

Studies on Efficiency in Fruit

marketing costs for apples, pears, table grapes states examined in study aimed at improved e

*Part I of a series of reports of studies on the effects of packing house equipment
University of California Giannini Foundation of Agricultural Economics, and the
ity of the Research and Marketing Act. Detailed reports are available by addressin*

Directly concerned with shipping-point costs for Pacific Coast apples, pears, and table grapes, a 1949-1951 study revealed many findings which may apply to other fruits and vegetables.

Appropriate marketing channels vary for particular products depending upon such factors as the location of producing areas and major markets, the bulkiness and perishability of the product, and the amount of processing required. In all cases, however, such services must be performed if food is to be produced and moved to urban consumers.

Marketing Services

Hauling, storing, processing, and selling food products require the use of labor, machinery, buildings, fuel, and power. These marketing services are costly and recent trends in the total food marketing bill for the United States indicate that by 1950 the charges amounted to more than \$20 billions—roughly 50% of the consumer's food dollar and 10% of the total national income.

Because of their bulk and perishability, and the long distances to major markets, marketing costs for deciduous fruits produced in the three Pacific states are relatively more important than the average for all food products.

The 1946-1950 average reported prices for Washington apples and California fresh pears and table grapes indicate that Washington apple growers received at the packing house door an average of only 39% of the price paid by wholesalers on eastern auction markets; California pear and grape growers received 43% and 32% respectively.

Retail Prices

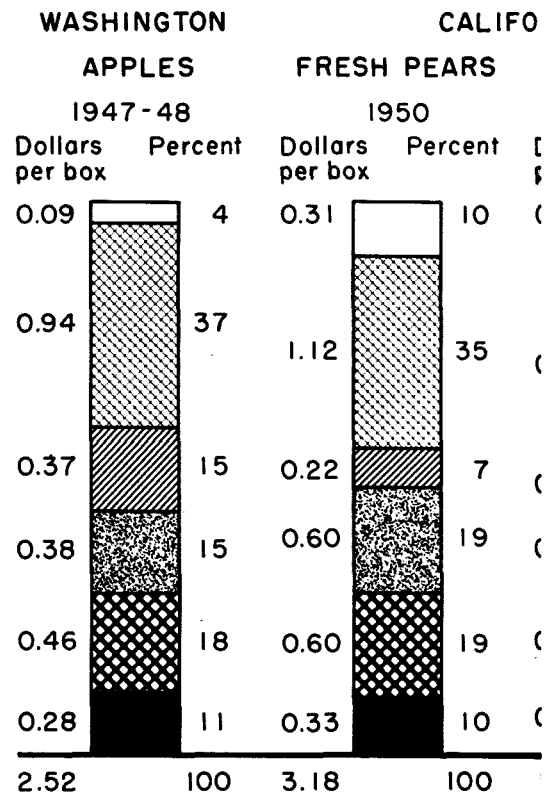
Reports of retail prices paid for these three fruits are not regularly available, but a 1947-48 study indicated that the wholesale-retail price spread for Washington Delicious apples averaged \$1.74 per box in Chicago while a 1948 study in California markets found a wholesale-retail price spread of \$1.12 per lug for table grapes. If these price spreads are

added to the auction prices reported, it would appear that the farmer received about 26% of the consumer's dollar spent for Washington apples and less than 20% of the consumer's dollar spent for California table grapes.

Marketing Charges

The results of several studies of the major components of marketing costs between the grower and eastern auction markets indicate that marketing charges from tree or vine through eastern auction markets averaged about \$2.52 for a Northwestern box of apples, \$3.18 for a standard box of California pears, and \$1.96 per lug of table grapes.

Although the importance of individual components varied somewhat for the three fruits, picking and hauling to the packing-house averaged approximately 11% of the farm-through-auction price spread, container costs about 17%, and other packing costs about 17%. Reported charges for other shipping point services such as loading, precooling, warehousing, and selling ranged from six to 15% and averaged about 10% of the price



Plant	Standard boxes per hour ^b	Direct labor costs ^c				
		Receive and dump	Grade	Pack ^d	Packaging services ^e	Truck and load
L.....	312	0.034	0.048	0.155	0.064	0.049
M.....	277	0.020	0.035	0.155	0.034	0.022
N.....	712	0.031	0.033	0.155	0.065	0.031
P.....	662	0.019	0.037	0.155	0.039	0.014
Q.....	606	0.024	0.024	0.155	0.039	0.023
R.....	523	0.022	0.027	0.155	0.051	0.032
S.....	623	0.019	0.030	0.155	0.077	0.014
T.....	358	0.022	0.030	0.155	0.063	0.027
U.....	1,062	0.021	0.025	0.155	0.029	0.011
V.....	935	0.011	0.021	0.155	0.026	0.013
W.....	817	0.016	0.022	0.155	0.044	0.012

^a Computed on the basis of 8-hour days with typical hourly rates of output. As such, these cost estimates will differ from average costs for a season.

^b Typical hourly rates of output, in terms of 48-pound boxes.

^c Adjusted to reflect uniform wage rates typical for the industry.

^d Estimated on the basis of usual piece-work payments.

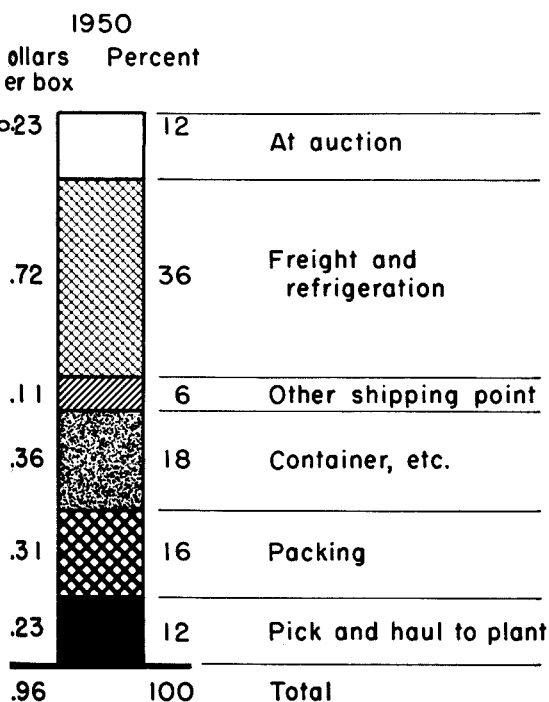
Marketing Practices

from Pacific Coast
efficiency and lowered costs

R. G. Bressler

plant layout, and work methods on efficiency and costs made co-operatively by the Bureau of Agricultural Economics, U. S. Department of Agriculture, under the authority of the Giannini Foundation, 207 Giannini Hall, University of California, Berkeley 4.

RNIA
TABLE GRAPES



spread. Transportation charges to eastern markets, including freight, standard refrigeration, and federal taxes, averaged about 37% of the spread, while charges at the auction market were reported to range from 4% to 12% and averaged about 8%.

Approximate marketing charges per box—as indicated in the accompanying chart—were used to obtain a rough estimate of the total marketing bill for Pacific Coast apples, pears and table grapes. The total shipments of these products from Washington, Oregon, and California are equivalent to approximately 12 million boxes of pears, 24 million boxes of apples, and 25 million lugs of table grapes annually. These shipments would represent a marketing bill from farm through eastern auctions of about \$130 million, divided almost equally between shipping point functions and transportation and auction charges.

Studies in California

A number of California fruit packing firms co-operated on a long-range study of costs and efficiency of marketing de-

ciduous fruits. The study began with apples and pears in 1949, continued through 1950 and was expanded to include table grapes during the 1951 season.

Selected costs of operating sample pear packing houses are shown in the tables on this page and on page 12. These cost estimates are not season averages of accounting costs, but—to focus attention on internal efficiency—were adjusted to represent uniform conditions with respect to wages, hours of operation, type of container, and length of season. Labor costs were standardized to eliminate the effects of differences in wages paid by the individual plants.

All calculations were based on a normal 8-hour day with average rates of operation. Fixed costs were based on estimates of current replacement values for buildings and equipment, uniform procedures for allocating between packed and cannery fruit, and the assumption of 30 full packing days in a season. Finally, all costs for packing fresh fruit were expressed relative to boxes containing 48 pounds net weight of pears.

These estimates emphasize the general importance of the California area selected for study—costs averaged about \$1.00 per box of packed fruit for these houses. In broad terms, labor costs account for roughly 30% of total costs, operating and administrative costs for 10%, packing boxes and materials 50%, and fixed costs for buildings, land, and equipment about 10%. Material costs, although important, are not subject to great modification or control by management, discounting any major change in type of package.

Costs

In the plants included in these studies, selected costs for receiving and dumping labor range from 1.1¢ to 3.4¢ per box of packed fruit; grading labor from 2.1¢ to 4.8¢; packaging services from 2.6¢ to 7.7¢; trucking and loading from 1.1¢ to 4.9¢; and supervisory and miscellaneous labor costs from 1.0¢ to 3.3¢ per box.

Operating costs—covering such items as supplies, fuel, light, and power—range

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11 California Pear Packing Plants, 1950^a

Cost per standard box equivalent—dollars

Label and box making ^d	Supervision and misc.	Subtotal	General operating ^f	Office and administration	Materials ^e	Fixed costs ^b	Grand total
0.020	0.022	0.392	0.046	0.059	0.511	0.101	1.109
0.018	0.011	0.295	0.014	0.037	0.511	0.083	0.940
0.020	0.022	0.357	0.033	0.045	0.511	0.090	1.036
0.020	0.020	0.304	0.041	0.035	0.511	0.144	1.035
0.020	0.033	0.318	0.037	0.049	0.511	0.136	1.051
0.020	0.021	0.328	0.014	0.049	0.511	0.085	0.987
0.020	0.015	0.330	0.031	0.044	0.511	0.078	0.994
0.020	0.017	0.334	0.031	0.044	0.511	0.088	1.008
0.019	0.015	0.275	0.028	0.043	0.511	0.087	0.944
0.020	0.010	0.252	0.025	0.037	0.511	0.098	0.923
0.019	0.021	0.285	0.029	0.048	0.511	0.108	0.981

^a Includes ladders, checkers, stampers, set-off men, and bin boys.

^b Includes general supplies, fuel, power, light, and miscellaneous costs.

^c Standardized to reflect uniform type of package. Actual reports show minor variations in this item.

^d Based on thirty 8-hour days of operation per season, current replacement values for buildings and equipment, and uniform methods of allocating plant, equipment costs between fresh, cannery fruit.

MARKETING

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from 1.4¢ to 4.6¢ per box, while administrative and office costs range from 3.5¢ to 5.9¢ per box.

Fixed costs for land, buildings, and equipment range from 7.8¢ to 14.4¢ per box even under the assumptions of current replacement values and of a uniform length of season.

As the tables suggest even the best op-

erated houses can improve efficiency in some operations and, conversely, houses with relatively high total costs usually are fairly efficient in some practices. Plant volume is an important factor, and is one of the aspects of efficiency covered by the current studies. Each plant consists of many small operations and improving efficiency requires change and adjustments in these small operations.

A reduction in shipping point costs will result, not from a single sweeping

adjustment, but from a step-by-step approach and the combination of these steps into well-integrated totals.

Following reports in this series will compare house operations, methods, equipment, and arrangements. The comparisons may be used to establish standards for efficient operation. With minor modifications, the results of these studies can be applied to many of the problems of packing and processing other fruits and vegetables.

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Selected Costs of Handling Cannery Fruit in 11 California Pear Packing Plants, 1950^a

Plant	Tons per hour ^b	Cost per ton of cannery fruit—dollars								
		Direct labor cost ^c					General operating ^d	Office and administration	Fixed costs ^e	Grand total
		Receive and dump	Grade	Package, truck and load	Supervision and miscellaneous	Subtotal				
L.....	1.9	1.42	1.99	3.60	0.91	7.92	1.93	2.44	2.49	14.78
M.....	5.4	0.94	0.76	2.49	0.43	4.62	0.46	1.54	1.93	8.55
N.....	2.0	1.29	1.38	2.09	0.45	5.21	1.36	1.89	2.88	11.34
P.....	2.1	0.78	1.52	1.25	0.54	4.09	1.70	1.47	4.08	11.34
Q.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
R.....	9.9	0.90	1.02	1.30	0.79	4.01	0.60	2.04	2.09	8.74
S.....	7.3	0.81	1.25	2.55	0.55	5.16	1.29	1.82	1.55	9.82
T.....	13.9	0.90	0.52	1.26	0.70	3.38	1.28	1.82	1.61	8.09
U.....	3.9	0.85	1.05	1.05	0.43	3.38	1.18	1.80	2.36	8.72
V.....	10.7	0.45	0.89	1.10	0.30	2.74	1.02	1.56	2.18	7.50
W.....	12.0	0.68	0.93	1.41	0.76	3.78	1.22	1.99	2.24	9.23

^a Computed on the basis of 8-hour days with typical hourly rates of output. As such, these cost estimates will differ from average costs for a season.

^b Typical hourly rates of output, in tons of cannery fruit.

^c Adjusted to reflect uniform wage rates typical for the industry.

^d Includes general supplies, fuel, power, light, and miscellaneous costs.

^e Based on thirty 8-hour days of operation per season, current replacement values for building and equipment, and uniform methods of allocating plant and equipment costs between fresh and cannery fruit.

IRRIGATION

Continued from preceding page

ahead of the dry plots, *D* and *E*. Treatment *C* was intermediate.

During this period—while the trees were 15 to 24 years old—the average yields were remarkably consistent, within each of the five treatments, when analysed in consecutive two-year periods. Plot *A* averaged 357 pounds; *B*, 350 pounds; *C*, 295 pounds; *D*, 230 pounds, and *E*, 240 pounds. The plots, *A*, *B*, and *C*, retained the averages through the entire 10 years, but *D* and *E* showed a tendency to decline in yields after the eighth year.

On the whole this period was characterized by maximum yields for the various treatments and relatively small increases in cross section areas.

Last Period Declines

In the last period while the trees were in their 25th to the 28th years, yields on all plots were materially reduced. Treatments *A* and *B* still yielded best with an average of 262 and 238 pounds respec-

tively; *C* was third with 193 pounds; *D* dropped to 66 pounds; and *E* produced 141 pounds.

Because of low yields and the death of trees, treatment *D* was discontinued after the first two years of the final period, and the trees were removed. Thus, after 16 years of no irrigation during the growing season, this part of the experiment ended. From a commercial standpoint, the trees had probably ceased to be profitable several years before their removal. In growth, treatments *A* and *B* averaged slightly less than in the previous period, while treatments *C*, *D*, and *E* were about the same.

Growth and Yield

During the period of the first four years of differential treatment the irrigated plots showed marked increases in growth, but not in yields. The differences in growth and yields, between the irrigated and unirrigated treatments, or those without readily available water for considerable periods, were due to the slower growth and smaller yields of the

dry plots. Increased yields from the irrigated plots followed, after the trees had attained large size.

The trees in all treatments seemed to be in their prime—during the 10-year period from 15 to 24 years old—although there was a tendency for the yields from the treatments to decrease a few years before the end of this period.

In this period the trees in treatments *A* and *B* seemed to reach a maximum average production—when averaged at two-year intervals to reduce the great variability due to alternate bearing—of 357 and 350 pounds per year respectively. When studied in the same way, the average maximum yield for treatment *C* was 295 pounds. Treatments *D* and *E* reached considerably lower average maximums.

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