A Minimum-Sized Economic Orchard Unit

Hood River Valley, Oregon

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Many persons have asked, "What would be the minimum size for an orchard in the Hood River Valley, big enough to be considered an economic unit?" In this publication such an orchard is defined as one large enough usually to return between $5,000 and $7,500 annually to the owner-operator for his labor and management after all other cash and noncash orchard costs have been met, including principal and interest payments on mortgage debt, if any. These are arbitrary figures set by the author. If an owner-operator would be satisfied with less income or if he demanded more, the size of the orchard could be smaller or larger according to need.

This presentation of a fruit orchard in the Hood River Valley that would qualify as a minimum-sized economic unit as thus defined, includes several assumptions:

1. It is assumed that the farm would contain three kinds of tree fruits--apples, winter pears, and Bartletts. The typical orchard farm in the Valley is now producing these three kinds of fruit.

2. It is assumed that the total value of the land, trees, equipment, and buildings (not including the dwelling) would be $1,118 per acre, on the average. This is consistent with the results of the 10-year cost study reported in Station Bulletin 573, Oregon State University.

3. The degree of efficiency assumed is the same as reported for the average fruit grower in the 10-year detailed cost of production study at Hood River (OSU Station Bulletin 573).

4. Prices at the packing house door are assumed to be consistent with recent prices in the area.

5. Cost of production figures are based upon estimated costs for 1960. (See Figures 1, 2, and 3.)

Description of Minimum Economic Unit

Under the above assumptions, the suggested characteristics of a minimum-sized economic unit in the Hood River Valley are:

Size of farm:	
Acres of apples	13/1
Acres of winter pears	9/1
Acres of Bartletts	6/1
Total acres in orchard	28/1
Other land (nursery, etc.)	12
Total acres in farm	40

/1 These acreages are chosen to represent the approximate acreages of each fruit on the medium-sized farms in the 10-year study. (See page 32, OSU Station Bulletin 573.)

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Total investment:
Total value of land, trees, buildings (not including dwelling), machinery, and equipment. $44,720

Yield per acre:
Apples (loose boxes per acre) 607/1
Winter pears (loose-lug boxes per acre). 539/1
Bartletts (tons per acre) 7.6/1

Prices received:
Apples (PHD price per loose box) . . . . . $ 1.08/2
Winter pears (PHD price per loose-lug box). . . . $ 1.54/2
Bartletts (PHD price per ton) . . . . . $ 75.00/2

Financial results:
Operator's average labor income (Table 1) $5,627
Variations in operator's labor income (see Table 2).

/1 These are the approximate yields per acre obtained by the medium-sized farms in the 10-year study.

/2 These packing house door prices are consistent with prices received during the past few years.

Discussion

The size of farm indicated in this report is designed to be large enough to meet income requirements for a minimum economic unit as already defined, and assuming average efficiency as indicated. It is not necessarily the size that would be desirable if one wished to make a financial success of a very large fruit farm producing apples and pears in the Hood River Valley. Also, it would be possible to have different combinations of apples, winter pears, and Bartletts than the particular combination here indicated. Data in Table 1 present a picture of estimated average receipts, expenses, and earnings for the minimum-sized orchard unit suggested here. Results are shown for the entire orchard, and in addition, each type of fruit is shown separately. As shown in Table 1, the annual estimated operator's labor income under the conditions specified herein would amount to $5,627, on the average.

Variations in Annual Income from Minimum Economic Unit:

Annual financial returns can be expected to vary each year, depending mostly upon variations in prices received for fruit and yields of the different fruits per acre. Data in Table 2 present a picture of how the annual labor income of the operator might vary from $2,590 to $9,286 dependent solely upon 10% increases or decreases in assumed yields per acre and/or 10% increases or decreases in assumed PHD prices received (see in Table 1). Variations of 10% or more in yields per acre and/or general prices for fruit are not at all uncommon.

In estimating labor incomes in Table 2 for the various assumed yields per acre there shown, cost of production estimates were based upon the 10-year average relationships between percentage changes in yield per acre and percentage changes in costs of production per unit for each type of fruit (see Figures 1, 2, and 3).

Table 1. Estimated Receipts, Expenses and Earnings on a Suggested Minimum-Sized Economic Unit in the Hood River Valley, Oregon /1

Item	Apples (7,891 boxes)	Winter pears (4,851 lugs)	Bartletts (45.6 tons) (2,026 lugs)	Total orchard (28 acres)
Receipts (at packing house door)				
13 acres apples @ 607 loose boxes @ $1.08	$8,522	xxx	xxx	$ 8,522
9 acres winter pears @ 539 loose-lug boxes @ $1.54	xxx	$7,471	xxx	7,471
6 acres Bartletts @ (338 lugs) 7.6 tons @ $75.00	xxx	xxx	$3,420	3,420
Total receipts	$8,522	$7,471	$3,420	$19,413
Expenses (total expenses to packing house door including 5% interest on investment, and value of operator's own time; based on Ore. Expt. Sta. Bull. 573 adjusted to 1960 for changes in labor and other costs)				
Harvest labor	$1,815	$1,106	$ 448	$ 3,369
All other labor	2,730	1,441	1,170	5,341
All other costs	3,977	2,648	1,776	8,401
Total expenses	$8,522	$5,195	$3,394	$17,111
Minus value of operator's own time /2	1,814	907	604	3,325
All expenses except value of operator's own time	$6,708	$4,288	$2,790	$13,786
OPERATOR'S LABOR INCOME (Total receipts minus all expenses except value of operator's own time)	$1,814	$3,183	$ 630	$ 5,627

/1 Assumptions: Total acres of orchard, 28 acres; apples 13; winter pears 9; Bartletts 6. Total value of land, trees, farm buildings, machinery and equipment, $1,118 per acre. Acreages and yields per acre represent 10-year averages obtained on medium sized farms included in the OSU-Hood River cooperative study. Packing house door prices are consistent with prices received during last few years. Expenses are based upon average costs of production found in the study, for the specific yields of fruit here assumed, adjusted to 1960 conditions. See Station Bulletin 573.

/2 Operator's time spent on the crop annually assumed to be 90 hours per acre on apples; 65 hours per acre on winter pears; and 65 hours per acre on Bartletts. Total hours worked by operator on this farm, 2,145 hours. Time valued at $1.55 per hour.

Figures 1, 2, and 3 illustrate estimated 1960 relationships between yields per acre and estimated costs of production for Hood River apples, winter pears, and Bartletts, respectively. The curves shown here are based upon previous curves drawn free hand to fit scatter diagram data.

Table 2. Estimated Labor Income on Minimum-Sized Economic Unit Fruit Farm Shown in Table 1--Assuming Different Yields and Different Prices Received for Fruit

	Assumed yields per acre	Assumed packing house door prices	Estimated operator's labor income (Yearly basis)
	%	%	Dollars
Example No. 1	100 /1	100 /2	5,627
Example No. 2	100	90	3,686
Example No. 3	100	110	7,568
Example No. 4	90	90	2,590
Example No. 5	90	100	4,337
Example No. 6	90	110	6,084
Example No. 7	110	90	5,015
Example No. 8	110	100	7,150
Example No. 9	110	110	9,286

/1 Based on 100% of 10-year averages obtained by operators of medium-sized orchard farms, Hood River, Oregon, 1947-56 (see Table 1).

/2 Based on 100% of prices consistent with last few years' experience, Hood River, Oregon (see Table 1).

Based on the analysis presented in Table 2, Example No. 4, with 90% of average yields and 90% of average prices, would result in the lowest operator's annual labor income here shown ($2,590). In contrast, Example No. 9 would result in the highest labor income shown in Table 2 ($9,286). On the average, however, over a period of several years, assuming 100% of average yields per acre and 100% of recent average packing house door prices for fruit, Example No. 1 would return an operator's labor income of $5,627, well within our defined objective for a minimum-sized economic orchard unit in the Hood River Valley./1

Conclusions

Looking into the future of fruit production in the Hood River Valley for the next few years and assuming (1) average yields per acre and average packing house door prices for fruit to be equal to or higher than during the past 10 years, and (2) no major changes in the cultural practices of producing apples and pears, it is believed that the size of the orchard suggested here will qualify as a minimum economic unit for the Hood River Valley.

/1 To show how inadequate the expected operator's labor income might be on a smaller sized fruit orchard at Hood River, all acreages shown in Table 1 were reduced 25% and expenses were arbitrarily reduced 20%. With prices for fruit remaining the same as in Table 1, the resulting operator's labor income for a normal year would be $3,531.

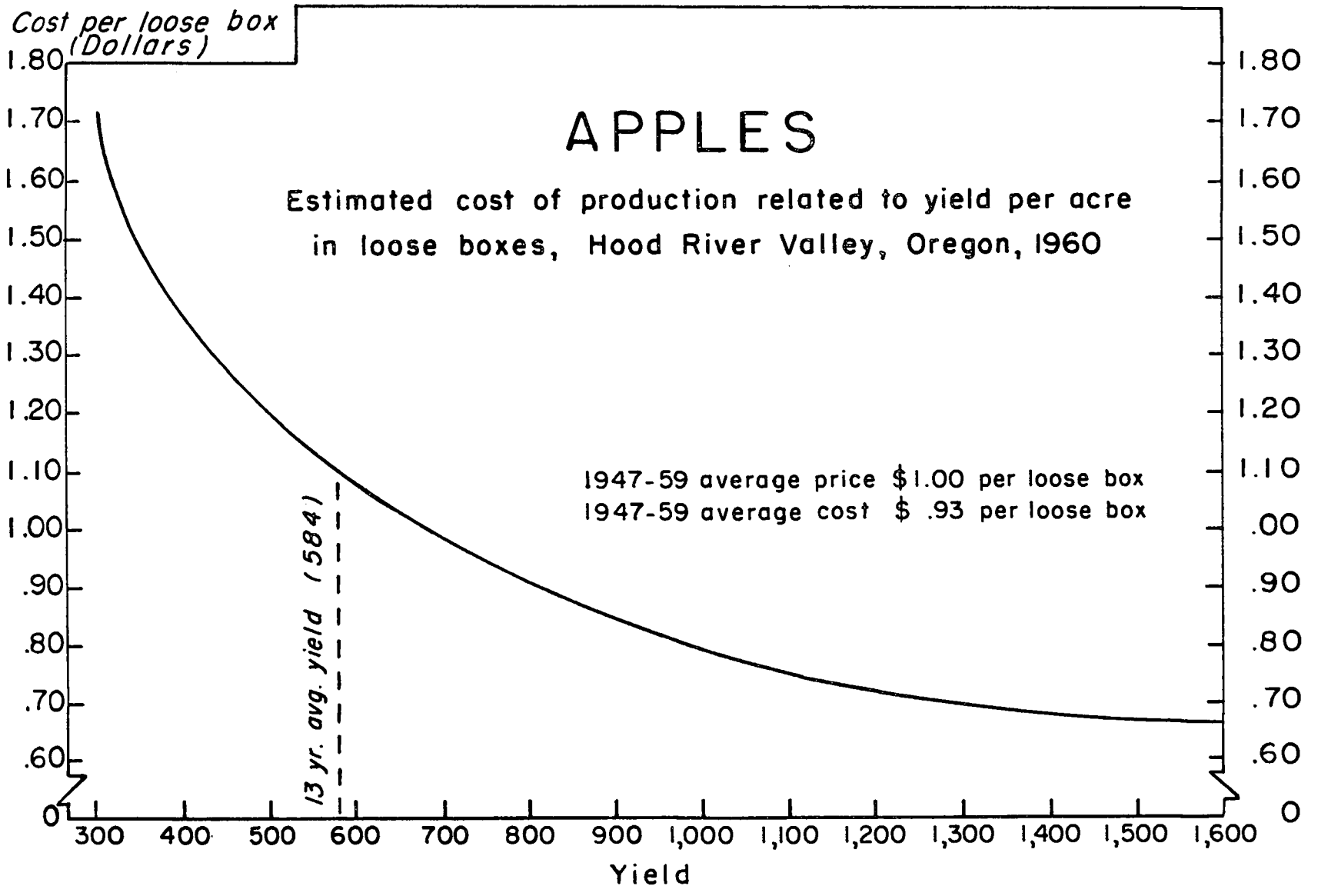
Cost per loose box (Dollars)
APPLES
Estimated cost of production related to yield per acre in loose boxes, Hood River Valley, Oregon, 1960
1947-59 average price $1.00 per loose box
1947-59 average cost $ .93 per loose box
13 yr. avg. yield (584)
1.80
1.70
1.60
1.50
1.40
1.30
1.20
1.10
1.00
.90
.80
.70
.60
0
300 400 500 600 700 800 900 1,000 1,100 1,200 1,300 1,400 1,500 1,600
Yield

FIGURE 1

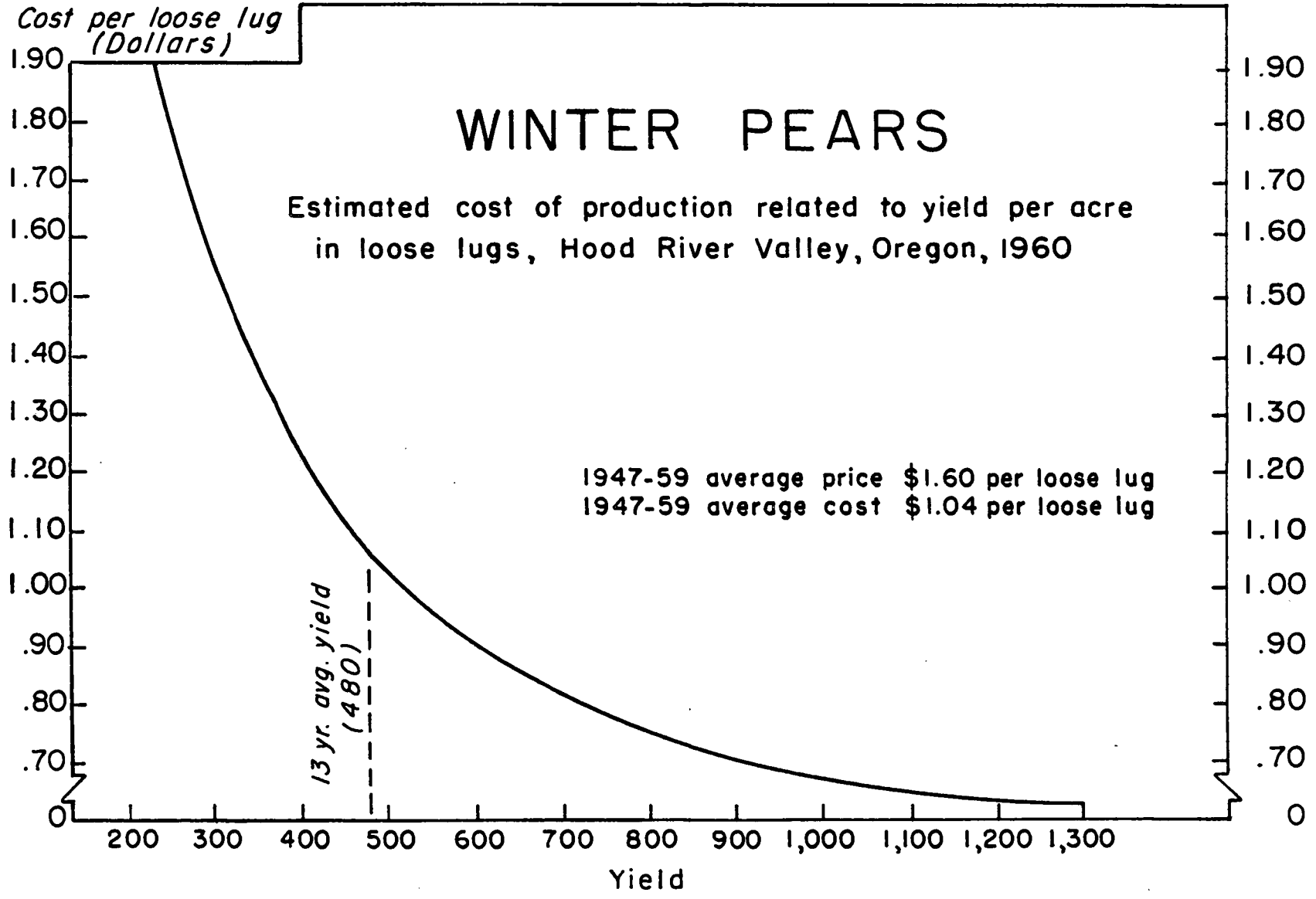
Cost per loose lug (Dollars)
1.90
1.80
1.70
1.60
1.50
1.40
1.30
1.20
1.10
1.00
.90
.80
.70
0
WINTER PEARS
Estimated cost of production related to yield per acre in loose lugs, Hood River Valley, Oregon, 1960
1947-59 average price $1.60 per loose lug
1947-59 average cost $1.04 per loose lug
13 yr. avg. yield (480)
200
300
400
500
600
700
800
900
1,000
1,100
1,200
1,300
Yield

FIGURE 2

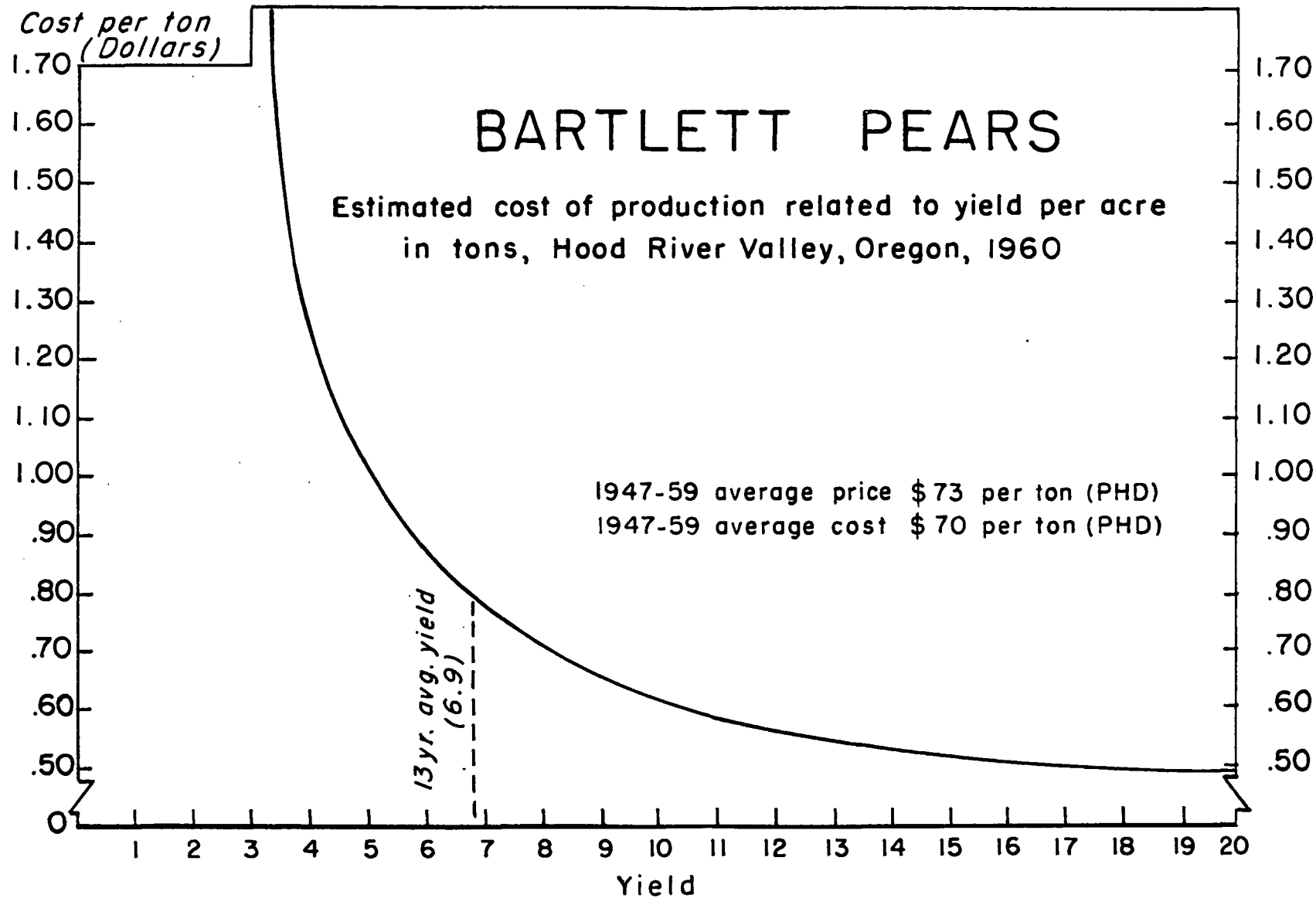
Cost per ton (Dollars)
1.70
1.60
1.50
1.40
1.30
1.20
1.10
1.00
.90
.80
.70
.60
.50
0
BARTLETT PEARS
Estimated cost of production related to yield per acre in tons, Hood River Valley, Oregon, 1960
1947-59 average price $73 per ton (PHD)
1947-59 average cost $70 per ton (PHD)
13yr. avg. yield (6.9)
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20
Yield

FIGURE 3