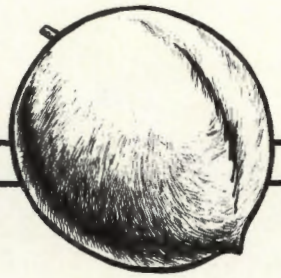
B. Flores



Central Washington Peach Production Costs

Stations Circular 294

Washington Agricultural Experiment Stations
Institute of Agricultural Sciences

State College of Washington
September 1956

Foreword

This peach cost study was conducted by the Washington State Fruit Commission and the Department of Agricultural Economics, State College of Washington.

The study was planned by Fred W. Westberg, Manager, Washington State Fruit Commission and C. H. Zuroske, Associate Agricultural Economist, State College of Washington. Lee Rosencranz of the Fruit Commission and Roy Fode of the Department of Agricultural Economics completed the interviews (schedules) of Washington peach growers. The peach growers who cooperated in this study deserve special thanks.

The schedules were edited and the preliminary manuscript was prepared by C. H. Zuroske. The computation work was done by Nancy Okazaki.

The manuscript was reviewed and edited by members of the Washington State Fruit Commission and of the Department of Agricultural Economics. The suggestions resulted in many helpful changes.

Central Washington Peach Production Costs, 1955

Introduction

What are the production practices and costs of peach producers in the state of Washington? The purpose of this study was to help answer the above question.

The first step was to ascertain the amounts of various items used to produce peaches. Then for each item, the cash cost, the market value, or the opportunity cost was determined.

Peach production cost studies for the state of Washington were made by the Department of Agricultural Economics, Pullman, for years 1925-27 and 1943-44 and by the Washington State Fruit Commission in 1950.[1] This study was made to supply current data on peach production costs.

THE DATA ARE FOR 1955

The data for this study were based on 1955 production. The peach yields in 1955 were above average. The results of this study do not apply directly to years of higher or lower yields. (For varying yields, see Appendix B.)

Sampling Procedure

A list of the names of the Central Washington peach growers and the number of tons they produced was obtained from the Washington State Fruit Commission and from peach marketing firms.

A sample of peach producers was divided into three groups, based on the number of tons produced. One-third of the growers produced 50 or fewer tons, one-third produced 51 to 90 tons, and one-third produced 91 and more tons.

Six-sevenths of the records (interviews) were to be taken in the Yakima area. One-seventh of the records were to be taken in the Wenatchee area.

FORTY-TWO NAMES DRAWN FROM A HAT

A 5 per cent sample (as was used for apple and pear costs) would have resulted in only twenty-five records. The final plan included thirty-six records to be taken in Yakima and six records in Wenatchee. Fourteen records in each of the production (size) groups above were taken. Within each size group the growers were randomly selected. The relationship of the sample to the total population was not known. Hence, validation of the relationship of the sample to the total peach production in the area was not made.

Results of the Study

It cost an average of $69.92 per ton or $622.29 per acre to produce peaches in 1955. These results were weighted averages for forty-two typical growers with 16 acres of peaches each, which yielded 8.9 tons per acre (Table 1).

Peach orchards were valued at $1,288 per acre. The total investment in land, orchards, buildings, improvements, machinery, and equipment was $1,710 per acre.

1/ The State College of Washington phase of the work was conducted under Project No. 1295.

The total costs shown in Table 1 are broken down and itemized in Table 2. The costs included are shown in detail. They can be added to or omitted to facilitate comparison with costs of other studies.

Some areas had costs that were $10 per ton less than average. Costs in other areas were way above average. However, this study included all Central Washington peach producing areas. The study was not designed to find cost differences by areas. The variations possible are pointed out to show that any one grower may have production costs above or below average.

Individual production costs varied from $36 per ton to over $150 per ton. One-half of the growers had costs between $66 and $99 a ton. One-fourth had costs below $66 a ton. One-fourth had costs above $99.

ELBERTA IS THE MAIN VARIETY

Elberta is the principal variety of peach grown in Washington. The Hale variety and miscellaneous other varieties constituted a small proportion of the total acreage.

The distribution of acreage for this sample in 1955 was:

Elberta	80.6%
Hale	16.7%
Other	2.7%

For each farm, the number of acres of each variety of peach was recorded. The average yield of Hale peaches was 8.4 tons per acre. The average yield of Elbertas was 9.6 tons per acre.

THE AVERAGE COST IS $622.29 PER ACRE

Table 1. Average Cost of Producing Peaches and Related Data, Forty-Two Growers, Central Washington, 1955

Item	1955
Number of Orchards Studied	42
Acreage of Bearing Peaches per Orchard	16
Yield of Peaches per Acre (tons)	8.9
Production and Harvesting Costs per Acre	$ 622.29
Production and Harvesting Costs per Ton	69.92
Average Investment per Acre in:	
Land and orchard trees	1,288.00
Buildings and improvements	259.00
Machinery and equipment	163.00

DOZENS OF ITEMS AFFECT COSTS

Table 2. Central Washington Peach Production Costs, Forty-Two Growers, 1955

Item	Total Cost 42 Growers	Cost Per Acre	Cost Per Ton
Orchard Labor Costs (for peaches)			
Pruning	$ 35,351.50	$ 51.31	$ 5.77
Brush disposal	3,311.38	4.81	.54
Discing, cultivating, mowing, and planting cover crop	3,815.63	5.54	.62
Ditching	828.82	1.20	.14
Irrigating	16,110.26	23.38	2.63
Spraying	2,503.14	3.63	.41
Thinning	24,948.88	36.21	4.07
Propping	3,358.56	4.88	.55
Harvest: Picking	59,661.89	86.60	9.73
Harvest: Scattering empty boxes	2,968.95	4.31	.48
Harvest: Yarding out (roadsiding)	7,812.97	11.34	1.27
Harvest: Picker supervision	4,749.51	6.90	.77
Fall clean-up (after harvest box, prop, ladder pickup, etc.)	1,548.91	2.25	.25
Orchard heating	2,204.34	3.20	.36
New tree planting	892.77	1.30	.15
Fertilizing	2,121.03	3.08	.35
Record keeping	3,962.25	5.75	.65
Miscellaneous labor	4,789.00	6.95	.78
Orchard Material Costs (for peaches)			
Spray	15,965.48	23.17	2.60
Fertilizer	12,517.53	18.17	2.04
Cover crop seed	1,191.60	1.73	.19
Orchard heating (fuel)	2,287.37	3.32	.37
New trees	2,124.35	3.08	.35
Miscellaneous materials	2,386.05	3.47	.39
Land and Orchard (for peaches)			
Interest on investment (5%)	44,368.75	64.40	7.24
Orchard depreciation (beg. of yr. value of trees ÷ yrs. use left)	29,967.76	43.50	4.89
Water charges	5,103.15	7.41	.83
Building and Improvements (proportion chargeable to peaches)			
Interest on investment (5%)	8,911.51	12.94	1.45
Depreciation (beg. of yr. value ÷ yrs. use left)	14,515.19	21.07	2.37
Repairs and maintenance	3,154.27	4.58	.51
Machinery and Equipment (proportion chargeable to peaches)			
Interest on investment (5%)	5,612.32	8.15	.92
Depreciation (beg. of yr. value ÷ yrs. use left)	22,764.45	33.04	3.71
Repairs and maintenance	7,597.23	11.03	1.24
Farm vehicle license	1,188.35	1.73	.19
Fuel, oil, and grease	12,259.17	17.79	2.00
Machine hire (plane, speed sprayer, etc.)	1,316.20	1.91	.21
Other Expenses (proportion chargeable to peaches)			
Land and property taxes	4,752.66	6.90	.78
Insurance	4,271.25	6.20	.70
Electricity	3,783.03	5.49	.62
Telephone	771.28	1.12	.13
Interest on operating capital (6%)	6,455.93	9.37	1.05
Operator's management	39,459.03	57.27	6.43
Miscellaneous expenses (other than misc. labor and materials)	1,215.34	1.77	.20
Grand total	$434,879.04	$631.25	$70.93
Credit (machine rental income, etc.)	-6,174.35	-8.96	-1.01
Total balance	$428,704.69	$622.29	$69.92

HIGH COST GROWERS RAISE A SMALL PART OF THE CROP

Table 3. Distribution of Production at Different Costs

Cost per Ton	Number of Growers	Percentage of Growers	Number of Tons	Percentage of Tons
$30-39	2	4.8	710.0	11.6
40-49	3	7.1	946.0	15.4
50-59	4	9.5	760.0	12.4
60-69	9	21.4	1,096.3	17.9
70-79	5	11.9	571.0	9.3
80-89	3	7.1	1,200.0	19.6
90-99	4	9.5	322.0	5.2
$100 or more	12	28.6	526.0	8.8

ELBERTA, HALE HAVE ABOUT SAME COSTS

Thirteen growers had all Elberta peaches. The production costs of these thirteen were compared with thirteen growers who had over 33 per cent Hale trees. The thirteen Elberta peach growers had costs per acre of $584. The thirteen growers with considerable Hale acreage had costs per acre of $586. The costs were only $1 per acre lower for the Elberta growers than for those with more than one-third Hales.

Eleven per cent of the growers produce 27 per cent of the peaches for less than $50 per ton. Twenty-seven per cent of the growers had costs of more than $100 per ton, but these growers produced only 8 per cent of the peach tonnage (Table 3 and Figure 1).

With costs as found in this study, a continuous return of $100 would cover production costs for all but 8.8 per cent of the tonnage or 28.6 per cent of the growers. In other words, many growers have costs over $100 per ton, but they produce only a small proportion of the total tonnage.

Some people in the fruit industry report that orchard depreciation is higher on Hales than Elbertas. No such difference appeared in this study, perhaps, because the questions to growers were not sufficiently detailed. The rate of return on investment, as well as costs of production, was about the same for Elbertas and for all peaches. The results of this study show no important differences between Elberta production costs and the production costs of all peaches.

LARGEST FARMS HAD LOWEST COSTS

The larger producers (tons) of peaches showed the lowest cost per

acre and per ton. A stratification by size (tons produced) was made in selecting the farms to be studied. The records were divided into three groups based on tonnage, and farms were selected for study from each of the groups. The production-size groups were divided at 50 and 90 tons. The results are shown in Table 4.

How much income was earned by the operator for his own or family labor? The hours of orchard labor not hired were allocated to the operator at $1.25 per hour (estimated rate of wages given by owner-operators).

The operator and/or family performed 26 per cent of the total work done on peach orchards. Total labor costs on peaches were $288 per acre. The work of the operator and/or family had a value of $62.25 per acre. The management income was calculated to be $57.27 per acre. Hence, the total income to operator was $62.25 plus $57.27 or $119.52 per acre.

The median wage rate for all the jobs shown in Table 2 was $1 per hour except picking peaches and hauling peaches. The picking rate was 15 cents per field box (same for Elbertas as Hales) and $1.25 for hauling peaches out of the orchard. Several growers said the peach picker rate was 14 cents per box. However, 15 cents was the most frequently reported rate.

OPERATOR'S LABOR AND MANAGEMENT

Some other studies have included costs of operator's management and some studies excluded them from production costs. This study includes operator's management costs as an input and cost, just like all other input requirements which can be identified and expressed as quantities.

Each (peach grower) was asked to estimate the total value of his time spent on the peach orchard. Each was asked the value of his labor per hour in peach orchard jobs such as pruning, irrigating, and spraying.

The weighted average value of the operator's time was given as $119.52 per acre of peaches. This value was divided into two parts as follows. The operators, on the

LARGER PEACH ORCHARDS PRODUCED FOR LESS

Table 4. Relationship of Number of Tons of Peaches Produced to Unweighted Production Costs and Other Items

Item	1955 Tons Produced		
	0-50	51-90	91 and more
Production Cost per Acre	$581	$671	$612
Production Cost per Ton	$110	$105	$ 64
Yield (tons) per Acre	6	7	11
Acres Peaches per Farm	5	12	28

PRUNING, THINNING, AND PICKING ARE THE BIG JOBS

Table 5. Average (Median) Labor Requirements for Orchard Jobs,[a] Forty-Two Peach Growers, Central Washington, 1955

Job	Man Hours Labor Used per Acre
Pruning	40.0
Brush Disposal	4.5
Discing and Mowing	4.5
Ditching	0.8
Irrigating	11.7
Spraying	2.3
Thinning	31.6
Propping	4.0
Scattering Empty Boxes	3.0
Picking	67.0
Hauling Fruit to Roadside[b]	7.2
After Harvest Clean-Up (box, ladder and prop pickup)	2.0
Fertilizing	1.8
Record Keeping	4.6
Miscellaneous Labor	9.2
Total	194.2

[a] Includes operator's labor, operator's family (non-hired) labor and hired labor.

[b] Hauling peaches from roadside to warehouse was not included in this study. The labor requirements for hauling to warehouse were 3.4 hours per acre.

average, did 49.8 hours or $62.25 worth of work on peach cultural jobs listed in Table 5. The value of operator's management was $57.27 per acre. The operator's cultural labor value ($62.25) was subtracted from total operator's labor value ($119.52). The value of operator's management was the remainder ($57.27).

The amount of labor for producing peaches hasn't been reduced as have some crops. The labor requirements per acre for producing wheat are only about one-fourth of what they were in 1910-14. Wheat production takes about 4 hours per acre. Peach production takes about 200 man hours per acre (Table 5).

The big jobs are pruning, thinning, and harvesting. These jobs take three-fourths of the total labor for peach production.

RETURNS ON INVESTMENT, 1955

The total costs per acre were $622.29. The interest on investment was $94.85; that is, 5 per cent on $1,897 capital invested. Total costs ($622.29) minus interest cost ($94.85) were $527.44. The latter figure is cost less interest charges.

The average yield of peaches was 8.9 tons per acre. The average price of all peaches reported by Central Washington growers was $64.80 per ton. This included returns for both fresh market and process. The returns per acre were $537.35 per acre (8.9 T/A x $64.80 per ton).

Total returns per acre ($537.35) minus cost other than interest ($527.44) equaled $9.91. Net returns per acre of $9.91 on an investment of $1,897 equaled 0.52 per cent earned on investment.

The yield on Elbertas was 9.6 tons per acre. The average price was $57.50 per ton. The receipts per acre were $552 ($57.50 x 9.6). Costs, except interest, were $527.44 per acre. Net returns per acre were $24.56. A net of $24.56 divided by $1,897 was 1.3 per cent earned on investment.

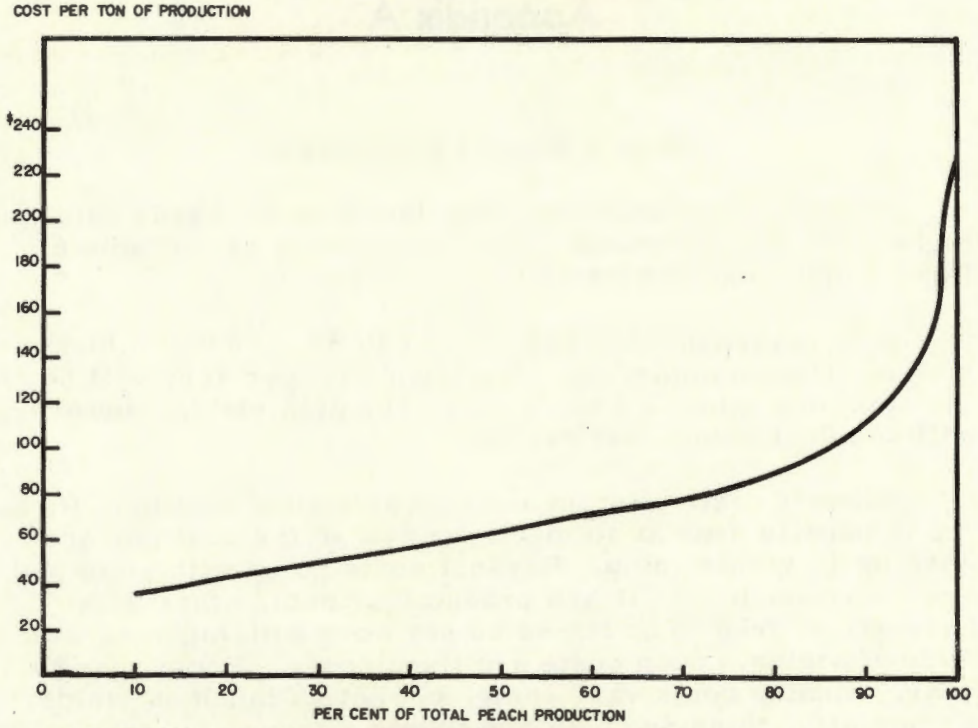
HIGH YIELDS CUT COSTS

Table 6. Estimated and Reported Peach Production Costs per Ton, 1955

Yield (tons per acre)	Estimated Costs (per ton)	Reported Grower Cost (per ton)
2.0	$268.82	$ --
2.5	217.51	228.67
3.0	183.30	130.27
4.0	140.53	136.89
5.0	114.88	100.34
6.0	97.77	98.20
7.0	85.56	68.24
8.0	76.39	105.22
8.9 (av. yield)	69.92	--
9.0	69.27	75.30
10.0	63.56	70.83
11.0	58.90	77.08
12.0	55.01	58.90
13.0	51.72	45.37
14.0	48.90	35.50
15.0	46.46	43.15
16.0	44.32	--
17.0	42.43	--
18.0	40.76	45.65

FIGURE 1

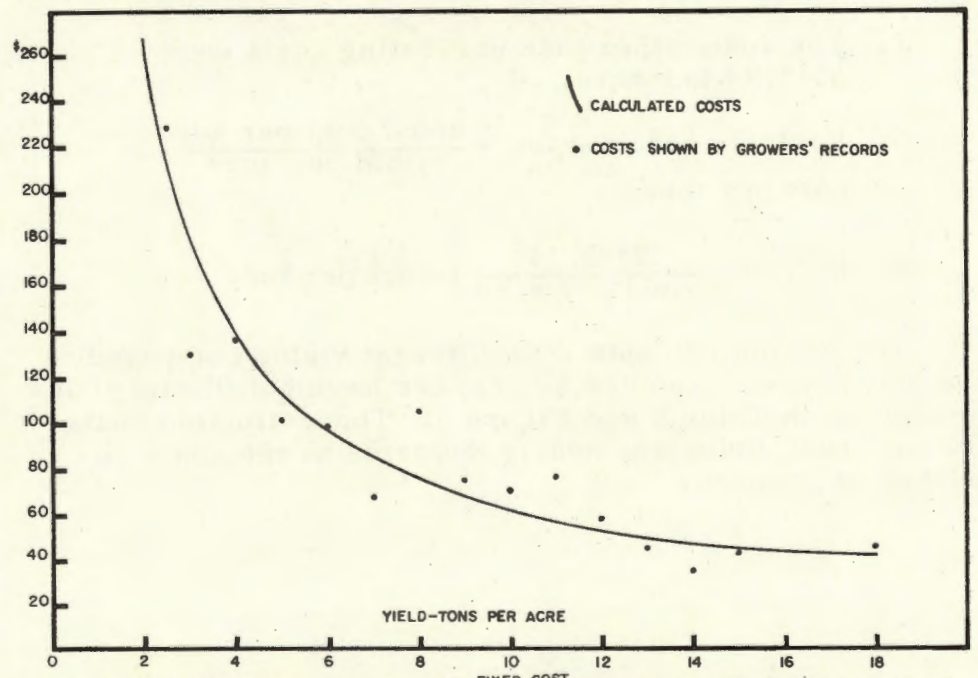
PER CENT OF PEACHES PRODUCED AT DIFFERENT COSTS



EIGHTY PER CENT OF THE PEACHES WERE PRODUCED AT $88 PER TON OR LESS.
FIFTY PER CENT OF THE PEACHES WERE PRODUCED AT $65 PER TON OR LESS.

FIGURE 2

CALCULATED AND ACTUAL (GROWERS' DATA) PEACH PRODUCTION COSTS



CALCULATED COSTS, WHERE Y = VARIABLE COST + $\frac{\text{FIXED COST}}{\text{YIELD PER ACRE}}$, CORRESPONDED CLOSELY TO GROWERS' RECORDS WITH YIELDS COMPARABLE.

Appendix A

HIGH YIELDS CUT COSTS

Peach production costs were lower on orchards with higher yields. The costs fell at a declining rate (Table 6, last column, and Figure 2).

It is reasonable to expect costs to be lower with higher yields. For example, the irrigation cost per acre will be the same for a high or low yield. The high yields, however, will result in a low cost per ton.

Harvest costs went up directly as yields went up. Picking is usually done at so much per box so the cost per acre goes up as yields go up. Harvest costs go up with yield and are variable costs. Peach production costs, other than harvesting, tend to be the same per acre with high, as well as low, yields. Such costs are fixed costs. From year to year, thinning costs vary some, but not as much as yields. Essentially, thinning costs are fixed.

The production costs with varying yields can be estimated with the following data:

1. The harvesting costs of peaches were $12.25 per ton.

2. The costs other than harvesting costs were $513.14 per acre.

3. Variable cost per ton + $\frac{\text{fixed cost per acre}}{\text{yield per acre}}$ = cost per ton.

4. $\$12.25 + \frac{\$513.14}{\text{yield per acre}}$ = cost per ton.

The estimated costs with different yields compared to the actual costs reported by growers having different yields are shown in Table 6 and Figure 2. The estimated costs for different yields are nearly the same as the costs reported by growers.

Appendix B

WEIGHTED AND SIMPLE AVERAGE COSTS

Farm production costs in the past have been figured by two methods. These two methods are: (1) the weighted average based on units of production such as bushel, ton, etc., and (2) an unweighted or simple average per grower. A weighted average is useful to compute the cost of an average unit such as a ton of product. The simple average is used to determine the production cost of the average grower.

In this study, the average grower produced peaches at $89.03 per ton. The weighted average ton of peaches was produced for $69.92. The weighted average cost of $69.92 has been used in this study except for frequency distribution calculations for Table 3 and Figures 1 and 2. For frequency distributions, the unweighted average cost is the logical choice.

METHODS OF CALCULATION

The mathematical expressions for the two averaging methods are:

MC = Mean (weighted average) cost per ton
AC = Simple (unweighted average) cost per ton
TC = Total costs for the peach enterprise on a given farm
Tn = Total tons produced on a given farm
C/T = Costs per ton on a given farm
n = Number of cases

The two averages are computed as follows below:

$$MC = \frac{TC_a + TC_b + TC_c + \ldots TC_n}{Tn_a + Tn_b + Tn_c + \ldots Tn_n} = \$69.92$$

$$AC = \frac{C/T_a + C/T_b + C/T_c \ldots C/T_n}{n} = \$89.03$$

The example below helps illustrate the two methods. Let us assume that there are three peach growers A, B, and C.

	Acres	Tons Produced	Yield Per Acre	Cost Per Ton
Grower A	2	10	5	$90
Grower B	10	90	9	80
Grower C	100	1,000	10	60

The simple average cost is:

$$\$90 + \$80 + \$60 = \$230$$

The total of $230 divided by three growers equals $76.67 per ton.

In the above case, the average production cost of Grower A is added to the average production costs of Growers B and C on an equal basis. Yet, Grower C has more tonnage and acreage than the other two combined. To give weighting to volume or size of business, the following calculations would be made:

Grower A	10 tons at $90 per ton =	$ 900
Grower B	90 tons at $80 per ton =	$ 7,200
Grower C	1,000 tons at $60 per ton =	$60,000

Now we add Grower A's total costs of $900 plus $7,200 for Grower B plus $60,000 for Grower C. The total costs of the three are $68,100. The total tons of the three growers are 1,100. The weighted average cost would be $68,100 divided by 1,100 or $61.50 per ton.

Thus, these methods give average costs of $76.67 and weighted average costs of $61.50.

In the example above, the yields were higher on the larger acreages. In the orchards studied, higher yields were produced on the larger acreages, as shown in Table 4.

The next illustration is identical with the first illustration, except that yields are the same at 10 tons per acre in all three cases.

	Acres	Tons Produced	Yield Per Acre	Cost Per Ton
Grower A	2	20	10	$90
Grower B	10	100	10	80
Grower C	100	1,000	10	60

In this case, the weighted cost per ton is $62.32. The simple average cost is $76.67 per ton.

There are possible cases where weighted and unweighted average costs are identical. If the yields were the same for all farms and the costs were the same for all farms, the weighted and unweighted average costs would be the same. The probability of such occurrence is minute.

WHY AVERAGES DIFFER

1. Fixed costs are unchanged by yield differences.

2. Higher yields reduce costs per ton.

3. An example. Two farms have the same acreage, but the yields are higher on Farm A than on Farm B. The production costs per acre (other things except yield equal) on Farm A will be higher than on Farm B, but the cost per ton will be less.

4. With acreages the same and yield higher on Farm A, then Farm A will have produced more tons than Farm B.

5. Farm A has the most tons and the lowest cost. When the average cost is weighted by tons, Farm A will have the most weight. The farm with the lowest cost has the most weight.

6. Consequently, the weighted average costs, generally, are lower than unweighted average costs.

The weighted average yield was 8.9 tons per acre. The unweighted average yield was 8.2 tons per acre--that is, 8 per cent lower than the weighted average yield.