags, ties, slip sheets, etc., used in packing and shipping of fruit.

Cartons and containers	_____
Bags	_____
Other shipping supplies	_____
Total packing and shipping materials	_____

Plant Labor

Direct labor costs which include payroll taxes, workman's compensation, unemployment insurance, medical insurance, life insurance, vacation pay, bonuses, etc., include supervisory costs.

Labor - Receiving	_____
Labor - Washing, Wax, and Grading	_____
Labor - Packers	_____
Labor - Boxmaking	_____
Labor - Trucking	_____
Labor - Loading	_____
Plant Supervision	_____
Total plant labor costs	_____

Utilities

Electricity	_____
Gas	_____
Water	_____
Sewerage	_____
Total Utilities	_____

Repairs and Maintenance

All costs associated with plant upkeep. Include wages and salaries of all maintenance personnel and supervision, along with the payroll taxes, insurance costs, etc. Also include maintenance supplies, purchased small hand tools, outside maintenance contractors, etc.

Labor - repair and maintenance	_____
Supervisor - repair and maintenance	_____
Maintenance supplies	_____
Small hand tools	_____
Outside contractors	_____
Total maintenance and repairs	_____

Other Expenses, Assessments and Fee

Shed supplies (color add, wax, etc.), processing and inspection fees, theft assessment, advertising assessment, miscellaneous plant expenses.

Color add, wax, etc.	_____
Maturity inspection	_____
Theft assessment	_____
Citrus committee	_____
Plant supplies	_____
Total other expenses, assessments and fees	_____

Insurance

Insurance premiums on buildings and vehicles, plus premiums for liability insurance.

Insurance on buildings	_____
Insurance on vehicles	_____
Liability insurance	_____
Total insurance	_____

Taxes

All property, inventory and other business related taxes.

Property tax	_____
Inventory tax	_____
Other tax	_____
Total taxes	_____

Depreciation and Rent

Rental paid on buildings and equipment and depreciation allowance on all capital items.

Total rent or lease	_____
Total depreciation	_____
Total depreciation and rent	_____

Administrative Expenses

All wages and salaries of office and administrative personnel included and costs associated with the wages and benefits received. Also add all office related expenses (telephone, postage, printing, dues and subscriptions (not included elsewhere), travel, bad debts, etc.

Office - wages	_____
Office - salaries	_____
Telephone	_____
Postage	_____
Printing	_____
Office supplies	_____
Interest	_____
Legal and accounting fees	_____
Donations	_____
Travel	_____
Bad debts	_____
Other administrative expenses	_____
Total administrative expenses	_____

Sales Expenses

Sales wages and salaries, brokerage fees, sales related travel and entertainment, advertising, miscellaneous sales expense.

Sales - wages salaries	_____
Sales - wage taxes and fringe benefits	_____
Brokerage fees	_____
Travel and entertainment	_____
Advertising	_____
Miscellaneous sales expense	_____
Total sales expenses	_____

Total Tons Processed - Units of each category which was shipped.

40 pound cartons	_____
18 pound bags	_____
1/2 standard	_____
1/4 standard	_____
8/5 poly bags	_____
8/5 vexar bags	_____
Cribs	_____
Bulk	_____
Tons of eliminations	_____
Other (please list)	_____
Total	_____

Appendix II

Suggested chart of accounts to be used by Texas Citrus
Packinghouses.

Administrative Expenses

Office Employees Wages and Salaries

Officer and Administrative Salaries

Telephone

Postage

Printing

Office Supplies

Legal and Accounting

Travel and Entertainment

Bad Debts

Administrative Vehicle Expense (Gas, oil, repairs, etc.)

Payroll Taxes

Workman's Compensation

Medical Insurance

Other Fringe Benefits

Donations

Interest

Dues and subscriptions

Other Administrative Expenses

Plant Expenses

- Plant Labor - Receiving
- Washing, Waxing, Grading
- Cold Room
- Packers
- Box Making
- Loading & Shipping
- Hauling (Eliminations to Juice Plant)

Payroll Taxes

Workman's Compensation

Medical Insurance

Plant Vehicle Operating Expense

Plant Labor - Supervision

Other Fringe Benefits (Bonuses, Vacations, Holiday Pay, Sick Leave, Retirement, etc.)

Utilities

Electricity

Gas

Water and Sewerage

Plant Repair

- Plant Maintenance - Labor
- Outside Contractors
- Supervision

Repair Supplies and Small Tools

Payroll Taxes

Workman's Compensation

Medical Insurance

Other Fringe Benefits

Other Expenses

Plant Supplies

Color and Dye

Wax

Inspection Fees

Citrus Committee Assessments

Theft Assessment

Other Miscellaneous Expenses

Insurance

Property Insurance

Liability Insurance

Vehicle Insurance

Taxes

Property Taxes

Inventory Taxes

Franchise Tax

Fees and Licenses

Other Taxes

Depreciation and Rent

Building Rent or Lease

Equipment Rent or Lease

Building Depreciation

Equipment Depreciation

Vehicle Lease

Vehicle Depreciation

Sales Expense

Sales - Wages, Salaries, Commissions

Brokerage Fees

Payroll Taxes

Workman's Compensation

Other Fringe Benefits

Travel and Entertainment

Advertising

Freight

Sales Vehicle Expense

Misscellaneous Sales Expense

Shipping Materials

Boxes (Separate listing for each item)

Bags (Separate listing for each item)

Other