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THE COST OF PICKING, HAULING, PACKING, MARKETING AND ADVERTISING CALIFORNIA-ARIZONA GRAPEFRUIT FOR THE 1985-86 SEASON

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LIST OF TABLES

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INTRODUCTION

This report contains the results of a research project being conducted by the University of California and the University of Arizona to develop annual estimates of the costs of growing, picking, hauling, packing, marketing and advertising California and Arizona citrus fruits. The project is sponsored by the California-Arizona citrus industry through grants from the Orange and Lemon Administrative Committees and the California-Arizona Citrus League.

This current study of the project concerns the industry average costs of picking, hauling, packing, marketing and advertising California-Arizona grapefruit during the 1985-86 season and is a continuity of our past reports. Similar reports are also provided for other citrus varieties at the end of the respective growing season.

The research team was composed of staff members of the Cooperative Extension Service, University of California, Riverside, and the Department of Agricultural Economics, University of Arizona, Tucson. In California the project is conducted by Gary Benoit, Staff Research Associate, under the direct supervision of Ms. Etaferahu Takele, Area Farm Management Specialist. In Arizona the project is conducted by Dr. Roger Fox, Economist. Carol Adams, Senior Statistician, Cooperative Extension Service, University of California, Riverside, assists in the development of the statistical methodology. The analysis, coordination, and summarization of data has been delegated to the California group. All information received is handled in strict confidence and only members of the research team have access to it. The research team wishes to thank the many packinghouse managers and office personnel for the fine cooperation extended to them.

PURPOSE

The purpose of this study was to develop representative industry cost estimates for grapefruit. Realizing certain limitations such as record availability, the research team sought cost figures which would best depict industry averages for the season previously mentioned.

In many cases the cost information supplied by the packinghouses came directly from their auditors' reports. This made it easier to categorize certain costs and keep them consistent from one packinghouse to another. Other sources of information were annual reports, pool statements, personnel records, and personal interviews. Often it was necessary to use a combination of these sources. Thoroughness of records ranged from excellent (where each cost was itemized and categorized in a readily accessible manner) to poor (where cost figures were kept in separate locations or grouped with other costs). In most cases the research team collected the information by personally visiting the packinghouse.

Cost figures collected and analyzed represent costs to the growers, regardless of the organizational structure of the packinghouse. The charge to the grower was the end result the research team was to obtain.

The basic units of measurement for the study were cartons and carton equivalents. The standard citrus carton is defined by law in California and Arizona and is the most uniform and stable industry measure. The average net weight of fruit in pounds per carton and carton equivalent for grapefruit is 33.5 for California and 32 for Arizona.

METHODOLOGY

In this citrus cost study, there was concern about maintaining the same accepted statistical procedures used in the previous collection, analysis, and interpretation of data, in order to provide an objective basis for evaluating certain costs regarding the California-Arizona citrus industry. Because we were dealing with such an extensive population, time and financial restraints necessitated the use of sampling in order to obtain costs which were representative of the entire citrus industry. Sampling allowed us to learn the facts associated with a small portion of an aggregate, and then make inferences regarding the total population.

The individual packinghouses supplied volume data in field boxes by district for the 1984-85 fiscal year. A stratified random sampling technique was used which proportioned the handlers in terms of district, location, and volume. This allowed the sample to be spread more uniformly throughout the three geographical areas and to increase precision. The three packinghouse size categories were as follows: 1) houses with 100,000 to 500,000 field boxes; 2) houses with 500,000 to 1,000,000 field boxes; 3) houses with more than 1,000,000 field boxes. Houses with a volume of less than 100,000 field boxes were eliminated from the sample because cost figures were usually too difficult to obtain. The allocation of houses by volume is revealed in table 1.

Table 1
Number, size, and location of California-Arizona grapefruit packinghouses used in the 1985-86 study

Size of House	District 1	District 2	District 3	Total
Millions of field boxes		Number of Houses		
.1 - .5	0	6	8	14
.5 - 1.0	0	4	4	8
> 1.0	0	2	1	3
	0	12	13	25

The previous year's study was used in order to obtain picking, hauling, and packing costs which gave an historical sample of houses with both the fresh volume and the packing cost of fresh fruit. Accepted statistical methods were used in selecting an allowable deviation of plus or minus $.09 in the estimated packing cost at the 95 percent confidence level. This indicates that 95 times out of 100 the cost figure will fall within a range of plus or minus $.09 of the true industry average. To estimate the number of packinghouses in the sample, a formula[1/] was used where (s) is the standard deviation and (D) equals $.09. The finite population correction [2/] was also used where (N) equals the total number of packinghouses for a particular variety, and (n') equals the corrected sample size. On the basis of this analysis, a sample of 15 houses was selected and distributed to insure adequate representation of each district (table 2).

Table 2
Sample size and distribution of California-Arizona grapefruit packinghouses used in the 1985-86 study

Size of House	District 1	District 2	District 3	Total
Millions of field boxes		Number of Houses		
.1 - .5	0	4	4	8
.5 - 1.0	0	2	2	4
> 1.0	0	2	1	3
	0	8	7	15

The specific packinghouses selected for the study were chosen by use of a table of random numbers. Because of unforeseen problem areas such as houses which declined to cooperate and houses which were no longer in business, three alternates were chosen for each stratum. Alternates were used when necessary.

All cost figures in the study have been weighed to compensate for differences in sample size and volume handled.

[1/] $n = \frac{4s^2}{D^2}$

[2/] $n' = \frac{n}{1 + \frac{n}{N}}$

PICKING COSTS

Picking costs include all operations which involve getting the fruit from the tree to the holding bin. Some houses grouped all of these costs together, while others had them segregated into two categories -- picking expense and field expense. Breakdown by citrus variety was readily obtained in most cases.

The greatest portion of the picking cost is the actual direct labor. Included in this figure are wages, payroll taxes, workmen's compensation insurance, and unemployment insurance for both picking and delivery to roadside. These same cost categories would be true for all supervision required. Housing and transportation costs were also included along with equipment rental, and maintenance and repairs involved in the field operation. Bin and ladder repair was allocated differently from one packinghouse to another, but for this study it is included in picking costs.

HAULING COSTS

The hauling operation includes the roadsiding and movement of fruit to the packinghouse. Many factors such as distance and mode of travel greatly affect the cost per unit. The cost should include wages, taxes, workmen's compensation insurance, unemployment insurance, equipment usage, maintenance and repairs, fuel, depreciation, and administration. There appeared to be more houses that charged the same rate for all varieties than those that differentiated between varieties.

In some cases it was impossible to obtain separate pick and haul cost data as there are some packinghouses that give this as one combined figure. The research team did not divide and allocate this cost to the proper category; therefore, the cost figure was included only in the total cost. In table 3, separate pick and haul cost figures were used when they could be obtained. The combined total of pick and haul includes houses that gave the costs separately and those that combined them.

PACKING COSTS

Packing costs include all operations that move the fruit through the house. This involves the receiving, washing, treating, grading, sizing, packing, storing, and loading of the fruit. Costs are broken down into four categories: materials and supplies; labor; direct operating overhead; and indirect operating overhead. Labor costs include salaries of house, floor, and administrative personnel, as well as payroll taxes and compensation insurance. Direct operating overhead is composed of power, water, repairs and maintenance, and machine leasing. Costs which make up indirect operating overhead are insurance, taxes, licenses, fees, depreciation, rent, interest, retirement benefits, travel, and legal. This study is based on the premise that all of the above-mentioned costs should be allocated to the packed cartons of fresh fruit.

Table 3
Estimated costs of picking, hauling, packing, products handling, marketing and advertising
California-Arizona grapefruit
for the 1985-86 season

Variety	Picking	Hauling	Total	Packing	Handling Products	Marketing & Advertising
	all fruit[1]/	all fruit[1]/	all fruit[2]/	fresh fruit[3]/	products fruit[3]/	fresh fruit[3]/
	Dollars per carton					
Summer Grapefruit	.495	.204	.688	2.123	.226	.465
Winter Grapefruit	.624	.145	.800	2.069	.147	.354

1/ Includes only houses which kept separate pick and haul cost records.

2/ Cost figure includes all houses.

3/ Proportion of industry 1985-86 production to fresh and products is as follows: Summer Grapefruit, 73% fresh, 27% products; Winter Grapefruit, 66% fresh, 34% products.

PRODUCTS HANDLING COSTS

The products handling charge is placed on fruit which is utilized in the processing outlet. This tonnage is sent to processing plants in bulk. Because this fruit usually has to be separated in the packinghouse process, it must bear some of the direct operating costs such as unloading, washing, and grading. Because of this, a charge is levied on the products either by tonnage or carton equivalent. In this report there has been a conversion of all cost figures to carton equivalents using 33.5 pounds or 32 pounds.

MARKETING AND ADVERTISING COSTS

Marketing and advertising costs for the year 1985-86 were received from corporate headquarters when dealing with cooperative houses, and the amounts shown are net costs for that function. In the case of independent houses, the cost of these functions to growers was obtained from the individual house itself.

Included in marketing and advertising costs are trade promotion, advertising, selling, brokerage fees, district exchanges, overhead of sales and administrative personnel, and overhead of office or headquarters.

Table 4
Comparisons of costs of picking, hauling, packing, products handling, marketing and advertising California-Arizona grapefruit 1974-75 through 1985-86 seasons

Year	DOLLARS PER CARTON			
	Picking & Hauling	Packing	Products Handling	Marketing & Advertising
1974-75				
Summer	.432	.984	.180	.223
Winter	.368	1.204	.151	.218
1975-76				
Summer	.481	1.022	.199	.257
Winter	.371	1.157	.129	.221
1976-77				
Summer	.483	1.129	.236	.248
Winter	.450	1.300	.131	.251
1977-78				
Summer	.480	1.218	.192	.231
Winter	.526	1.346	.126	.218
1978-79				
Summer	.548	1.280	.202	.239
Winter	.563	1.428	.124	.236
1979-80				
Summer	.580	1.407	.178	.288
Winter	.613	1.480	.138	.290
1980-81				
Summer	.655	1.473	.175	.298
Winter	.690	1.556	.160	.280
1981-82				
Summer	.648	1.726	.181	.338
Winter	.679	1.682	.162	.357
1982-83				
Summer	.695	1.899	.175	.360
Winter	.734	1.820	.148	.388
1983-84				
Summer	.748	1.990	.182	.384
Winter	.739	1.969	.160	.401
1984-85				
Summer	.659	2.067	.191	.439
Winter	.748	1.980	.131	.310
1985-86				
Summer	.688	2.123	.226	.465
Winter	.800	2.069	.147	.354