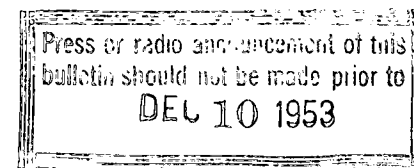


Cost of Producing
Apples and Pears
in the Hood River Valley, Oregon

PROGRESS REPORT VI

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Arthur E. Irish



**Agricultural Experiment Station
Oregon State College
Corvallis**

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G. W. Kuhlman and Arthur E. Irish*

This report is a summary of detailed cost records kept on 28 fruit farms in the Hood River Valley for the year 1952 with comparable data for the 6-year period 1947-1952. The cost of production includes all items of expense incurred in producing and delivering the crop to the door of the packing house or processing plant. No packing house costs are included.

Apple Production Costs

The cost of producing apples in 1952 on 27 orchards averaged 74¢ per loose box and \$1.15 per packed-box basis, exclusive of packing and storage costs (Table 1). Assuming packing and handling charges (from \$1.25 to \$1.50**), the total F.O.B. cost would be \$2.40 or more per packed box.

Table 1. APPLES: Cost of Production.
(Does not include cost of storage, boxes, packing, and shipping)

Item	Year 1952	Six-year aver- age 1947-1952	Distribution of costs
Number of orchards in study	27	-	-
Acreage of apples per orchard	15.5	-	-
Yield per acre, loose boxes	657	608	-
Yield per acre, packed boxes	424	370	-
Costs per loose box for:	<u>Dollars</u>	<u>Dollars</u>	<u>Per cent</u>
Preharvest labor .....	.22	.25	30.9
Picking .....	.13	.12	14.8
Other harvest .....	.05	.06	7.4
Total labor .....	.40	.43	53.1
Materials .....	.11	.12	14.8
General expense .....	.12	.12	14.8
Depreciation on equipment .....	.04	.06	7.4
Interest on investment (5 per cent) ....	.07	.08	9.9
Total cost per loose box .....	.74	.81	100.0
Cost per packed-box basis	1.15	1.32	-

* Dr. Kuhlman, now deceased, was formerly Professor of Agricultural Economics, and Mr. Irish is a fieldman employed by the Department of Agricultural Economics. Special credit is due Mrs. Ellyne Bain for her contribution to this study.

** The cost of sorting and handling all apples which are delivered to the packing house is charged against the packed fruit, which usually comprises from 60 to 85 per cent (by weight) of fruit delivered.

Table 2. APPLE PRODUCTION COSTS.
(Does not include cost of storage, boxes, packing, and shipping)

Item	Man hours		Cost	
	1952	1947-1952	1952	1947-1952
Labor per acre				
Pruning	33.6	32.1	\$ 34.98	\$ 31.41
Brush removal	3.7	4.8	3.65	4.65
Hand cultivating	1.1	1.7	1.04	1.53
Machine cultivating	3.0	3.5	3.44	3.62
Fertilizing; mowing	1.7	1.7	1.93	1.74
Irrigating	9.7	12.3	11.57	12.86
Spraying	6.7	10.8	8.34	11.24
Thinning	37.2	39.9	35.71	35.50
Propping; cleanup	8.6	6.8	9.37	6.94
Maintenance	18.1	23.5	21.57	25.24
Supervision	5.7	9.9	8.09	13.24
Total preharvest	129.1	147.0	\$139.69	\$147.97
Picking	100.1	91.2	\$ 85.61	\$ 76.64
Other harvest	29.2	31.5	34.35	34.57
Total labor	258.4	269.7	\$259.65	\$259.18
Materials per acre				
Fertilizers			\$ 15.65	\$ 13.65
Irrigation water			6.01	5.86
Sprays			39.38	39.89
Miscellaneous supplies			11.81	10.72
Total materials			\$ 72.85	\$ 70.12
General expense per acre				
Building repair			\$ 3.89	\$ 3.80
Machinery repair			9.89	9.14
Machine hire			8.86	6.04
Gas and oil			13.45	11.78
Electricity; water; wood fuel; office			8.24	8.15
Liability, fire and motor insurance			7.59	7.69
Property taxes			15.76	15.72
Cash to operate			10.00	10.00
Total general expense			\$ 77.68	\$ 72.32
Depreciation per acre				
Buildings (not including operator's dwelling)			\$ 7.95	\$ 10.14
Machinery			19.96	21.16
Total depreciation			\$ 27.91	\$ 31.30
Interest per acre (5 per cent)				
Buildings			\$ 7.65	\$ 8.31
Machinery			10.03	10.39
Orchard			29.97	30.01
Total interest			\$ 47.65	\$ 48.71
Total cost per acre			\$485.74	\$481.63
Cost per loose box ..			\$.74	\$.81
Cost per packed box ..			\$ 1.15	\$ 1.32
Acres per orchard			15.5	15.8
Loose boxes produced per acre			657	608
Packed boxes produced per acre ..			424	370

Pear Production Costs

3

► Winter pears

The cost of producing winter pears in 1952 on 27 orchards averaged 94¢ per lug box and \$1.10 per packed-box basis, exclusive of packing and storage costs (Table 3). Assuming packing and handling charges (from \$1.25 to \$1.50), the total F.O.B. cost would be \$2.35 or more per packed box.

Table 3. WINTER PEARS: Cost of Production.
(Does not include cost of storage, boxes, packing, and shipping)

Item	Year 1952	Six-year aver- age 1947-1952	Distribution of costs
Number of orchards in the study	27	-	-
Acreage of winter pears per orchard ..	11.3	-	-
Yield per acre, loose-lug boxes	476	438	-
Yield per acre, packed boxes.....	408	387	-
Costs per loose-lug box for:	<u>Dollars</u>	<u>Dollars</u>	<u>Per cent</u>
Preharvest labor .....	.22	.29	27.1
Picking .....	.14	.13	12.2
Other harvest .....	.07	.06	5.6
Total labor .....	.43	.48	44.9
Materials .....	.16	.18	16.8
General expense .....	.17	.18	16.8
Depreciation on equipment .....	.07	.09	8.4
Interest on investment (5 per cent) ..	.11	.14	13.1
Total cost per loose-lug box .....	.94	1.07	1.00
Cost per packed-box basis	1.10	1.21	-

► Bartlett (cannery) pears

The cost of producing cannery pears in 1952 on 26 orchards averaged \$1.32 per lug box and \$59.97 per ton (Table 4). See Table 6 for itemized costs.

Table 4. BARTLETT CANNERY PEARS: Cost of Production.
(Includes all costs, delivered to the cannery door)

Item	Year 1952	Six-year aver- age 1947-1952	Distribution of costs
Number of orchards in the study	26	-	-
Acreage bearing pears per orchard	7.2	-	-
Yield per acre, loose-lug boxes	356	298	-
Yield per acre, tons	7.8	6.7	-
Costs per loose-lug box for:	<u>Dollars</u>	<u>Dollars</u>	<u>Per cent</u>
Preharvest labor .....	.42	.49	32.6
Picking .....	.13	.12	8.0
Other harvest .....	.08	.07	4.7
Total labor .....	.63	.68	45.3
Materials .....	.23	.25	16.7
General expense .....	.24	.27	18.0
Depreciation on equipment .....	.08	.11	7.3
Interest on investment (5 per cent) ..	.14	.19	12.7
Total cost per loose-lug box	1.32	1.50	100.0
Cost per ton	59.97	66.14	-

Table 5. WINTER PEAR PRODUCTION COSTS.
(Does not include cost of storage, boxes, packing, and shipping)

Item	Man hours		Cost	
	1952	1947-1952	1952	1947-1952
Labor per acre				
Pruning	39.6	42.2	\$ 42.97	\$ 42.00
Brush removal	3.4	4.2	3.80	4.11
Hand cultivating .....	.7	1.5	.71	1.35
Machine cultivating	2.8	2.6	3.21	2.81
Fertilizing; mowing	1.9	1.7	2.16	1.82
Irrigating	9.2	10.6	10.75	11.02
Spraying	4.9	8.6	6.26	9.25
Thinning	-	.3	-	.28
Propping; cleanup	5.1	5.3	5.55	5.08
Maintenance	18.4	21.7	22.92	23.95
Supervision	5.2	10.4	7.59	14.01
Total preharvest	91.2	109.3	\$105.92	\$115.68
Picking	78.6	67.7	\$ 67.70	\$ 56.83
Other harvest	24.6	25.2	29.94	27.43
Total labor	194.4	202.2	\$203.56	\$199.94
Materials per acre				
Fertilizers			\$ 16.19	\$ 13.86
Irrigation water			5.76	5.89
Sprays			37.14	38.51
Miscellaneous supplies			16.33	13.15
Total materials			\$ 75.42	\$ 71.41
General expense per acre				
Building repair			\$ 4.77	\$ 3.72
Machinery repair			10.87	9.90
Machine hire			7.92	5.09
Gas and oil			16.04	13.27
Electricity; water; wood fuel; office			8.70	8.15
Liability, fire, and motor insurance			8.57	7.99
Property taxes			15.99	16.06
Cash to operate			10.00	10.00
Total general expense			\$ 82.86	\$ 74.18
Depreciation per acre				
Buildings (not including operator's dwelling)			\$ 8.76	\$ 10.93
Machinery			22.65	23.56
Total depreciation			\$ 31.41	\$ 34.49
Interest per acre (5 per cent)				
Buildings			\$ 8.16	\$ 8.66
Machinery			10.89	11.25
Orchard			35.56	38.09
Total interest			\$ 54.61	\$ 58.00
Total cost per acre			\$447.86	\$438.02
Cost per loose box			\$.94	\$ 1.07
Cost per packed box			\$ 1.10	\$ 1.21
Acres per orchard			11.3	11.0
Loose-lug boxes produced per acre			476	438
Packed boxes produced per acre			408	387

Table 6. BARTLETT PEAR PRODUCTION COSTS.
(Includes all costs delivered to the cannery door)

Item	Man hours		Cost	
	1952	1947-1952	1952	1947-1952
Labor per acre				
Pruning	31.1	31.4	\$ 34.12	\$ 31.87
Brush removal	2.2	3.4	2.41	3.34
Hand cultivating	3.0	3.2	3.07	3.01
Machine cultivating	4.5	3.4	5.32	3.64
Fertilizing; mowing	2.8	1.9	3.12	1.93
Irrigating	13.1	11.8	15.46	12.35
Spraying	4.3	9.1	5.61	9.62
Thinning	46.1	37.1	45.02	33.52
Propping; cleanup	5.8	6.0	6.52	5.79
Maintenance	17.3	22.5	21.02	25.04
Supervision	5.9	9.0	8.44	11.82
Total preharvest	136.1	138.8	\$150.11	\$141.93
Picking	53.6	40.6	\$ 46.18	\$ 34.12
Other harvest	22.3	19.1	27.06	20.61
Total labor	212.0	198.5	\$223.35	\$196.66
Materials per acre				
Fertilizers			\$ 18.11	\$ 14.53
Irrigation water			5.58	5.42
Sprays			37.60	38.10
Miscellaneous supplies			19.94	13.42
Total materials			\$ 81.23	\$ 71.47
General expense per acre				
Building repair			\$ 5.88	\$ 4.03
Machinery repair			10.67	9.41
Machine hire			9.33	6.22
Gas and oil			16.45	13.01
Electricity; water; wood fuel; office			8.73	8.49
Liability, fire, and motor insurance			8.43	8.38
Property taxes			16.32	16.08
Cash to operate			10.00	10.00
Total general expense			\$ 85.81	\$ 75.62
Depreciation per acre				
Buildings (not including operator's dwelling)			\$ 7.81	\$ 9.64
Machinery			21.86	22.80
Total depreciation			\$ 29.67	\$ 32.44
Interest per acre (5 per cent)				
Buildings			\$ 8.01	\$ 8.44
Machinery			10.88	11.57
Orchard			31.76	34.04
Total interest			\$ 50.65	\$ 54.05
Total cost per acre			\$470.71	\$430.24
Cost per loose-lug box			\$ 1.32	\$ 1.50
Cost per ton			\$ 59.97	\$ 66.14
Acres per orchard			7.2	6.2
Tons produced per acre			7.8	6.7
Loose boxes produced per acre			356	298

Effect of Yield on Cost

In both the apple and winter pear groups, the majority of growers had yields of more than 400 boxes per acre.

Table 7. YIELDS: Effect on Cost of Producing Apples and Pears.
(Does not include costs of storage, boxes, packing, and shipping)

Yield of packed boxes per acre*		Number of orchards	Acres per orchard	Cost per packed box*
Range	Average			
Apples				
Less than 200 boxes	**	1	**	**
200 to 399 boxes	299	11	18.5	\$ 1.43
400 or more boxes	549	15	14.1	.99
All orchards	424	27	15.5	\$ 1.15
Winter pears				
Less than 200 boxes	**	1	**	**
200 to 399 boxes	290	9	18.9	\$ 1.39
400 or more boxes	601	17	7.3	.87
All orchards	408	27	11.3	\$ 1.10
Bartlett pears				
Less than 200 boxes	136	6	3.6	\$ 2.77
200 to 399 boxes	323	10	11.2	1.37
400 or more boxes	514	10	5.4	1.11
All orchards	356	26	7.2	\$ 1.32

* Bartlett pears are figured as loose-lug boxes.

** One orchard not shown.

Age of the Trees

The orchards typically have trees of varying ages ranging from a year up to maturity (Table 8). The usual practice followed by most growers is to replace any dead or undesirable trees and thus tend to perpetuate the orchards. Therefore, depreciation on orchard investment was not included in computing the cost of producing fruit.

Table 8. AGE OF TREES: Distribution on 28 Farms.

Age of trees	Apples	Winter pears	Bartlett pears	
			Total	Bearing
	Per cent	Per cent	Per cent	Per cent
Less than 6 years	16	11	31*	23
6 to 9 years	5	7	18	20
10 years and over	79	82	51	57
Total, all trees	100	100	100	100

* This group of trees was not included in computing cost of production where the nonbearing trees comprised an abnormally high proportion of the total Bartlett pear plantings on the farms studied.

Over three-fourths of the apple trees were 10 years old or over. More than four-fifths of the winter pear trees were 10 years or older. In the case of the Bartlett pears, only 51 per cent of the trees had come into full bearing. One-third of the trees were less than 6 years old. In order to make the three orchard enterprises studied more nearly comparable, the latter group of trees (less than 6 years old) was excluded in computing cost of production where it comprised an abnormally high proportion of the total Bartlett planting. Thus 43 per cent of the Bartlett pear trees included in the cost study were less than full bearing age (under 10 years), and 57 per cent of the trees were in full bearing.

Varieties

Newtown and Delicious (Red, Striped, and Golden) comprised the major portion of the apple acreages on the farms studied (Table 9). D'Anjou is the principal winter (storage) pear, and the Bartlett is the canning pear.

Table 9. VARIETIES OF TREES: Distribution on 28 Farms.

Apples on farms studied		Winter pears on farms studied	
Variety	Percentage	Variety	Percentage
Newtown	46	D'Anjou	86
Delicious	44	Bosc	10
Ortley	5	Easter	3
Spitzenberg	3	Comice	1
Other	2		
Total	100	Total	100

Orchard Investment

The capital value represented by the plantings was estimated by the growers from a conservative, long-term standpoint. Consideration was given in the appraisal to the age and variety of trees and to the location and character of the land.

The present (depreciated) values of buildings (other than operator's dwelling) and all other equipment were allocated proportionately to the various enterprises according to the use made thereof (Table 10).

Table 10. ORCHARD INVESTMENT: Average Value of Capital Investment.

Item	Apples		Winter pears		Bartlett pears	
	Value per orchard	Value per acre	Value per orchard	Value per acre	Value per orchard	Value per acre
Orchard.....	\$ 9,280	\$ 599	\$ 8,062	\$ 713	\$ 4,580	\$ 636
Buildings	2,369	153	1,849	164	1,154	160
Equipment	3,105	200	2,469	218	1,568	218
Cash for operating ...	3,096	200	2,267	200	1,442	200
Total investment ..	\$17,850	\$1,152	\$14,647	\$1,295	\$ 8,744	\$1,214

► Apple enterprise

The estimated worth of the capital, represented by the apple enterprise on the 27 farms in the study, averaged \$17,850 per orchard. More than half of the total capital investment for apple production, or \$599 per acre, was for the plantings.

Buildings (exclusive of the operator's dwelling) averaged \$2,369 per apple orchard. The equipment inventory, averaging \$3,105 per apple orchard, includes irrigation equipment as well as the machinery, tractors, trucks, and small tools. It does not include the automobile (charge for the use of automobiles was computed on a mileage basis).

► Winter pears

The investment for winter pears averaged \$14,647 per orchard. The value of the plantings averaged \$8,062 per orchard or \$713 per acre. The investment in buildings and equipment per acre of pears was similar in amount to that shown for apple orchards in this study.

► Bartlett (canning) pears

The investment for bearing pears averaged \$8,744 per orchard. Plantings represented \$4,580 each or \$636 per acre.

Land Use

The size of the 28 farms in the study averaged 49 acres per farm (Table 11). Orchard plantings comprise 35 acres per farm. This was 85 per cent of the total cropland or nearly three-fourths of the total farm acreage. The remainder of the cropland was chiefly in hay or used as pasture. Much of the untillable acreage is steep, rocky, and covered with trees and brush.

Table 11. FRUIT FARMS: Utilization of the Land on 28 Farms.*

Land use	Number of farms	Average per farm reporting	Average acreage per farm	Distribution of total farm area
		Acres	Acres	Per cent
Apples	27	15.7	15.1	31
Bartlett pears	28	8.1	8.1	16
Winter pears	28	10.6	10.6	22
Other	14	2.9	1.5	3
Total orchard	28	-	35.3	72
Other cropland	11	9.7	3.8	8
Farmstead	28	2.3	2.3	4
Nontillable	22	9.9	7.8	16
Total, all land	28	-	49.2	100

* Of the 35.3 acres in orchard, apple trees occupied 15.1 acres per farm. Total pear (winter and canning) acreage slightly exceeded the apple orchards with 18.7 acres per farm.

Five-Year Summary

The average annual yields per acre and the costs per box on the farms in this study have been compiled for the 6-year period 1947-52 (Table 12).

Table 12. COST OF PRODUCING APPLES AND PEARS.*
(Does not include costs of storage, boxes, packing, and shipping)

Year	Number of farms	Apples			Winter pears			Bartlett pears		
		No. of acres	Boxes /acre	Cost /box	No. of acres	Boxes /acre	Cost /box	No. of acres	Boxes /acre	Cost /box
1947...	24	366	328	\$1.54	256	406	\$1.14	107	263	\$1.64
1948...	25	406	358	1.39	283	363	1.20	126	258	1.64
1949...	21	324	360	1.24	228	388	1.10	119	363	1.24
1950...	23	360	425	1.18	236	556	.82	141	342	1.24
1951...	25	364	323	1.40	261	205	1.92	159	205	1.88
1952...	27	418	424	1.15	306	408	1.10	187	356	1.32
Average	24	373	370	\$1.32	262	388	\$1.21	140	298	\$1.49

* Apples and winter pears are packed boxes; cannery pears are standard lug boxes.

Effect of Size of Business on Costs

The size of the orchard enterprise had only very slight influence on the cost of production during the 6-year period studied (Table 13).

Table 13. SIZE OF BUSINESS: Five-Year Results on the Cost Farms.
(Does not include costs of storage, boxes, packing, and shipping)

Item**	Production *			Cost		
	Acres	Yield /acre	Total yield	Total	Per box	Range per box
Small farms						
Apples	6.8	456	3,101	\$3,969	\$1.28	\$.72 to \$8.96
Winter pears ...	3.4	465	1,581	2,229	1.41	.48 to 4.18
Bartlett pears ..	2.5	308	770	1,340	1.74	.95 to 4.09
Total	12.7	429	5,452	\$7,538	\$1.38	\$.48 to \$8.96
Cost per acre				\$ 594		
Medium farms						
Apples	13.6	383	5,209	\$7,084	\$1.36	\$.71 to \$9.06
Winter pears ...	8.6	460	3,956	4,549	1.15	.47 to 4.26
Bartlett pears ..	5.4	320	1,728	2,557	1.48	.88 to 5.51
Total	27.6	395	10,893	\$14,190	\$1.30	\$.47 to \$9.06
Cost per acre				\$ 514		
Large farms						
Apples	22.9	350	8,015	\$10,500	\$1.31	\$.75 to \$2.91
Winter pears ...	17.4	348	6,055	7,508	1.24	.66 to 3.53
Bartlett pears ..	8.3	286	2,374	3,419	1.44	.56 to 4.59
Total	48.6	338	16,444	\$21,427	\$1.30	\$.56 to \$4.59
Cost per acre				\$ 441		

* Apples and winter pears are packed boxes; cannery pears are standard lug boxes.

** Small farms had less than 20 acres of orchard; medium farms had from 20 to 39 acres; and large farms had 40 acres or more.

The small farms (12.7 acres of apples and pears per farm) generally had the highest yields per acre. Good yields thus reduce the cost per box. The individual growers should note the wide range in the costs per box and strive to reduce his own costs by increasing his yields.

Purpose and Nature of the Study

The purpose of this study was to obtain information from growers that would provide basic facts on yields and on costs of production. This information, when carefully adjusted to reflect changes occurring in yields and in the price level of farm production cost, provides a basis whereby cost of production can be readily estimated for any given year if no changes have occurred in production techniques.

The cost of production reported herein is the average-acre cost of the entire plantings in the study. Thus, the man-hours-per-acre (see Tables 2, 5, 6) is a figure that is applicable to the entire acreage of a crop within an area such as a county and indicates the average amount of labor that may be required per acre for all of the acreage in that crop in the area even though each acre may not have been covered by each operation. The same holds true of the other items of cost.

Acknowledgments

The fine cooperation received from the growers, who kept detailed daily records which provided the data for this report, is gratefully acknowledged. Special mention is made of the financial assistance contributed by the Hood River Traffic Association. Without the active participation of both these groups, the study would have been impossible.

Completion of the 1952 study would have been more difficult were it not for the far-sighted planning of Dr. G. W. Kuhlman, who passed away in December 1952.

LeRoy Childs, formerly superintendent of the Mid-Columbia Branch Experiment Station, Paul C. Newkom, Apple Growers Association, Robert Nunamaker, fruit grower, and A. L. Marble, formerly County Extension Agent of Hood River County, were instrumental in helping to plan and initiate this project.