

ESTIMATED PLANT CITY AREA STRAWBERRY PRODUCTION COSTS, 1977¹

J. A. OTTE
IFAS, Food & Resource Economics Department,
Agricultural Research & Education Center,
5007 60th St. E, Bradenton, FL 33508

M. T. POSPICHAL
IFAS, Hillsborough County Cooperative
Extension Service,
Seffner, FL 33584

C. M. HOWARD AND E. E. ALBREGTS
IFAS, Agricultural Research Center,
Dover, FL 33527

Additional index words. For year 1977, fixed costs, variable costs, harvest costs, break-even prices.

Abstract. Estimating production costs is a management tool for growers. Cost data can aid existing or new growers in obtaining credit. Plant City area strawberry growers and grower supply dealers were surveyed to estimate production costs. Estimates of the investment in land and equipment, of the annual fixed costs, variable growing costs, and harvesting and packing costs were determined for the 1977 crop. For a typical 20 acre farm the estimated fixed and variable costs/acre were \$1247 and \$2269, respectively. Harvesting and packing costs were estimated at \$1.99/flat. Estimated break-even prices to cover fixed, variable, harvesting, and packing costs ranged from \$4.50 per flat² at a yield of 1400 flats per acre to \$3.75 per flat at a yield of 2000 flats per acre.

Estimating strawberry production and harvest costs is a management tool for growers. Cost projections allow growers to plan credit needs before planting the crop. Expected yields and production costs can be used to determine break-even prices for strawberries. A grower can compare estimated costs to records from previous seasons to determine business performance and help plan subsequent crops. Cost estimates also provide information to individuals who are considering strawberries as a potential crop. This report estimates grower investment and production, harvesting, and packing costs to produce strawberries.

Method

A 20 acre farm was selected as an average size Plant City area strawberry operation. Fruiting beds were on 4 ft centers with 2 rows per bed with irrigation provided by permanent overhead sprinklers. Field operations were performed by the operator except that supplemental labor was hired for fumigation, plant setting, and harvesting.

Plant City area strawberry growers and grower supply dealers were surveyed to determine management and production practices and their costs. Cost and quantity estimates for fuel, oil, labor, and material used with each production practice were obtained to determine variable costs. Estimated investment in land and equipment were used to determine fixed costs. Additional information was obtained from previous publications and University of Florida Institute of Food and Agricultural Sciences Researchers (3, 4).

¹Florida Agricultural Experiment Stations Journal Series No. 760.

²A "flat" is a tray holding 12 1 pint (0.55 liter) containers.

Efforts were made to obtain reliable cost data. However, one must keep in mind that each grower does things differently, and the cost of land, equipment, and materials is constantly changing. Individual growers should adjust cost data in the tables from their own records to represent their production practices.

Results and Discussion

Fixed costs. Production costs are divided into fixed and variable costs. Fixed costs are tied to investment. Variable costs are direct production expenses to produce the crop.

Table 1 shows land and machinery investment of \$153,770 for the 20 acre farm at current prices. Straight line depreciation was used for machinery. Various percentages of average annual investment were used to estimate machinery interest, taxes, insurance, and repairs in Table 2. The percentages used were derived from several previous engineering and agricultural record studies (1, 2). Land taxes and interest on land add \$5,380 to the machinery fixed costs of \$19,559. Total fixed costs for the 20 acre farm were \$24,939 or \$1,247 per acre. Each grower should use his own records to estimate fixed costs for his operation.

Table 1. Estimated investment in land and equipment and equipment depreciation costs for strawberry production on a typical 20 acre farm, 1977.

Item	Cost	Salvage Value	Life years	Depreciation
<i>Machinery and Equipment</i>				
60 HP tractor	\$12,000	\$1,000	10	\$1,100
25 HP tractor*	7,500	700	10	680
Fumigation rig [†]	870	80	10	79
Sprayer	2,000	150	10	185
Rotovator	2,450	200	10	225
Planting & harvesting aid	750	50	10	70
Portable packing shed	700	0	10	70
1/2 ton truck	7,000	500	8	813
2 ton truck	10,500	1,000	8	1,188
Irrigation system [‡]	40,000	1,000	10	3,900
Total machinery and equipment	\$83,770	\$4,680		\$8,310
Land [§]	\$70,000			Non-depreciable
Total land, machinery and equipment	\$153,770	\$4,680		\$8,310

*Fully equipped (includes fertilizer spreader and cultivator).

[†]Includes bed press and plastic layer.

[‡]Includes well, pump, water lines, and sprinklers.

[§]20 Acres at \$3,500/acre.

Variable costs. Variable costs are tied to growing practices. The time and the amount of supplies needed per acre to carry out each growing practice were estimated. For example, rotovating for the cover crop requires the rotovator, a tractor and a driver. The operation takes 1 1/2 hours per acre. The \$6.52 hourly charge covers the driver's time at \$3.25 per hour, plus fuel, oil, and other lubricants on the equipment (5). One must remember that in calculating wages that growers pay about 13.35% above the base wage for their contribution to social security and workmen's compensation. Beginning January 1, 1978 an additional 3% will be added to cover state and federal unemployment insurance.

Table 2. Estimated fixed costs for land and machinery for strawberry production on a typical 20 acre farm, 1977.

Item	Cost
<i>Machinery fixed costs</i>	
Depreciation (Table 1)	\$ 8,310
Interest*	6,767
Taxes, 1.2% of average investment	955
Insurance, 0.3% of average investment	239
Repairs, 3.0% of average investment	2,388
Truck tag and insurance	900
Total machinery fixed costs (20 acres)	\$19,559
<i>Land fixed costs</i>	
Interest, 7% of investment	4,900
Taxes, \$24/acre	480
Total land fixed costs	\$ 5,380
Total fixed costs (20 acres)	\$24,939
Fixed cost per acre	\$ 1,247

*8.5% of average machinery investment, average annual investment = $\frac{\$83,770 + (\$83,770 - 8,310)}{2}$ or \$79,615.

Plants and spray materials cost more than one-half of the \$2,269 per acre total cash growing costs in Table 3. Plant costs varied depending on cultivar. Tioga was the most common cultivar in the 1976-77 season, while Tufts will likely be most common in 1977-78. Pesticide costs vary depending on spray frequency, weather conditions, and pest pressure. Table 4 shows a sample spray program.

Table 3. Estimated variable strawberry growing costs per acre for a typical 20 acre farm, 1977.

Item	Cost
<i>I. Cash costs</i>	
<i>Remove plastic from previous crop</i>	
8 hrs. labor @ \$2.66/hr.	\$ 21.28
<i>Rotovate, 1 time, 1.5 hrs. each time tractor, driver, and rotovator @ \$6.52/hr.</i>	9.78
<i>Fertilizer for cover crop</i>	
chicken manure, 3 tons, delivered and spread	45.00
<i>Plant cover crop, 1 time, 1/2 hr. @ \$5.28/hr. seed, 50 lbs. sorghum</i>	2.64 15.00
<i>Rotovate cover crop, 2 times, 1.5 hrs. each time tractor, driver, and rotovator @ \$6.52/hr.</i>	19.56
<i>Lay off rows, 1 time, 1 hr. each time, tractor, and driver, @ \$5.28/hr.</i>	5.28
<i>Make beds, 1 time, 1 hr. each time, tractor and driver, \$5.28/hr.</i>	5.28
<i>Fertilizer, 2 times, 1 hr. each time tractor, with spreader and driver @ \$5.28/hr.</i>	10.56
Fertilizer, 3000 lbs. 6-8-8 @ \$152/T	228.00
Lime, 1 ton every 3 years @ \$14/T	4.67
<i>Fumigate, 1 time, 4 hrs. each time tractor with fumigator and driver @ \$5.97/hr.</i>	23.88
3 helpers @ \$2.66/hr.	31.92
Fumigant, 175 lbs. @ \$0.80 lb.	140.00
Plastic, 11,000 ft. x 44 in. @ \$14/1000 ft.	154.00
<i>Set plants</i>	
40 hrs. labor @ \$2.66/hr.	106.40
23,000 plants @ \$32/1000	736.00
<i>Cultivate, 3 times, 1 hr. each time tractor, with cultivator and driver @ \$5.28/hr.</i>	15.84
<i>Spray, 36 sprays, 1/2 hr. each time tractor, driver and sprayer @ \$5.95/hr.</i>	107.10
spray materials	429.58
<i>Electricity for irrigation</i>	50.00
Interest on above expenses, 8.5% for 7 months	107.19
Total variable costs	\$2,268.96
<i>II. Fixed costs (Table 2)</i>	\$1,247.00
<i>III. Total production costs other than harvesting & packing</i>	\$3,515.96

Table 4. Rates and costs/per acre for a sample strawberry pest control program, 1977.*

Material	Rate/A	Price	No. Sprays	Seasonal cost/A
Captan	6 lb.	\$ 0.455/lb.	36	\$ 98.28
Benlate	1 lb.	7.30/lb.	16	116.80
Dibrom	1 pint	4.50/pint	12	54.00
Plictran	2 lb.	12.00/lb.	6	144.00
Phosdrin 4-E	1 pint	2.75/pint	6	16.50
Total				\$429.58

*The use of trade names in this publication is solely for the purpose of providing specific information. It is not a guarantee or warranty of the products named and does not signify that they are approved to the exclusion of others of suitable composition. A preventive maintenance fungicide spray program will likely be used. The insecticides and miticides included above may not be used if pests are not observed.

Irrigation costs ranged from about \$30 per acre to \$85 per acre. The variation was due primarily to soil type and amount of frost protection required. Soils in low lying areas or those with a spodic horizon require little irrigation after plants are established. Deep sands with low organic matter content require frequent irrigation.

Harvesting and packing costs. Labor costs, including benefits, for fruit harvest were \$1.14 per flat. Containers cost \$0.55 per flat, while packing shed operations and supervision added another \$0.20 per flat. Some growers paid a picking bonus to maintain quality and minimize buyer rejections. Total harvest costs shown in Table 5 came to \$1.99 per flat.

Table 5. Strawberry harvesting and packing costs for a typical 20 acre farm, 1977.

Item	Cost per flat
Picking labor	\$1.00
Labor benefits	.14
Containers	.55
Packing shed labor*	.10
Labor bonus	.10
Supervision	.10
Total picking and packing cost	\$1.99

*Level flats, sort fruit, etc.

Break-even prices. The price a grower needs to cover his costs depends on his yield and total cost. The break-even price to cover variable, harvesting, and packing costs was determined by dividing total variable costs per acre (\$2,268.96) by expected yield to obtain variable cost per flat then adding harvesting and packing cost per flat (\$1.99). Dividing fixed and variable cost per acre (\$3,515.96) by expected yield and adding harvesting and packing cost (\$1.99) gives the break-even price per flat needed to cover fixed, variable, harvesting, and packing costs.

Table 6 shows estimated break-even prices to cover

Table 6. Estimated break-even prices to cover the fixed, variable, harvesting and packing costs for strawberries, 1977.

Yield saleable	Variable cost	F and V* cost	H and P ^y cost	V, H and P costs	F, V, H, and P costs
Flats	\$ per flat				
1400	1.62	2.51	1.99	3.61	4.50
1600	1.42	2.20	1.99	3.41	4.19
1800	1.26	1.95	1.99	3.25	3.94
2000	1.13	1.76	1.99	3.12	3.75

*F and V equal fixed and variable costs, respectively.

^yH and P equal harvesting and packing costs, respectively.

fixed, variable, harvesting, and packing costs. These calculations assume no berries were rejected by the buyer. If some berries are rejected, costs will rise proportionally. As yield increases, the price required to cover total costs decreases.

Literature Cited

1. Greene, R. E. L. 1971. Cost of producing principal field crops and cost of operating selected types of farm equipment, north and west Florida. University of Florida. *Agricultural Economics Report 22*. 34 pp.

2. Herbst, J. H. 1974. Farm management principles, budgets, plans, 3rd edition. Stipes Publishing Co., Champaign, Illinois.
 3. Johnson, F. A., J. E. Brogdon, R. S. Mullin, T. A. Kucharek, and D. W. Dickson. 1974. Commercial vegetable insect, disease, and nematode control guide. *Florida Cooperative Extension Service Circular 193-H*. 72 pp.
 4. Levins, R. A., and R. D. Downs. 1974. Strawberry production costs in the Plant City area, 1974. *Bradenton AREC Research Report GC1974-9*. 4 pp.
 5. Smerdon, E. T., Chairman, IFAS Energy Committee. 1975. University of Florida, Agricultural growth in an urban age, Fuel use estimates for Florida agricultural production. 47 pp.

Proc. Fla. State Hort. Soc. 90:236-239. 1977.

MARKETING FLORIDA LIMES: RETAIL PRACTICES AND PROBLEMS WITH SUMMER MOVEMENT

KARY MATHIS

*IFAS Food and Resource Economics Department,
University of Florida, Gainesville, Florida 32611*

Additional index words. merchandising, promotion.

Abstract. Produce merchandisers of major food retailers in Chicago and Los Angeles were interviewed to determine retail marketing practices and problems associated with fresh Florida limes and to identify ways to increase retail lime sales during the summer months, the peak production period. Few physical handling problems were discovered. The consensus was that Florida limes are preferred over limes from other areas because of superior quality. However, limes were found to represent an extremely small proportion of produce department sales. Consequently, limes are given relatively little attention by retailers. Florida lime growers and shippers could increase retail interest by special promotions and improved communications with merchandisers. Additional research on consumer characteristics is also needed.

Florida produces most of the limes grown in the United States, with over 90% of domestic acreage and production. Florida has held this dominant position for 50 years, as production of the 'Persian' or 'Tahiti' lime supplanted the 'Mexican' or 'Key' lime following the 1926 hurricanes (6). From 9,800 bushels in 1928, Florida lime production has increased to about 1 3/4 million bushels¹ currently (4).

Bearing acreage increased 18% from 1968-69 to 1975-76, while production rose 57% over the same period. Total value more than doubled over those 7 seasons, increasing from \$3 million to \$10 million (4). Recent projections show lime acreage increasing by about 5% from 1973 to 1985, with total production expected to go up by 30% in the absence of hurricanes or other natural disasters (7). Increased production in the past 5 years and prospects for further growth are of concern to lime growers and shippers.

The seasonal nature of lime marketing and the resulting variation in grower prices also has major effects. From 1971-72 through 1975-76, total production ranged from 1,680,000 to 1,760,000 bushels, with certified fresh shipments varying between 711,000 and 895,000 bushels. Over these 5 seasons, an average of 62% of the season's crop was marketed during the five-month period of May through September and 41% during June, July, and August (10).

Volume increases sharply during May to a summer peak, then declines substantially. Prices vary in the opposite direction from shipments (11), with a sharp drop in price in May, and an increase in the fall from the low summer level (Fig. 1). Over the five-season period, 1971-72 to 1975-76, July prices were about one-third those in April, with March prices averaging nearly 4 times July levels (5).

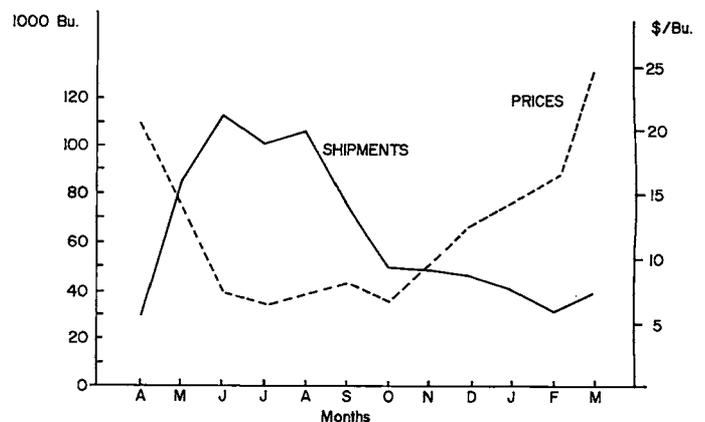


Fig. 1. Florida limes, fresh sales: average monthly shipments and average monthly prices, 1971/72-1975/76.

An average of 53% of the total lime crop was diverted to processing uses during the 1971-72 to 1975-76 period. This proportion ranged from 57% in 1971-72 to 46% in 1975-76. Grower returns on processing fruit have been negative for the past several seasons.

Florida growers are facing the problems of heavy volume and low prices for fresh limes in the summer months, losses on processing fruit, and anticipated increases in the lime crop in coming years. The objectives of this study were to determine retail practices and problems with fresh Florida limes and to identify ways to increase retail lime sales during the summer months.

Procedure

Structured interviews were conducted with produce merchandisers and buyers in corporate or regional offices of retail chains or voluntary retail cooperatives in Chicago and Los Angeles. Executives in 19 retail organizations were interviewed during September and October, 1976.

Los Angeles and Chicago were selected because they are the second and third leading U.S. markets for fresh Florida

Florida Agricultural Experiment Station Journal Series No. 767.

¹One bushel = 50 pounds (22.69 kilograms).