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Orchard Establishment Costs on the Wasatch Front

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ORCHARD ESTABLISHMENT COSTS ON THE WASATCH FRONT

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ORCHARD ESTABLISHMENT COSTS ON THE WASATCH FRONT

Earnest M. Morrison

Present and potential fruit farmers are asking the question, "How much do I have invested in an acre of fruit by the time the trees are old enough to produce a paying crop?" or "How much would I have to invest to bring an acre of young trees into production?" Sometimes the question is "How much do trees add to the value of bare land?" or "How much value must I depreciate my trees each year to recover my investment by the time their productive life has passed?"

To furnish basic data usable in answering these and related questions a study was initiated in 1963. Research was aimed to find the investment farmers actually make in planting and developing an orchard to the point where the income from fruit produced will normally pay the current costs of production. The agricultural value of bare land, water costs, all investments made from the time the land was devoted to the orchard until the orchard was bearing enough to produce a break-even point between receipts and expenses, were added together. The accumulated investments then become the cost of producing or establishing an orchard. This might also be considered to be the value of a producing orchard. Although cost of

production and value may be different at a particular time, over a period of time under competitive conditions value will at least equal the cost of maintaining land in fruit production.

It was impossible to obtain full and detailed cost data for each maturing year for all orchards. Therefore, records were obtained from each grower by the survey method. For example, 1 grower may be able to supply cost data for the first, second, and third years from planting, another grower for the third and fourth year, and another for only the fifth year, while some growers can give complete data for the entire time involved. Data from each grower, for appropriate years, were added and divided by the number of acres involved. Then the averages per year were added or accumulated to produce a cost of production figure for the group. First year cost on 1 record may have been for 1958, on another record for 1960, and on another record for 1963. Therefore, the resulting figure was an average of cost condition in recent years. With 1 group an attempt was made to adjust each year to a common level by use of an appropriate cost index. The adjusted and unadjusted averages were insignificantly different.

AREA STUDIED

Survey data were obtained in Box Elder, Weber, Davis, and Utah Counties. A list of young orchard growers was made by contacting county agents, horticultural societies, nurserymen, and other orchardists. All locatable growers, currently starting

young orchards or who had young orchards not yet in full production, were contacted. All those who had some basis for reporting desired data were included in the study. Therefore, this is more of a census study than a sample study of young orchards.

The fruit growing areas were located on the Wasatch Mountains' west foothills, except the West Mountain

areas west of Payson and the Santaquin areas, which are adjacent to the foothills of the Wasatch Mountains.

DESCRIPTION OF COST ITEMS

Bare land and water were valued at market price by producers. Values varied from \$300 to \$2,000 per acre. Although we emphasized that we were interested in a value for agricultural purposes, no doubt some site value was reflected in producer's estimates. Although the average of value per acre for the different kinds of orchards involved in the study ranged from \$488 to \$1,416, a figure of \$500 per acre has been used.

Anyone so desiring can increase or decrease that figure by an amount suggested in each column reporting different kinds of orchards and obtain a figure in line with his individual estimate of a beginning value for bare land. Adjusted net investments per acre have been included for beginning land and water values for \$750 per acre and \$1,000 per acre.

The orchard acreage was considered to be the land occupied by and chargeable to the trees. In cases where no other use of the land was made except that used by the tree, all the land was charged to the orchard. In a few cases, some intercropping was practiced while the trees were young. When intercropping was practiced, some receipts and expenses were involved. To avoid penalizing or rewarding the orchard for inter-planted crop production while the orchard was young, only that part of the land occupied by a row of trees was charged to the developing orchard. As the trees grew in size, more land was charged to the trees since less could be

used for inter-planting. Inter-cropping, however, was not extensively practiced in the young orchards studied.

Cost of trees, that were planted and designated as a current capital addition, was added to the value of initial bare land. Interest at 5 percent was charged each year on the fixed capital involved in land and trees. This charge can be regarded either as rent for the land involved or as interest which that capital could have earned had it been invested in some other manner.

The first year cost of labor and equipment used in preparing the land for planting, and actual tree planting costs were added to all other costs during the first year. This makes the first year's cost higher than immediate subsequent years. Other tree growing costs each year consisted of labor, power and equipment, water, spray, taxes, and interest on the investment of these items. Operating costs of each year were added to the fixed capital investment to accumulate the amount of investment in the orchard. This process continued up to the year that receipts from sale of fruit equaled the costs of production. Therefore, when the costs for a peach orchard have been accumulated for 4 years, it means that the average orchards were producing enough fruit the fifth year to pay the operating costs.

Labor cost was primarily for the operator's time. Little hired labor was involved until the trees

began to bear fruit. Labor was used in fertilizing, pruning, spraying, cultivating, irrigating, weeding, and rodent control. As the trees began to bear fruit, some labor was involved in box distribution, picking fruit, loading, hauling, and unloading fruit at some designated place on the farm.

Power and equipment cost included the operating and fixed capital charges involved with all sources of power and equipment used except power costs for pumping water. Equipment cost was determined by totaling the hours each kind of equipment was used in the orchard, then multiplying that figure by the custom charge in the community. By this procedure, owned equipment was charged against the orchard on the same basis that hired equipment would have cost.

The actual operating cost on a particular farm, because of adequate or inadequate equipment use, did not enter into these calculations. If, in an individual case, a farmer chooses to own equipment and its use is so limited as to actually cost more for its service per unit than a hired machine would cost, that farmer's power and equipment costs would exceed those costs used in this study.

To the usually defined farm equipment has been added the appropriate annual fixed and operating costs for irrigation structures. Where such improvements as concrete irrigation structures, sprinkling equipment, wells and pumps existed, the annual costs were added to the power and equipment cost. Interest on such investments, as well as depreciation and maintenance costs, were included.

Water cost included the power costs for pumping water either for furrow or sprinkler irrigation, and

the per acre or per share assessments charged by the irrigation company. Water stock value was assumed to be reflected in land value, hence, interest on the investment in water was included there.

Spray cost was spray material only. Spray application costs were included elsewhere.

Taxes were property taxes levied primarily on the value of the land. Some of the increase shown represented change in assessed values, although most of the increase was due to change in tax rates rather than assessed values.

Interest on operating capital was charged each year, and since the operating costs were considered as an investment, they were added to each succeeding years' beginning value. Had the investments been made elsewhere, a rate of interest could have been earned, which justifies this charge. Hence, the amount was foregone when the investment was periodically made in producing the orchard. Annual interest rate was originally assumed to be 6 percent on operating capital. But, since it averaged an amount equal to just slightly less than 5 percent per annum when the time of investment was considered, a 5 percent per rate was considered sufficiently accurate for our purposes.

Miscellaneous costs include any unclassified costs, most of which were rodent bait.

From the accumulated annual costs, which were regarded as investments in producing a bearing orchard, was subtracted the value of fruit produced as the trees began to bear fruit, but prior to the time when expenses and receipts were at a break-even point. The remaining amount repre-

sented the cost to establish a bearing orchard.

The grower must regard this investment the same way he would any other capital improvement made on land. Whether or not that figure will equal market value depends upon other market conditions. The investment made plus the value of bare land and water, total the cost of production which must be recovered through annual depreciation during the producing life of the trees.

In table 1 the complete listing of costs per year are shown illustrating the method used in accumulating costs and arriving at a final

net investment figure for establishing a producing orchard.

In table 2 detail has been omitted and summary figures for the number of years involved with each kind of fruit have been included.

Data presented here, as for all similar survey cost data, represents what the growers reported to be their experience. All practical efforts were made to minimize errors of estimating or omission. Since the data are average figures they have the limitations that are ascribed to averaged data. They are useful as guides to producers in formulating plans and expectations.

APPLES

The apple orchards studied were located in Utah County with exception of 1 in Box Elder and 3 in Weber. Because of some differences existing, the records were divided into 3 groups--Standard Delicious, Semi-dwarf Delicious, and Rome Beauty.

Standard Delicious apples were 8 years maturing and had an accumulated net investment of \$1,366 per acre including the value of land (tables 1 and 2). Seventeen orchards with 94 acres were included. An average of 85 trees per acre were planted with an average replacement of 3 trees. Cost per tree averaged \$1.18 or \$104.00 per acre. Some producers followed a practice of planting excess trees to bear in the early years with intention of removing them as the other trees need more room. Trees planted per acre varied from 50 to 150.

Of the accumulated gross investment, about 36 percent was land; 28 percent interest on investment; 12

percent, labor; 7 percent, trees. Other costs classifications were each 5 percent or less.

Semi-dwarf Delicious apples were 6 years maturing and had an accumulated net investment of \$1,290 per acre (table 2). Ten orchards and a total of 73 acres were involved. An average of 88 trees per acre were planted with an average replacement of 1 tree. Trees cost \$1.28 each or \$114.00 per acre.

Land value accounted for 38 percent of the accumulated gross investment; interest amounted to 21 percent; labor, 17 percent; trees, 9 percent; and other items of power, water, fertilizer, taxes, and spray accounted for 15 percent.

Rome Beauty apples were 6 years developing into a producing orchard. The accumulated net investment, including the land, was \$1,238 per acre (table 2). Thirty-four acres in 4 orchards were involved in this class-

Table 1. Cost per acre of establishing a Standard Delicious apple orchard from planting to break-even production

Year	Beginn- ing value*	Current capital addition	Interest on fixed capital 5 percent	Labor	Power and equip- ment	Fert- ilizer	Water	Spray	Taxes	Miscell- aneous costs	Interest on operating capital at 5 percent	Total annual operat- ing cost	Accum- ulated invest- ment
First	\$500	\$100	\$30	\$31	\$12	\$3	\$8	\$--	\$5	\$1	\$3	\$63	\$693
Second	693	4	35	22	8	4	8	1	5	1	2	51	783
Third	783	--	39	22	7	3	8	1	6	2	2	51	873
Fourth	873	--	43	18	7	3	7	2	6	2	2	47	963
Fifth	963	--	48	16	7	3	7	2	7	2	2	46	1,057
Sixth	1,057	--	52	16	8	5	10	4	7	2	2	54	1,163
Seventh	1,163	--	58	19	12	5	11	5	8	2	3	65	1,286
Eighth	1,286	--	64	22	12	6	11	6	8	2	3	70	1,420
Less receipts from fruit													54
Net investment per acre to establish a producing orchard													\$1,366

*For each \$100 additional beginning land value add \$148 to the final investment or subtract \$148 from the final investment for each \$100 less for beginning land value.

Table 2. Cost per acre of establishing an orchard from planting to break-even production in the Wasatch Front areas of Utah

Item	Standard Delicious apples	Semi-dwarf Delicious apples	Rome Beauty apples	Apricots	Sour cherries	Sweet cherries	Peaches
Years to establish an orchard ¹	8	6	6	7	5	6	4
Trees per acre (original planting plus replacements)	88	89	100	106	115	61	127
*Beginning value of land and water	\$500	\$500	\$500	\$500	\$500	\$500	\$500
Cost of trees	104	114	100	87	121	69	114
Accumulated interest on investment	388	279	291	367	217	269	174
Labor	166	228	233	331	150	196	176
Power and equipment	73	61	101	108	70	70	42
Fertilizers	32	21	23	32	14	16	12
Water-annual charges	70	36	40	46	31	50	29
Spray	21	41	24	9	4	13	8
Taxes	52	29	32	62	23	37	41
Miscellaneous	14	13	13	15	11	12	11
Gross investment	1,420	1,322	1,357	1,557	1,141	1,232	1,107
Less receipts from fruit	54	32	118	57	34	45	125
Net investment to establish orchard	1,366	1,290	1,239	1,500	1,107	1,187	982
*To adjust land and water values up or down, for each \$1 change add or subtract from the net investment to establish an orchard	\$1.48	\$1.34	\$1.34	\$1.41	\$1.28	\$1.34	\$1.22
If land and water is \$750 the adjusted net investment to establish an orchard is	\$1,736	\$1,625	\$1,573	\$1,852	\$1,427	\$1,522	\$1,287
If land and water is \$1,000 the adjusted net investment to establish an orchard is	\$2,106	\$1,960	\$1,908	\$2,205	\$1,747	\$1,857	\$1,592

¹Some growers have experienced longer or shorter periods from date of planting until the trees are producing enough to pay operating costs. Years reported are the last year for each kind of orchard where receipts were insufficient to cover annual operating costs. For example, with apricots, the sixth year's receipts were only \$13 per acre while the eighth year's receipts were \$187. For Sweet cherries the fifth year had no receipts while the seventh year receipts were \$178 per acre. The years to maturity is an average of what producers reported in the study and are not necessarily the last year when all trees do not pay operating costs.

ification. An average of 99 trees per acre were originally set with 1 tree per acre needing replacing. Trees averaged \$1.00 each or \$100.00 per acre. Of an accumulated gross investment of \$1,343 per acre, land accounted for 37 percent; interest on investment totaled 22 percent; labor, 17 percent; trees, 7 percent;

power and equipment, 8 percent; and other production cost items accounted for 9 percent with no single item amounting to more than 3 percent.

The survey data produced a fourth classification of apple orchards which were designated as mixed, but of such a variation that they have not been reported here.

APRICOTS

Apricot trees averaged 7 years to produce enough fruit to cover current costs of production. Nearly all the apricot records were obtained from growers in Weber County. The 7 year accumulated net investment per acre averaged \$1,500 (table 2). Information from 4 growers with a total of 15 acres was used in this report. An average of 102 trees per acre, at a cost of \$.82 per tree, were planted. An average of 4 replacements per acre resulted in

a cost of \$87.00 per acre. Some growers planted extra trees to bear in the early years but to be removed as the other trees developed.

Thirty-two percent of the gross accumulated investment was in land, 24 percent was interest on investment, 2 percent was labor, 7 percent was power and equipment costs, 6 percent was trees, and the balance was fertilizer, 2 percent; water, 3 percent; spray, 1 percent; and taxes, 4 percent.

CHERRIES

The cherry orchards studied were located principally in Box Elder, Davis, and Utah Counties. The sour cherries and sweet cherries are summarized separately.

There were 11 sour cherry orchards involving 85 acres included in the study (table 2). Five years were required to establish a producing orchard. The net accumulated investment averaged \$1,107 per acre. Value of bare land per acre was \$500. An average of 111 trees were planted with 4 replants per acre at a cost of \$1.05 per tree for a total of \$121.00 per acre.

Land value accounted for 44 percent of the accumulated gross in-

vestment; interest, 19 percent; labor, 13 percent; trees, 11 percent; power and equipment, 6 percent; and the remaining 6 percent was investment in water, fertilizer, spray, and taxes.

Sweet cherry orchards included in the study were 22 in number and involved 185 acres (table 2). Sweet cherry trees were 6 years maturing*

*See footnote of table 2. Utah State University fruit specialists believe it generally takes 7 or 8 years for sweet cherry trees to produce significantly. The reader is cautioned to consider this variation.

and a net investment of \$1,187 per acre was accumulated in establishing a producing orchard. Fifty-four trees were planted per acre with 7 replacements. Trees cost \$1.13 each or \$69.00 per acre. Of the accumu-

lated gross investment of \$1,220, land accounted for 41 percent; interest on investment, 22 percent; labor, 16 percent; trees, 6 percent; power and equipment, 6 percent; water, 4 percent; taxes, 3 percent; fertilizer, 1 percent; and spray, 1 percent.

PEACHES

Sixteen peach orchards located in Box Elder, Weber, Davis, and Utah Counties, comprising 85 acres, furnished data which revealed that a net investment of \$982 was required to produce an acre of orchard (table 2). Peach trees mature in 4 years. Trees were planted 125 to the acre with 2 replacements at a cost of \$114 for trees or \$.90 per tree.

Of the accumulated gross investment of \$1,096, 46 percent was in land, 16 percent in labor, 16 percent in interest on investment, 10 percent in trees, and power and equipment accounted for 4 percent, taxes for 4 percent, water for 2 percent, and fertilizer and spray for 1 percent each.

CONCLUSIONS

In general, the major cost items in developing a producing orchard above the cost of the bare land and water are annual interest charges on the accumulated investment, the cost of trees, and the labor in caring for the young trees. Other costs are relatively small. The annual interest charges could also be regarded as rent on the capital

items or the cost of keeping the land idle for 4 to 9 years while the trees are maturing to a producing stage. Labor costs are associated mostly with hand operations as little machinery or power units were associated with the labor. After the trees were set, the bulk of the labor was associated with irrigating, spraying, and pruning.

