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The Idaho Prune Industry
PRODUCTION COSTS

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SUMMARY

The yearly growing costs of 10 better-than-average prune producers averaged $88 per acre. These costs included machinery operation and repair, machinery depreciation, materials, water, insurance, taxes, and building depreciation and repair.

The labor required for producing an acre of prunes averaged 34 hours.

An investment of about $1385 per acre in land, buildings and equipment was necessary. This did not include the cost of homes.

Production costs for individual prune producers differ according to differing situations. Not only his horticultural practices but the amount of labor and capital that the individual producer can supply affects these costs. This bulletin provides a means for each individual producer to calculate his own costs.

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The Idaho Prune Industry: Production Costs

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How The Cost Study Was Made

This study of the Idaho prune industry was made during the growing seasons of 1960 and 1961. A group of 14 better-than-average prune growers were asked to keep a diary of all work connected with producing prunes. Diary sheets were sent to each cooperator each week with a postpaid envelope for returning the previous week's sheets. The diary sheets were designed to show each operation on each plot of prunes, the number of man hours, machinery and machinery hours, and materials that went into the operation. Each of the cooperators was visited personally by the researcher to collect data on machinery inventory, tax and water costs, land value, insurance, and buildings.

Ten cooperators' records for the 1960 season were found to be usable; four were not completed. Of the 10 with usable records for 1960, 7 kept records the following year, the 1961 growing season. These data are not presented as being average, or even typical, of Idaho prune growers; these are data for this group only. However, the individuals in the group were selected because they were, in the opinion of packers, brokers, county agents, extension specialists, bankers and others interested in the Idaho prune industry, better-than-average producers and leaders in the industry. Therefore, it would seem that the data are more typical of the more efficient producers than of the average producers.

Every effort has been made to conceal the data and/or identity of any individual producer. Most of the data are presented in simple arithmetic averages as the sample is too limited for more elaborate statistical analysis. Farm sizes included in the study were from 21 to 273 acres; 6 were 100 per cent fruit and 4 were diversified farms. Of the fruit acreage one farm was 100 per cent prunes; others ranged from 10 per cent to 63 per cent prunes. Table 1 presents the size of the farms included in the study, the number of acres in fruit, the percentage of acreage in fruit, the number of acres in prunes and the percentage of acreage in prunes.

TABLE 1

Size of farm, acres in fruit, percentage of acres in fruit, acres in prunes and percentage of acres in prunes for 10 Idaho prune growers.

Size of farm in acres	Acres of fruit	Percentage of acreage in fruit	Acres of prunes	Percentage of acreage in prunes
273	70	26%	26½	10%
160	53	33%	31	19%
157	157	100%	71½	46%
70	70	100%	21	30%
67½	35½	53%	11½	17%
63	63	100%	31½	50%
53	53	100%	21	40%
42	42	100%	26½	63%
40	32	80%	13½	34%
21	21	100%	21	100%

Cost Of Production

INVESTMENT

LAND: Each prune orchardist estimated the value of his land as an orchard and as farm land without trees on it. Table 2 presents the data on land value. The average valuation was $1177 per acre with trees, and $500 without trees, leaving a value for trees of $677 per acre. Even though there is a wide range, from $570 to $2,000 per acre, farmers in the same general area tended to value their land approximately the same. While the individual valuation of trees had a wide range, $220 to $1500 per acre, the average valuation, $677, was within the range of other studies and estimates of **prune and plum tree value.**[1] **The variation in valuation was due to several different factors,** such as the suitability of land for other farming uses, age of trees, and emotional ties with a particular orchard or ranch.[2]

[1] **Colusa County Prune Orchard Development Cost,** N. W. Stice and A. D. Reed, University of California Agricultural Extension Service, Colusa, California, April, 1959, showed a development cost of $522 per acre. **Sample Costs to Produce Prunes in Colusa County,** N. W. Stice and Philip S. Parsons, University of California Extension Service, Colusa, California, June, 1958, showed a value of $800 per acre for producing orchards. **Sample Costs of Prune Production,** J. E. DeTar, University of California Agricultural Extension Service, Farfield, California, January, 1960, and **Sample Inputs and Costs for Pears, Plums and Peaches in Placer County,** J. W. Osgood and Philip S. Parsons, University of California Agricultural Extension Service, Auburn, California, January, 1959, both present a valuation of $600 per acre for trees. The prune trees in the above reports are not **Italian prune trees but Santa Clara** varieties for drying.

[2] For the purposes of analysis in this study it is only necessary to know the combined value of land and trees in an orchard. However, some data was gathered on the costs of non-bearing orchards and is presented in the Appendix. (In Footnote 1 above there is reference to a study of developmental costs.)

TABLE 2

Value of Prune orchard land with prune trees and without as estimated by 10 Idaho prune growers.

Grower Number	Value of land per acre With Trees	Without Trees	Value of Trees
1	$ 1000	$ 250	$ 750
2	$ 1000	$ 600	$ 400
3	$ 1500	$1000	$ 500
4	$ 1200	$ 400	$ 800
5	$ 1000	$ 500	$ 500
6	$ 1000	$ 550	$ 450
7	$ 570	$ 350	$ 220
8	$ 1000	$ 250	$ 750
9	$ 1500	$ 600	$ 900
10	$ 2000	$ 500	$1500
Total	$11,770	$5,000	$6,770
Average	$ 1,177	$ 500	$ 677

BUILDINGS: In determining the investment in buildings for these prune growers, the homestead of the operator, any homes provided for workers and packing sheds were not included. Only buildings associated with the production of prunes were included, such as machinery sheds, shops and storage buildings for boxes and ladders. Where there was more than one enterprise on a farm and a building was used for more than one enterprise—such as a machinery shed for storing machinery that was used jointly in producing prunes and raising hay—then the investment in buildings was apportioned according to the number of acres in prunes compared to the number of acres of other enterprises.

The investment in buildings per acre of prunes is given in table 3. The average is $37. High per-acre investment in buildings is associated with small, specialized prune operations or with large, modern machinery storage and shop facilities; in the latter case the higher building investment may lower the cost of main-

TABLE 3

Investment per acre of prunes in buildings for a prune enterprise for 10 Idaho prune growers.

Grower Number	Per Acre Investment
1	$28
2	$21
3	$32
4	$ 4
5	$64
6	$68
7	$21
8	$95
9	$36
10	$ 2
Total	$371
Average	$ 37

tenance and repair by providing facilities to do repairs on the farm and keep machinery out of the weather. Low per-acre building costs were associated with large, other-than-prune farming operations.

Four of the operations had homes for permanent workers which were carried as an expense of the business operation. The investment in these homes ranged from $31 per acre to $155 per acre with an average of $89. As homes for workers are not a typical expense of prune production the costs of them are not considered in this study; any prune producer who does maintain homes for workers will figure the added cost of them into his costs.

EQUIPMENT: The Appendix presents detailed analysis of how investment in equipment was calculated. The average per-acre investment in equipment for these 10 growers is $172.16 (see table 4). The higher costs were associated with buying new rather than used equipment and trading often, particularly trucks and tractors, and with having a full complement of equipment. The lower investments were associated with growers who tended to "make-do" with older equipment, who built much of their own equipment during winter months, and who occasionally hired custom work—such as spraying—or who "swapped" some specialized work with neighbors to save investment in certain types of little-used equipment. The data are not detailed enough to judge whether high or low investment in equipment contributes to high or low costs of operation because of the many other production factors. The operator with high equipment investment may have a maximum amount of equipment so that he can do every job within a very limited time, such as spraying, which could have an effect on his total production; or his high investment in equipment may save him labor costs because he has more power per man hour. The operator with low investment in equipment may only be able to get by with low investment because he substitutes labor for power, he can borrow equipment from neighbors or he can construct equipment of his own making for factory-made equipment. From the data no analysis can be made to verify this.

TABLE 4

Investment in equipment per acre of prunes for 10 Idaho prune producers

Grower* Number	Investment per acre
1	$413.30
3	$119.20
4	$ 73.90
5	$134.12
6	$165.53
7	$141.80
8	$118.22
9	$282.92
10	$102.53
Average	$172.39

*Data from only 9 growers.

There was no correlation in this sample of 9 growers between investment in equipment and acres of **total farm operation, or fruit operation or prune operation,** but this does not mean that such a condition could not be found if more data were available.

TOTAL INVESTMENT: The average total investment in the prune enterprise per acre for these 10 growers is $1386, the sum of $1177 average per acre in land and trees, $37 average in buildings and $172 average investment per acre in equipment. The range (see table 10) is wide, from $783, Grower 8, to $2104 per acre for Grower 10, and depends mostly on the value the owner places on the land.

The yearly cost of producing an orchard crop is considered differently from other agricultural enterprises because trees are perennial and because of the variability of the weather. Normally, in studying the yearly costs of producing an agricultural crop, there are "fixed" costs, those which do not vary with production, such as depreciation on equipment and taxes on land; and "variable" costs, which do vary directly with production, such as seed, machinery operating costs and fertilizer. Generally, higher variable costs result in higher production. However, theoretically, the yearly costs of producing prunes do not vary greatly with the size of crop for three reasons related to the perennial nature of the producing plant and the variability of the weather.

(1) Many of the yearly costs of prune production are invested before it can be determined if there will be a crop; examples of such costs are pruning, which is done before the producing season, and dormant spray, which is applied before the buds open.

(2) Many of the yearly costs of producing prunes are not associated with the current crop of prunes but must be carried on to keep the trees in shape for future production; examples of such costs are watering, fertilizing, and certain types of insect and weed control.

(3) Most orchard operations are indivisible, they cannot be reduced because of the prospects of a reduced yield; the whole tree must be sprayed, not only a part of it; all the land around a tree must be cultivated (if it is cultivated), not just 20 per cent of it because there are prospects of a 20 per cent crop.

The data collected tends to substantiate the points above but the sample is too small to statistically validate them.

DEPRECIATION OF EQUIPMENT: The Appendix gives a detailed analysis of how depreciation on equipment was calculated. The average depreciation of equipment was $24.76 per acre of prunes. The highest, $46.28, was nearly 6 times the lowest, $8.63. The same factors influence depreciation of equipment as do investment in equipment, as stated above. (See table 5.)

DEPRECIATION AND REPAIR OF BUILDINGS: In general buildings were assumed to depreciate out in 40 years unless there

TABLE 5
Yearly Depreciation of Equipment Per Acre for 10 Idaho Prune Producers

Operator Number	Depreciation per Acre
1	$46.28
2	23.70
3	17.10
4	8.63
5	20.18
6	33.65
7	21.88
8	16.77
9	37.63
10	21.78
Average	$24.76

was a special reason why this would not be so. Depreciation of buildings was rounded off at $1.00 per acre per year ($37 ÷ 40 yr.). Repairs on buildings were found to be approximately $1.00 per acre, also.

TAXES: There was more than 400 per cent difference in the highest rate over the lowest in the taxes as reported by the cooperators. Any number of factors could account for the difference, among which are county of location, value of land, value of buildings associated with the land, and variation in farm records, although every effort was made to separate out all taxes except land tax in the records of the cooperators. The range in tax is $1.80 to $8.74 per acre, with an average of $5.37. Table 6 presents the tax data.

TABLE 6
Property Tax Per Acre for 10 Idaho Prune Producers

Grower Number	Per Acre Tax
1	$3.93
2	4.38
3	4.25
4	3.75
5	8.74
6	7.72
7	5.40
8	6.76
9	7.96
10	1.80
Average	$5.47

INSURANCE: Separating the cost of farm enterprise insurance from that of other types of insurance carried by farm operators is difficult. Four of the cooperators had "umbrella" insurance policies that covered all types of insurance, including home, auto and truck in one premium. In the 6 cases where the cost of farm enterprise insurance was separated from the other insurance costs, the range of insurance was from 47c to 95c per

acre, with an average of 72c. However, it was assumed that a $1 per acre total insurance charge would cover all insurance chargeable to the prune operation. The cost of insurance of trucks, autos and equipment is figured in as an operational expense for the individual pieces of equipment. (See table 7.)

TABLE 7
Insurance Cost Per Acre for Seven Idaho Prune Producers

Grower Number	Insurance cost per acre
2	63c
3	95c
4	47c
6	80c
8	57c
10	92c
Average	72c

WATER COSTS: The cost of water depends not only on the amount used to irrigate, but also on the rate in different irrigation districts and on whether the water is gravity fed to the plots or has to be pumped. If it is pumped the cost of electricity and pump operation was added to the water cost for this study. Water costs varied widely, from $1.62 per acre to $9.66, with an average of $4.81. (See table 8.)

TABLE 8
Cost of Water Per Acre for Nine Idaho Prune Producers

Grower Number	Cost of Water per acre
1	$3.41
2	9.66
3	6.44
4	5.06
5	6.27
6	3.15
8	1.62
9	5.24
10	2.48
Average	$4.81

COST OF MATERIALS: Cost of materials for prune production was taken directly from the work diaries of the farmers. The largest cost items were spray and fertilizer. Also included were insecticides, rodenticides, herbicides, re-placement trees, poles for propping and any other direct cost in the orchard. The cost of orchard heating was kept separate as not all farmers in the group heated and as heating is not a normal cost of producing prunes for all producers; some do not bother to heat feeling that the cost does not justify it, others are located in areas where they do not need to heat or where heating does not help. The cost of materials varied from a low of $22 per acre to a high of $60, with an average cost between the two years of $38.55. There was no appreciable difference in the average materials costs between the

TABLE 9

1960-1961 PER ACRE COSTS of OPERATING MACHINERY & MATERIALS and LABOR REQUIREMENTS for TEN IDAHO PRUNE PRODUCERS

ITEM	COST FACTORS / GROWER NUMBER	FULL or PARTIAL CROP 1	2	3	4	5	6	7	8	NO CROP 9	10	2	8	Ave. with crop	Ave. without crop	Ave. of all
	YEAR 1960															
1	Materials	$49.17		$40.10	$28.00	$22.00	$48.92	$33.82		$41.16	$39.29	$36.55	$35.99	37.00	38.25	37.50
2	Machine Operation Costs	8.41		12.10	15.03	6.91	11.85	9.75		10.74	9.77	12.60	8.54	10.68	10.41	10.57
3	Total (Items 1 & 2)	57.58		52.20	43.03	28.91	60.77	43.57		51.90	49.06	49.15	44.53	47.68	48.66	48.07
4	Labor in Hours	25		33	30	25	34	34		32	40	37	33	30	36	32
5	Cost**	31.25		41.25	37.50	31.25	42.50	42.50		40.00	50.00	46.25	41.25	37.71	44.38	40.38
6	Total (Items 3&5)	88.83		93.45	80.53	59.16	103.27	86.07		91.90	99.06	95.20	85.78	85.39	93.04	88.45
	YEAR 1961															
7	Materials		38.87	31.16	26.31	46.32	60.67	28.62	45.18					39.59		39.59
8	Machine Operation Costs		11.17	13.63	22.16	12.75	12.13	6.98	12.47					13.04		13.04
9	Total (Items 7&8)		50.04	44.79	48.47	59.07	72.80	35.60	57.65					52.63		52.63
10	Labor in Hours		22	56	31	59	43	15	29					36		36
11	Cost**		27.50	70.00	38.75	73.75	53.75	18.75	36.25					45.54		45.54
12	Total (Items 9&11)		77.54	114.79	87.22	132.82	126.55	54.35	93.90					98.16		98.16
	YEARS 1960 & 1961															
13	Materials & Machine Opr. Costs Total (Items 3&9)	57.58*	99.19	96.99	91.50	87.98	133.57	78.17	102.18	51.90*	49.06*					
14	Average for two years (Items 3&9)	57.58*	49.60	48.50	45.75	43.99	66.79	39.08	51.09	51.90*	49.06*					50.33
15	Labor - Total (Items 4&10)	25*	59	89	61	84	77	49	62	32*	40*					
16	Average for two years (Items 4&10)	25*	30	45	32	42	39	25	31	32*	40*					34.1
17	Total (Items 6&12)	88.83*	172.94	208.24	167.70	192.98	229.82	140.42	179.68	91.90*	99.06*					185.70
18	Average	88.83*	86.47	104.12	83.85	96.49	114.91	70.21	89.84	91.90*	99.06*					92.57

* Only one year's crop. ** Calculated at $1.25 per hour.

two years included in the study, nor between the farmers who had a partial crop and those two that had no crop at all in 1960, nor between the costs for individual farmers who had a crop one year and not the other. These data are presented in Table 9.

In every case where the costs for materials were above average the added cost could be traced directly to cost of sprays; some farmers sprayed more often than the average as a matter of practice or were faced with a particular problem which necessitated more spraying.

COST OF MACHINERY OPERATION: The Appendix contains details of the method used to calculate costs of operation of machinery which included fuel, oil, grease, and repairs. All costs were calculated on an hourly basis except for trucks when used on the highway (for field work they were figured on an hourly basis) which were calculated on a mileage basis.

The costs per acre for operating machinery vary widely, from a low of $6.91 per acre to a high of $22.16 per acre. There is no reasonable explanation in the data for the one high cost figure of $22.16 except that, as recorded, it required an extraordinarily large number of hours to apply the amount of spray used.

There is very little difference in machinery operation between years with a crop and without a crop for the same grower and between different growers in the same year with a crop and without a crop. The average cost between the 2 years of operating machinery is $11.80 per acre. The data on machinery operating cost are presented in table 9.

Labor Requirements

Labor is the final cost to be considered in producing a crop of prunes to the point of harvest. On the average it requires 34 hours of labor per acre per year (see table 9). Only labor for orchard operations is considered; there is no charge for labor for managerial functions as these are assumed to be carried on by the operator and the return to managerial labor is in the profit shown by the orchard.

Labor varied for these 10 operators from a low of 15 hours per acre to a high of 59 hours per acre in the 2 years that records were kept; however, there is very little variation in the average labor requirements between the year with a low yield and the year in which the yield was higher; nor is there any considerable variation within the same year between growers who had a full crop and those who did not.

Pruning is by far the highest labor-consuming operation; tree-propping is second. The exceptionally low labor input of 15 hours was the result of very little pruning in one of the years in which the diary was kept; the high labor input of 59 hours was a combination of pruning and tree propping combined in one year.

Table 10.

1960-1961 Yearly Costs of Producing Prunes, Investment and Labor Requirements per Acre for Ten Idaho Prune Growers.

Item	GROWER	1	2	3	4	5	6	7	8	9	10	Simple Average	*** Weighted Average
							YEARLY GROWING COSTS						
1	Depreciation, Equip. (from Table 5)	$ 46.28	$ 23.70	$ 17.10	$ 8.63	$ 20.18	$ 33.65	$ 21.88	$ 16.77	$ 37.63	$ 21.78	$ 24.76	
2	Depreciation, Build. (from Page 8)	1.00*	1.00*	1.00*	1.00*	1.00*	1.00*	1.00*	1.00*	1.00*	1.00*	1.00*	
3	Repairs, Build. (from Page 8)	1.00*	1.00*	1.00*	1.00*	1.00*	1.00*	1.00*	1.00*	1.00*	1.00*	1.00*	
4	Taxes (from Table 6)	3.93	4.83	4.25	3.75	8.74	7.72	5.40	6.76	7.96	1.80	5.47	
5	Insurance (from Table 7)	.72	.63	.95	.47	.72	.80	.72	.57	.72	.92	.72	
6	Water Costs (from Table 8)	3.41	9.66**	6.44**	5.06	6.27	3.15	4.81**	1.62	5.24	2.48	4.81	
7	Materials and Mach. Oper. Costs (from Table 9, Item 14)	57.58	49.60	48.50	45.75	43.99	66.79	39.08	51.09	51.09	48.06	50.33	
8	Total (Item 1-7)	113.92	89.97	79.24	65.66	81.90	114.11	73.89	78.81	104.64	77.04	88.09	$ 87.79
							LABOR						
9	Hours of Labor (from Table 9, Item 16)	25	30	45	32	42	39	25	31	32	40	34.1	
10	Cost of Labor****	31.25	37.50	56.25	40.00	52.50	48.75	31.25	38.75	40.00	50.00	42.63	44.45
							INVESTMENT						
11	Land Value (from Table 2)	1,000	1,000	1,500	1,200	1,000	1,000	1,000	570	1,500	2,000		
12	Buildings (from Table 3)	28	21	32	4	64	68	21	95	36	2		
13	Equipment (from Table 4)	413	170	119	73	134	165	141	118	282	102		
14	Total (Items 11, 12, 13)	1,441	1,191	1,651	1,277	1,198	1,233	1,162	783	1,818	2,104	1,386	1,377
15	5% of Total	72.05	59.55	82.55	63.85	59.90	61.65	58.10	39.15	90.90	105.20	69.30	68.85
							TOTALS						
16	Yearly Growing Cost plus Cost of Labor (Items 8 & 10)	145.17	127.47	135.49	105.66	134.40	162.86	105.14	117.56	144.64	127.04	130.54	132.24
17	Yearly Growing Cost, Labor plus 5% on Investment (Items 8, 10, 15)	247.22	187.02	218.04	169.51	194.30	224.51	163.24	156.71	235.54	232.24	200.02	200.86

* Assumed from Average reporting.
** Includes Electricity.
*** Weighted for number of acres of fruit in production.
**** Calculated at $1.25 per hour.

Total Cost Of Producing Prunes To Point Of Harvest

It is not possible, to present a "cost of producing prunes" that is applicable to all prune producers; this is true in any agricultural cost-of-production study. Some prune growers are merely investors; they have invested their money, they hire someone to operate their property, and they expect a return on their investment plus a profit. They calculate costs for their operation differently than does the man who operates a farm as a "way of life"; this latter type of agricultural producer is really not interested in the investment opportunities in prunes, or any other agricultural commodity, but he is interested in having his farm provide him with a living. Even this latter group is divided into growers with varying interests depending on their situation; one grower may have enough land so that all his time and energy is taken up in management—he does very little or none of the actual production labor —so that the labor for producing prunes is an out-of-pocket cost to him, while the grower with fewer acres may, with the help of his family, supply all the labor for the production of prunes. A grower, of any of the types above, may have his land and equipment clear of debt; he does not have to figure in a cost for interest on the debt, while one who does not have his land and equipment clear has to figure on the farm earning the interest cost on the debt, as well as other out-of-pocket costs.

Our final cost-of-production data here, then, are presented so that each prune grower can use whatever portion of the data is necessary to calculate his own costs in table 11. Where he does not have any more exact figures from his own operation, he can use the average figures for this group of growers, as presented in table 10. The final figures are presented as both a simple average and a "weighted" average.

The difference in the simple average and weighted average cost per acre is so close that it can be concluded that for these growers in these years costs were about the same for all, both larger and smaller ones.

For the ten growers in this study, the average yearly growing costs, which include materials, machinery operating expenses, water, insurance, taxes, building repair and depreciation, and machinery depreciation, were approximately $88 per acre.[1] Any difference between this and the gross income from the acre after harvest costs had been subtracted, would be the residual to the operator's labor, investment, and profit. If the operator (and/or his family) could not supply the labor necessary, then 34 hours of labor had to be hired; at $1.25 per hour there is an additional cost of $42 per acre. In this situation the cost per acre is $130; any difference between this and the gross income per acre after harvest costs had been subtracted would be the return to the operator's investment and profit.

[1]The data did not reveal that there was any appreciable difference in the cost of producing any particular variety of prunes.

Similarly, if there is a mortgage on the operation the cost of carrying the mortgage must be paid. This will vary with each operation. The extreme, and impractical, situation would be if 100 per cent of the investment, $1375 per acre, were borrowed; at 5 per cent interest (this figure is only used for exposition purposes) the cost would be another $70 per acre. If only half the investment were borrowed the cost would be $35 per acre, etc. After this cost is added to the per acre costs above, the difference between the gross income after harvest costs and this figure is the return to that portion of the investment that the operator owns himself and his profit.

Table 11 is a work sheet for the individual prune grower to work out the cost of production for his own farm; in the situation where he does not have exact figures for his own particular operation he can use the average figures for this group. In the cost analysis there is no charge for depreciation of trees as it is assumed that the orchard is kept in bearing condition each year;

TABLE 11

Work Sheet, with Example From Table 10, for Prune Grower to Calculate His Own Costs of Producing Prunes

	Example, Table 10, Average Costs 10 Idaho Prune Producers 1960-1961		YOUR FARM
YEARLY GROWING COSTS PER ACRE			
Depreciation, Equipment	$ 24.76		
Depreciation, Buildings	1.00		
Repairs, Building	1.00		
Taxes	5.46		
Insurance	0.72		
Water Costs	4.81		
Materials and Machinery Operating Expense	50.33		
Heating			
Other			
Other			
TOTAL		88.09	
LABOR			
Hours of hired labor per acre	34.1[4]		
Multiply by Wage Rate		42.63[5]	
OTHER COSTS	none	none	
INVESTMENT COST PER ACRE			
Outstanding Mortgages, Purchase Contracts, Notes, Etc.	$82,546.00[1]		
Multiply by interest rate	4,127.30[2]		
Divide by number of acres		69.30[3]	
TOTAL COSTS PER ACRE		200.02	

[1]Assumes All Capital Investment Borrowed
[2]Assumes 5% Interest Rate
[3]Assumes 59.6 Acres, average number of acres of fruit for these 10 growers
[4]Assumes All Labor Hired
[5]$1.25 per hour

non-bearing or poor-bearing trees are replaced; this cost of new trees to keep the orchard in bearing condition is calculated in "machinery operation," and "labor" in table 9. Some operators may wish to charge depreciation on trees and may do so under "other" in table 11.

Cost Of Harvesting

PICKING: Per unit picking costs are determined by yield. Low yield requires a higher per unit cost in order to get pickers. Picking costs ranged from 25 cents to 70 cents per field box for the cooperators in this study, with the higher rates being paid in 1960 when the yield was low.

ASSOCIATED COSTS: Picking is not the only cost of harvesting. There are associated costs of labor and machinery for spreading ladders, boxing trees, orchard supervision, picking up filled field boxes in the orchard and hauling them to the packing shed and picking up unused boxes and ladders after harvest.

These costs are more difficult to determine than the picking costs and, unfortunately, the data collected on harvest costs were sketchy. Cost data from only 5 growers in 1960 and 4 in 1961 were complete enough to be useable, which are too few to draw conclusions for the whole industry. However, this data is presented as examples of associated picking costs. In the single case where an orchard used bulk bins rather than field boxes in the operation, costs were converted to a field box basis. Even though this is the lowest cost of those presented here it cannot be concluded from this that bulk bins are the least expensive way of handling prunes from the orchard to the packing shed. They may very well be, but there is not sufficient data to warrant this conclusion.

Generally, the associated costs of harvest for 1960, the low-crop year, were higher per unit than for the higher crop year 1961. This would be expected as labor could not be as efficiently used in the low-crop year as in the high-crop year. A certain minimum crew is necessary for driving tractors and trucks no matter what the yield is.

These data indicate that 12 cents per field box seems reasonable for those costs associated with harvest other than the actual picking cost. See table 12.

Analysis Of Returns

Table 11 summarizes producer growing costs per acre which can be used with anticipated yield to determine in table 13 the profit or loss for any particular F.O.B. price. The analysis in table 13 will tell a producer how much he must receive for his prunes in order to cover cost of production and make a profit.

The per acre costs that are calculated in table 11 must be divided by the pack-out yield to find the cost of production per half-bushel. For example, a grower who has his farm and machinery clear and who uses only his own and family labor during the production season, may find that he has a cost of $100 per acre; in an exceptionally good yielding year he may have a yield of 500 half-bushels (this is on a pack-out basis, not field box basis) so his costs of production would only be 20 cents per half-bushel; however, in a poor yielding year with a bad spring freeze his pack-out yield may be only 100 half-bushels per acre which would make his costs $1 per half-bushel.

Similarly, a farmer who has a mortgage on his land and has to hire a considerable amount of labor may find that his costs are $150 per acre. With an exceptionally good yield of 500 half-bushels his costs would be 30 cents per half-bushel; with a 100 half-bushel pack-out yield his costs would be $1.50 per half-bushel.

A farmer who has borrowed 100 per cent of his capital investment and hires all his labor may find that his costs are $200 per acre. With a 500 half-bushel yield his costs are 40 cents; with a 100 yield, his costs are $2.00 per half-bushel.

TABLE 12

Per-Field-Box Cost of Harvest[1], Other Than Picking, and Transportation To Packing Shed for Prunes for Selected Idaho Producers, 1960-1361

Grower	Labor[2]	Machinery[3] Operations Costs	Total Cost Per Field Box
1960			
2	$523.75	$891.61	16.5c
4	856.25	254.56	9.7c
5	283.75	110.90	18.1c
7	415.00	212.38	14.2c
9	412.50	301.40	10.0c
Average	498.25		13.7c
1961			
3[4]	$240.00	$309.60	8.6c
5	373.00	136.80	10.9c
7	637.50	343.40	10.5c
9	390.00	286.00	10.6c
Average			10.2c
Average All			12.1c

[1]Does not include box or bin rent
[2]Includes boxing trees, scattering ladders, picker supervision, picking up fruit in orchard and hauling to packing shed and clean-up after harvest calculated at $1.25 per hour.
[3]Includes cost of operating tractors, trailers, fork lifts and trailers
[4]Bulk bin operation

The cost for any individual producer can be used in table 13 to determine profit or loss. From the F.O.B. price first must be subtracted the costs associated with packing and selling to see

what remains to the producer to cover his harvest and growing costs. If what remains after the packing and selling costs are subtracted is less than the harvest cost it would not pay him to pick his prunes. In the example (table 13) a price of $1.35 would only cover the costs of harvest, packing and selling, so it would be a matter of indifference to the producer whether he picked the prunes or not (as a matter of fact, he probably would not as it would be less work for him not to do so). At any price below $1.35 it would not pay him to pick the prunes as he would not regain even his picking cost. At any price above $1.35 he would be getting back some of his yearly growing costs so he would probably pick them even though he lost money. This point is demonstrated in the $1.65 price which shows in this example that the producer would be getting back only 30 cents on a growing cost of 44 cents; he would still, most likely, pick his crop as his loss would be less in picking it than in not picking it. At a price of $2.25, however, the producer in the example is making a return of 46 cents per

TABLE 13

Calculating Profit on Prune Production

		EXAMPLES			YOUR CALCULATIONS	
F. O. B. Price		$ 2.25	$ 1.65	$ 1.35		
Less Packing & Selling						
Packing Cost (assumed)	$ .85					
Selling Charges (assumed)	.15					
Advertising Tax (rounded)	.03					
Box or Bin Rental						
Other						
Total Packing and Selling Costs	$ 1.03	$ 1.03	$ 1.03	$ 1.03		
Difference from F. O. B. Price		$ 1.22	$ .62	$ .32		
LESS HARVEST COSTS						
Packing Cost (77% of field box cost of 30c)[1]	$ .23					
Associated Harvest Cost (77% of assumed 12c)	.09					
Total Harvest Cost	$ .32	$ .32	$ .32	$ .32		
Remainder		$ .90	$ .30			
LESS GROWING COSTS						
Cost per acre from table 11	$199.97					
Divided by Yield (assume 350) in field boxes	$ .57					
Adjusted to pack out (77% of field box)	$ .44	$ .44	$ .44	$ .44		
Profit or loss per ½ bushel		$+.46	$ −.14	$ −.44		

[1] A field box packs out more than a half bushel. A 77 per cent conversion rate assumes that a 42-pound field box will pack out a half-bushel for market. This conversion rate will vary with the quality of the fruit.

half-bushel which is his return to his own labor, investment, and his profit. (The example used here is not presented as being average or typical, but is merely used to demonstrate the method of analysis.)

Table 13 can be used each year, in conjunction with table 11, to determine for the individual producer just what his profit or loss is. While it may be the most economic decision for a producer to sell at a loss in an individual year, such as selling for $1.65 in the example, he cannot continue to do so year after year and remain in the business.

(NOTE: The Appendix presents some miscellaneous data on the cost of planting an orchard, yearly costs of non-bearing orchards, and the cost of removing an orchard.)

Appendix

CALCULATING EQUIPMENT DEPRECIATION AND INVESTMENT

An inventory of the equipment of each cooperator was made. Only those pieces of equipment that were used in the production of prunes were included. If a piece of equipment was also used in the production of crops other than prunes, the cooperator was asked to estimate the percentage of total hours of use that went into prunes and only this percentage of the investment and of the depreciation was charged against the prune enterprise.

Depreciation, Other than Tractors and Trucks

The following method, which assumes the same average depreciation every year of ownership, was used to determine depreciation of equipment except for tractors and trucks:

1) The current replacement cost of the piece of equipment was used as a base. If the cooperator normally purchased new equipment, the cost for new equipment (or a similar piece if the exact same model were not available any more) was used; if he normally purchased used equipment he was asked to estimate the cost of a similar piece of used equipment at present.

2) He was then asked the number of years that he normally used a piece of equipment before retiring it and what value it would have at present prices at the time of retirement.

3) The residual value of the equipment was subtracted from the replacement cost; this difference, the total depreciation at current market prices was divided by the number of years of use to give an average yearly depreciation.

Investment Other than Tractors and Trucks

To determine the investment in machinery, the average yearly depreciation for the individual piece of equipment was multiplied by the number of years it had been owned; this was sub-

tracted from the original cost to give the current investment. In those cases where the number of years of ownership were not known, such as with hand tools and other smaller pieces of equipment, an arbitrary figure of 50 per cent of the original cost was taken as the investment.

Depreciation in Tractors: A somewhat different procedure was used in determining depreciation in tractors as it was felt that tractors were more of a "style" item in farm equipment and tended to depreciate in the same manner as an automobile or truck does, that is, at a higher rate the first years and at a lesser rate the following years. The **Tractor Blue Book** substantiated this hypothesis. A depreciation schedule was worked out for both new and used tractors from the published values in the **Tractor Blue Book, 1958**, for tractors of the types that would be used on farms that produce prunes; these are smaller, wheel-type tractors, generally costing less than $4,000 new. The depreciation schedules are presented in appendix tables 1 and 2. Tractors over 12 years old—the **Blue Book** does not carry values for tractors older than this—were carried at the 12-year price if they were still in good operating condition and could be sold; if they were not in saleable condition they were considered for the purposes of this study as having been depreciated out. Depreciation was then calculated:

1) The current replacement cost of the tractor was used as a base. Farmers who normally buy new tractors used the cost of the new equipment of the same or comparable type. Farmers who normally buy used equipment were asked to estimate the present cost of equipment comparable to what they normally purchase.

2) The farmer was then asked how long he used a tractor before trading it in or junking it. From the depreciation tables, then, the average percentage depreciation for the number of years

APPENDIX TABLE 1

Yearly Depreciation of new tractors as a percentage of new price for wheel type tractors costing under $4,000 for number of years owned before trading.*

Number of years owned	Yearly depreciation as a % of new price	Cumulative depreciation as a % of new price	Average yearly depreciation as a % of new price
1	36.5%	36.5%	36.5%
2	5.7%	42.2%	21.1%
3	5.3%	47.4%	15.8%
4	4.8%	52.4%	13.1%
5	4.2%	56.5%	11.3%
6	3.8%	60.0%	10.0%
7	3.5%	63.7%	9.1%
8	3.5%	67.2%	8.4%
9	3.0%	70.2%	7.8%
10	2.4%	73.0%	7.3%
11	2.0%	74.8%	6.8%
12	2.3%	76.8%	6.4%

*Source: Tractor Blue Book, 1958

that the individual farmer normally used tractors was read and calculated on the replacement value.

Investment in Tractors: The investment in tractors was calculated from the depreciation by multiplying the number of years the tractor had already been owned by the average yearly depreciation for the individual farmer, and subtracting this total from the replacement cost.

APPENDIX TABLE 2

Yearly depreciation of tractors purchased used, as a percentage of purchase price for wheel type tractors whose new price was under $4,000.*

Number of years owned	Yearly depreciation as a % of purchase price	Cumulative depreciation as a % of purchase price	Average yearly depreciation as a % of purchase price
1	9.5%	9.5%	9.5%
2	8.7%	18.2%	9.1%
3	7.9%	26.1%	8.7%
4	7.1%	33.2%	8.3%
5	6.4%	39.6%	7.9%
6	5.8%	45.4%	7.6%
7	5.3%	50.7%	7.2%
8	4.8%	55.5%	6.9%
9	4.3%	59.8%	6.6%
10	3.9%	63.7%	6.4%
11	3.5%	67.2%	6.1%
12	3.2%	70.5%	5.8%

*Source: Tractor Blue Book, 1958

Depreciation in Trucks: Depreciation of trucks was figured from the **National Automobile Dealers Association Book** which gives the values of used cars and trucks. The current book at the time the inventory was made was used in conjunction with the book published 1 year earlier; the difference in value for the individual truck was taken as the year's depreciation. Quite a large number of trucks were too old to be listed in the NADA book because many fruit farmers keep very old trucks to use only in the 2 or 3-week harvest season; they do not have to be in good working condition. These trucks were considered as having no further depreciation possible.

Investment in Trucks: The investment in trucks was taken as the value in the NADA book. If the truck was too old to be listed in the book, the farmer was asked to estimate what he could get for it on the market, and this was taken as his investment.

Calculating Machinery Operating Costs

The machinery-operating rates and costs used in this study were mostly taken from other sources; in those few cases where

there was no source material an estimate based on similar types of equipment was made.

Sources for rates and operating costs were:

Farm Management Crop Manual—R. L. Adams, University of California Press.

Analyzing Dairy Farms for Maximum Profit—L. K. Brooks, S. Walker, Jack Weber, Bulletin 301, University of Idaho, 1957.

Guide in Answering Basic Questions on Farm Machinery Costs—Leo M. Choate and Scott Walker; Bulletin 224, University of Idaho, 1954.

The following rates were used:

Tractor	60c per hour	Ditcher	6c per hour
Harrow	½c	Fork Lift	5c
Blade for tractor	2c	Tandem Disc	5½c
Corrugator	4c	Mower	2c
Hay Baler	50c	Hoe Attach.	2c
Beater	3c	Brush rake	5c
Power Pruners	5c	Trailer	2c
Culticutter	1.5c	Sprayer (speed)	$2.50
Fertilizer spreader	2c	Plow	4c
Truck	$1.50 per hour		10c mile

These rates do not include charges for investment, depreciation, storage buildings, or anything other than the costs of operation, such as fuel, oil, grease, tires, and repairs. All other costs associated with the machinery are considered elsewhere in the cost analysis.

Cost Of Orchard Heating

Heating is an expensive operation as far as materials are concerned, costing $31.72 per acre, nearly as much as all other materials. Table 3 presents the cost of heating materials for those cooperators that heated in either of the 2 years.

APPENDIX TABLE 3

1960-61 cost of Orchard Heating materials for selected Idaho Prune Growers

	1960				1961				
Grower Number	3	5	7	11	3	5	7	6	**Average**
Cost of heating materials per acre	34.28	32.43	35.39	24.61	25.20	34.07	36.95	20.84	31.72

Farmers that heated added approximately $2.00 per acre machinery operating costs. (Table 4)

APPENDIX TABLE 4

Additional Per Acre Machinery Operating Costs incurred by heating for selected Idaho Prune Producers.

	1960				1961			
Grower Number	**3**	**5**	**7**	**11**	**3**	**7**	**6**	**Average**
Additional cost per acre	3.92	25c	1.15	1.45	72c	2.72	3.42	1.95

Heating adds a considerable number of hours of labor, 9 per acre. (Table 5)

APPENDIX TABLE 5

1960-1961 Additional hours of labor required for heating for selected Idaho Prune growers.

	1960				1961				
Grower Number	**3**	**5**	**7**	**11**	**3**	**5**	**7**	**6**	**Average**
Additional hours of labor per acre	11	9	12	9	6	6	14	3	9

Costs On Non-Bearing Orchards, Planting Orchards And Taking Out Orchards

Seven non-bearing plots of prune orchard were included in this study. Five were included for 2 years. Two were only included 1 year as a non-bearing orchard and the other as a bearing orchard.

The cost data is included in appendix table 6.

In the data there was one example of the costs associated with a new orchard. This was replanted on the site of an orchard that had previously been removed, so there were no costs associated with grading or filling. This required $108.00 for materials, $43.76 for machinery operating costs, and 45 hours of labor. If the labor is calculated at $1.25 per hour, the cost of planting this orchard would be:

Materials	$108.00
Machinery—operation costs	43.76
Labor	56.25
	$208.01

If we assume (appendix table 6) that it costs about $50 per year while the orchard is non-bearing for the first 4 years, plus about $200 to plant the orchard, the total cost is $400 plus interest on the non-productive investment. This cost would be more if grading were required. In view of this, the growers' $677 evaluation of trees (table 2) is not unreasonable.

The data also include one instance of removing an old orchard because of severe frost kill. It required $9.88 in machinery operation costs and 50 hours of labor to remove the trees, or a total cost (at $1.25 per hour for labor) of about $80 per acre.

Appendix Table 6—Yearly per Acre Costs of Non-Bearing Prune Orchards.

	Grower Number	3	3	6	6	6	5	5	Average
Item				YEAR 1960					
1	Materials	$ 1.16	$ 2.90	$ 7.30	$ 7.86	$10.15	$12.22	$ 6.46	$ 6.86
2	Machine Operating Costs	4.57	11.47	6.81	3.88	10.54	5.92	5.09	6.90
3	Total (Items 1 & 2)	5.73	14.37	14.11	11.74	20.69	18.14	11.55	13.76
4	Hours of Labor	32.5	23	28	17	36	12	13	23
5	Cost*	40.63	28.75	35.00	21.25	45.00	15.00	16.25	28.84
6	Total (Items 3 & 5)	46.36	43.12	49.11	32.99	65.69	33.14	27.80	42.60
				YEAR 1961					
7	Materials	3.60	7.40	32.46	8.00			4.50	11.19
8	Machine Operating Costs	6.65	6.75	5.60	5.32			3.10	5.48
9	Total (Items 7 & 8)	10.25	14.15	38.06	13.32			7.60	16.67
10	Hours of Labor	32.5	18.5	54	32			9	29
11	Cost*	40.63	23.13	67.50	40.00			11.25	36.50
12	Total (Items 9 & 11)	50.88	37.28	105.56	53.32			18.85	53.17
13	Average (Items 6 & 12)								47.89

* Calculated at $1.25 per hour.