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CENTRAL WASHINGTON HOP COSTS 1970

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CENTRAL WASHINGTON HOP COSTS

by

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INTRODUCTION

Washington leads the nation in the production of hops. The state production amounted to about 31.4 million pounds in 1970, or approximately two-thirds of the national output. Most of that production is in the Yakima Valley. Washington growers have averaged about 1680 pounds of hops per acre. The principal use for hops is in the making of beer. Therefore, the market demand is mainly determined by one industry and the requirements are relatively constant. Until recent years, annual variations in hop production caused wide fluctuations in the market price. In 1964, a marketing order was established to stabilize hop prices in the United States.

Hop growers commonly sign long term contracts to supply a dealer a particular quantity of hops at a stated price, and rapidly increasing production costs are becoming a serious problem for hop growers. Many of the smaller producers have sold their farm or shifted to other crops. Most of the remaining growers have enlarged their operations to improve their efficiency and, thereby, minimize their costs of producing hops.

In 1964, Perryman and Zuroske reported that Yakima Valley growers could produce hops for approximately 49.7 cents per pound.[2/] By 1970, some growers indicated their production costs had increased as much as one-third, due to higher prices of such items as labor, materials, taxes and interest.

OBJECTIVE OF THIS STUDY

The principal objective of the study was to update the costs of establishing and producing hops in the Yakima Valley. Using that data, it was possible to determine the effect of yield differences on the total costs per acre, and the cost for each pound of hops produced.

The data in the following tables are not averages from a selected sample of growers. Instead, they represent expected typical costs for the conditions used in this study. Therefore, the costs may not be directly applicable to any one grower. Variations in such factors as farm location, size of the hop enterprise, the planting pattern and trellis design, the hop variety grown, and the harvest equipment affects each growers cost of producing hops. Growers should

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1/ Cooperative Extension Service Economist, Washington State University, Pullman, and Yakima County Extension Agent, Yakima, respectively.

2/ Perryman, Clifton, and C. H. Zuroske, "Central Washington Hop Costs, 1964", E.M. 2515, March 1965.

use the information in this publication only as a basic guide, and until they obtain more factual data from their own operation. Space is provided in most tables so growers can insert data from their individual operations.

The following assumptions were used in the study:

1. A 200-acre hop operation in the Yakima Valley, with 180-acres producing hops.

2. 1970 costs and cultural practices.

3. The trellis and stand depreciated on a 10-year basis.

4. A single-feed Dauenhauer picking machine was used for harvesting the crop.

5. Annual investment charges for buildings and equipment were based on the estimated current value of a normal inventory, and the expected remaining life of those items.

METHOD OF OBTAINING DATA

The cost data were compiled from information supplied mainly by a selected committee of experienced Yakima Valley hop growers. Additional data were obtained from local farm suppliers and service firms as needed. The assembled material was subsequently reviewed by the committee, by other local growers, other industry representatives and persons familiar with hop production in the Yakima Valley.

The authors express their appreciation for the information and other assistance supplied by the growers and industry personnel in providing needed information, reviewing the assembled data, and preparing this publication. However, they do accept full responsibility for the analytical procedures used in this publication.

TABLE 1. COSTS OF ESTABLISHING A HOP YARD

A 200-acre hop operation usually includes several hop yards of various sizes and ages. In recent years, growers have adopted a practice of regularly renewing their yards in order to maintain high yields. This study assumed each yard was renovated every ten years. Renovation included rebuilding the trellis and replanting the perennial vines.

In the Yakima Valley, hops usually provide near-normal yields during the first year. Therefore, the long-term investment costs due to establishing a new yard include only those expenses due to constructing the trellis and obtaining and planting new rhizomes, or "roots". There would be no carry-over charge because of a reduced yield the first year.

Establishing a hop yard was estimated to cost $780.95 per acre, as shown in Table 1. The trellis costs were $602.45 per acre, or about 77 percent of the

total. Preparing the land, obtaining and planting new roots was estimated to cost an additional $178.50 per acre, or 23 percent of the total establishment. Those costs did not include purchase of the land or the irrigation system.

CAPITAL INVESTMENT

Hop production is a high investment operation. The data in Table 2 indicates a grower with a 200-acre hop operation had about $441,786 invested in land, equipment and buildings. That amounted to $2208.93 per acre, exclusive of the operator's family residence or housing for hired farm workers. The investment was estimated as follows:

	Current Value	Per Acre	Percent
Land	$180,000	$ 900.00	40.7
Trellis	70,286	351.43	15.9
Field equipment	30,000	150.00	6.8
Harvest equipment	155,000	775.00	35.1
Shed, shop	6,500	32.50	1.5
Total	$441,786	$2,208.93	100.0

Table 2 also presents the detailed annual charges for depreciation ($123.76 per acre) and interest on the current value of the investment ($155.78 per acre).

The committee of growers indicated that only about 90 percent of their land was actually producing hops, with the remainder in buildings, roads, etc. Therefore, the costs in Table 2 include an investment of 180 acres of trellis, which was depreciated over a 10-year period.

Stationary vertical hop harvesters are most commonly used by Yakima Valley growers. Few other types are presently available on a commercial basis. This study assumed that growers used a Dauenhauer harvester. Those with another type of harvester would have different investment and operating costs.

ANNUAL PRODUCTION COSTS

The annual production costs were separated into three catagories: (1) pre-harvest operations, (2) harvest operations, and (3) annual overhead charges (Table 3). Total costs were estimated at $942.47 per acre, not including annual assessments or marketing charges.

Pre-Harvest: Annual pre-harvest operating charges for 1970 were estimated to be $310.78 per acre. Labor costs accounted for nearly one-half the amount. Repairing the trellis, and the practices related to training the vines, required 50.5 hours of labor per acre. Those costs amounted to $170.50 per acre. Insect and weed control practices were reported to cost $59.57 per acre. Fertilizer practices, the other major expense item, equaled $49.95 per acre.

Harvest: The growers reported a 10-man field crew was able to cut and load one acre of vines in two hours, or six acres in a 12-hour day. Total charges for cutting the vines and hauling them to the picking machine was estimated to be $65.10 per acre.

As previously indicated, harvest costs reported in this study were specifically related to use of the stationary Dauenhauer vertical picking machine. Unloading the trucks and feeding the picking machine, which strips the vines and separates the hop cones from the leaves and other trash, utilizes six men in addition to the machine operator and his helper. Picking machine costs amounted to $53.00 per acre.

Drying a batch of hops was reported to take from 8 to 10 hours. Two men load the kilns, while another two are engaged to "push" the dried hops into the cooling area. Then, growers commonly use one person to operate the dryer during the day, and one at night to finish drying the hops, empty the kilns, and maintain a fire guard. Total costs of operating the kilns were estimated to be $47.35 per acre for a yield of 1680 pounds of dry hops per acre of producing land.[a/]

Baling the hops is usually done on a custom basis, with the grower providing the necessary equipment and materials. Few growers stored their hops on the ranch; they were usually hauled to the buyer every day or two by a custom operator. Baling and hauling costs were reported at $27.20 per acre.

Total harvest costs were estimated to be $192.65 per acre at the 1680-pound level, or 12.74 cents per pound of dried hops.

Overhead: Annual overhead charges fall into two catagories: (a) those due to ownership of land, buildings and equipment, and (b) those costs associated with operating the business. Taxes, depreciation, and interest on the farm investment are in the first grouping. The second includes charges for such factors as irrigation water, industrial insurance, managing the operation, etc. Total overhead charges amounted to $439.04 per acre.

Total Annual Costs: Results of the study indicate the typical 200-acre hop grower in the Yakima Valley had annual costs of about $942.47 per acre in 1970, providing the average yield was 1680 pounds of dry hops per producing acre (or 1512 pounds for the total acreage). On a functional basis, the costs were as follows:

	Costs per Acre	Cents per Pound	Percent
Pre-harvest	$310.78	20.55	33.0
Harvest	192.65	12.74	20.4
Overhead	439.04	29.04	46.6
Total	$942.47	62.33	100.0

a/ 1680 pounds of dry hops per acre of producing land is equivalent to 1512 pounds per acre of total land when only 90 percent of the land is in trellis (90% of 1680 = 1512).

COSTS PER POUND OF HOPS AT VARIOUS YIELDS

Hop growers, like most farmers, normally strive for the highest yields possible for the condition of their hop yards, and the soil and climatic conditions. Few are willing to settle for low yields. As a result, they usually fertilize, irrigate, and train the plants for higher yields. Thus the pre-harvest operating costs are usually quite constant regardless of the final yield per acre.

Likewise, the harvest costs don't appreciably change until the hops reach the drying kilns. Drying cost will vary with yields, however, because of the amount of heat required to dry each pound of hops. The charges for baling the hops and hauling them to the buyer will also vary, but those operations are paid on a custom basis.

The data in Table 4 indicate the per acre costs for producing hops, with yields ranging from five bales per producing acre to ten bales per acre. The costs per pound of dry hops were estimated to be $1.0364 at the 5-bale level and 52.67 cents at 10 bales per acre. They were 62.33 cents per pound at the 1680-pound level.

NET INCOME PER ACRE AT VARIOUS YIELDS AND PRICES

The final table, Table 5, estimates the net income per acre that a 200-acre hop grower in the Yakima Valley could expect at various yields and market prices, providing his annual costs were as shown in Table 4. Even when annual costs were held fairly constant, the net income possibilities ranged from $-572.77 to $671.93 per acre, depending on the yield and the selling price.

Table 5 data suggest a 200-acre Yakima Valley grower could produce hops profitably under 1970 price conditions providing the operation was consistantly managed for medium or higher yields of good quality hops, the grower had an adequate marketing quota for his production, and a suitable marketing contract.

Table 1. ESTIMATED PER ACRE COSTS OF ESTABLISHING A HOP YARD (1970)

	Hours per A	Labor[1/] Costs	Machinery Fuel & Repairs	Materials & Other	Total
		$	$	$	$
Land Preparation					
Fall plow	1.0	2.50[2/]	1.25		3.75
Disc, pack, 2x	1.0	2.00	1.75		3.75
Marking Yard	5.0	10.00		Stakes = 6.50	16.50
Build Trellis					
Poles - 60 poles @ $1.75				Poles = 105.00	105.00
peel & treat (15 min. each)	15.0	30.00			30.00
				Material = 8.00	8.00
auger holes	2.0	4.00	2.75		6.75
spread, set poles (30 min. each)	30.0	60.00	6.00		66.00
Anchors - 12 holes @ $1.00				Holes = 12.00*	12.00
- concrete anchors	2.0	4.00		Material = 33.00	37.00
- spread, bury anchors	6.0	12.00	3.50		15.50
Wire - 1600 lbs. @ $15 per cwt.				240.00	240.00
- spread wires	5.0	10.00	1.15		11.15
- pole to anchor	6.0	12.00	2.00		14.00
- briddle wire	2.0	4.00	.50		4.50
- No. 4 wire	6.0	12.00	1.15		13.50
- raise trellis	5.0	10.00	.75		10.75
- stapling	5.0	10.00	1.15	Staples = 1.00	12.15
Planting					
5000 roots @ $25 per 1000				125.00	125.00
Plant roots (2 sides)	23.0	46.00			46.00
TOTAL COSTS PER ACRE	114.0	228.50	21.95	530.50	780.95

* Based on custom work costs

1/ Labor based on $2.00 per hour, which included such items as Social Security, Industrial Insurance, etc., except as noted.

2/ Plowing labor charged at $2.50 per hour.

Table 2. CAPITAL INVESTMENT FOR A 200-ACRE HOP ENTERPRISE

Item	Current Value		Remaining Life	Ending Value	Annual Charge per Acre		Annual Charge (Your estimate)	
	Total $	Per Acre $	(Yrs.)	$	Deprec. $	Interest on Inv.[a]	Deprec.	Interest on Inv.
Land & Irrigation Equipment								
200 acres	173,000	865.00		173,000		56.22		
Irrigation system	7,000	35.00	10		3.50	2.80		
Hop Yards[b]								
180 acres	70,286	351.43	5		70.29	28.11		
Field Equipment	30,000	150.00	8		18.75	12.00		
Picking Machine								
Dauenhauer (single feed)	50,000	250.00	15	20,000	10.00	17.50		
Kiln	80,000	400.00	15	40,000	13.33	28.00		
Cooling, Baling, Storage	25,000	125.00	15	10,000	5.00	8.75		
Maintenance								
Shed, shop	4,000	20.00	15		1.33	1.40		
Hand tools	2,500	12.50	8		1.56	1.00		
TOTAL PER ACRE	441,786	2,208.93			123.76	155.78		
YOUR FARM								

a/ Interest on investment charged at 8 percent of current value except for land (6.5%), harvest facilities and shop (7%).

b/ Based on 180 acres in hop production, with remaining land in buildings, roads, etc.

Table 3. ESTIMATED PER ACRE ANNUAL PRODUCTION COSTS[1/]
(1970)

	Hours per A	Labor[2/]	Machinery Fuel & Repairs	Materials & Other	Total	Your Estimate
		$	$	$	$	$
PRE-HARVEST						
Fertilize - spread hop vines (1.5 loads @ $4)				6.00*	6.00	
- manure (1/3 acres x 20 T x $1.50)				10.00*	10.00	
- 100 lbs. N @ 10¢				11.75*	11.75	
Cultivate - subsoil (1/3 acres)	.33	.67	.50		1.17	
- spring shanks	.75	1.50	.94		2.44	
- harrow	1.0	2.00	1.15		3.15	
Trellis repair - 8 posts (2 hop, 6 stub)				11.00	11.00	
- replace, repair	5.0	10.00	1.50	Bands = .70	12.20	
Twining - soak twine	.5	1.00		Twine = 40.00	41.00	
- string field ($22 per acre)		22.00*	2.00	Clips = 6.50	30.50	
- retwine	2.0	3.70[a/]			3.70	
Training vines - first time	10.0	18.50[a/]			18.50	
- second time	10.0	18.50[a/]			18.50	
- stripping, retrain	8.0	14.80[a/]			14.80	
- arching ($5 per acre)		5.00*		Twine = .50	5.50	
- put up heads	4.0	7.40[a/]			7.40	
Cultivate, 3x	3.0	6.00	3.00		9.00	
Corrugate, 2x	2.0	4.00	2.00		6.00	
Irrigate	6.0	18.00[b/]			18.00	
Fertilize - sidedress (50N, 10Zn)	1.0	2.00	1.00	Fert. = 15.00	18.00	
- aerial (3Zn, foliar)				4.20*	4.20	
Insect control - mites, aphids	1.0	2.00	2.75	Chem. = 15.50	20.25	
- mites	1.0	2.00	2.75	Chem. = 11.25	16.00	
- mites (aerial, 1/2 acre)				4.12*	4.12	

Table 3. (Contd.) ESTIMATED PER ACRE ANNUAL PRODUCTION COSTS[1/]

	Hours per A	Labor[2/]	Machinery Fuel & Repairs	Materials & Other	Total	Your Estimate
		$	$	$	$	$
Weed control, 2x	3.0	6.00	2.00	Chem. = 2.20	10.20	
Roguing vines	1.0	1.85[a/]			1.85	
Replace twine, pickup vines	3.0	5.55[a/]			5.55	
SUBTOTAL	73.6	152.47	19.59	138.72	310.78	
HARVEST						
Cutting vines (6 acres per 12 hours)						
- 10 man crew	20.0	40.00	1.50		41.50	
Hauling vines						
- 5 truck drivers	10.0	20.00			20.00	
- 1 trip per 160 vines (12 trips x 2 miles @ 15¢)			3.60		3.60	
Picking machine (Dauenhauer)						
- 6 man crew	12.0	24.00	15.00		39.00	
- 1 mechanic (45 days @ $40)		9.00			9.00	
- 1 helper (40 days @ $25)		5.00			5.00	
Kiln						
- 5 man crew	10.0	20.00	2.50		22.50	
- 1 hop dryer (7.6 bales @ $1)		7.60		Fuel = 17.25	24.85	
Baling						
- 3 man crew (7.6 bales @ $1.25)		9.50*	1.00		10.50	
- burlap @ $1.65 per bale				12.55	12.55	
Hauling (7.6 bales @ 55¢)				4.15*	4.15	
SUBTOTAL	52.0	135.10	23.60	33.95	192.65	

Table 3. (Contd.) ESTIMATED PER ACRE ANNUAL PRODUCTION COSTS[1/]

	Hours per A	Labor[2/]	Machinery Fuel & Repairs	Materials & Other	Total	Your Estimate
		$	$	$	$	$
OVERHEAD[c/]						
OASI, Industrial Ins., etc. ($288 x 11%)[4/]				32.00	32.00	
Office - utilities, legal, records, fire ins., etc.				20.00	20.00	
Irrigation water				11.00	11.00	
Taxes (R.E. & P.P.), Licenses				28.00	28.00	
Interest on Operating Capital (9% of $594 - $378)[5/]				19.00	19.00	
General Management and Supervision[6/]						
(1% of $2209) + (5% of $613)				53.00	53.00	
Depreciation[3/]						
- Hop yard ($729 ÷ 10 years)				70.29	70.29	
- Field equipment ($150 ÷ 8 years)				18.75	18.75	
- Harvest machinery, buildings ($450 ÷ 15 years)				28.33	28.33	
- Maintenance buildings, equipment ($6500)				2.89	2.89	
Interest on Current Investment[3/]						
- Land, irrigation equipment				59.02	59.02	
- Hop yard				28.11	28.11	
- Field equipment				12.00	12.00	
- Harvest machinery, buildings				54.25	54.25	
- Maintenance buildings, equipment				2.40	2.40	
SUBTOTAL				439.04	439.04	
TOTAL ANNUAL PRODUCTION COSTS[7/]	125.6	287.57	43.19	611.71	942.47	

Footnotes listed on following page.

Table 3. (Contd.) ESTIMATED PER ACRE ANNUAL PRODUCTION COSTS[1/]

* Custom work.

a/ Labor charged at $1.85 per hour.
b/ Irrigation labor charged at $3.00 per hour.
c/ Rounded to the nearest dollar amount.

1/ Based on 200 acre Yakima Valley hop operation with 180 acres in production.
2/ Labor rates based on cash wages of $2.00 per hour except as noted.
3/ See Table 2 for details.
4/ Assessed against wages only.
5/ Reduced by amount of cash advances from buyer during the crop season for the expected yield.
6/ Management based on 1 percent of investment plus 5 percent of operating costs.
7/ Does not include storage or marketing charges, or annual grower assessments.

Table 4. TOTAL COSTS PER ACRE AND PER POUND OF DRY HOPS AT VARIOUS YIELDS[1/]

	Yield-pounds of dry hops per acre[1/]						Your Estimate
	1000	1200	1400	1680	1800	2000	
	$	$	$	$	$	$	
Pre-Harvest Operations	310.78	310.78	310.78	310.78	310.78	310.78	
Harvest Operations							
- cut and haul	65.10	65.10	65.10	65.10	65.10	65.10	
- strip and clean	53.00	53.00	53.00	53.00	53.00	53.00	
- drying	38.30	41.45	44.69	47.35	50.95	53.10	
- baling	14.05	16.66	19.27	23.05	24.49	27.10	
- hauling bales	2.50	3.00	3.45	4.15	4.45	4.95	
Total Harvest Operations	172.95	179.21	185.51	192.65	197.99	203.25	
Overhead Costs[2/]							
- int. on oper. capital	31.00	28.00	24.00	19.00	18.00	14.00	
- other overhead	418.04	418.04	420.04	420.04	420.04	420.04	
Total Annual Costs - per acre[3/]	932.77	936.03	940.33	942.47	946.81	948.07	
- per pound	1.0364	.8667	.7463	.6233	.5844	.5267	

1/ Yields expressed in terms of pounds produced per acre, but costs were calculated on the basis of only 90 percent of the land in production.

2/ Some costs were non-cash items, such as annual depreciation and interest on the current investment in the hop operation.

3/ Does not include storage or marketing charges or annual grower assessments.

Table 5. NET INCOME PER ACRE AT VARIOUS YIELDS AND PRICES[1/]

Price per Pound	Yield-pounds of dry hops per acre[2/]						Your Estimate
	1000	1200	1400	1680	1800	2000	
¢	$	$	$	$	$	$	$
40	-572.77	-504.03	-436.33	-337.67	-298.81	-228.07	
45	-527.77	-450.03	-373.33	-262.07	-217.81	-138.07	
50	-482.77	-396.03	-310.33	-186.47	-136.81	-48.07	
55	-437.77	-342.03	-247.33	-110.87	-55.81	41.93	
60	-392.77	-288.03	-184.33	-35.27	25.19	131.93	
65	-347.77	-234.03	-121.33	40.33	106.19	221.93	
70	-302.77	-180.03	-58.33	115.93	187.19	311.93	
75	-257.77	-126.03	4.67	191.53	268.19	401.93	
80	-212.77	-72.03	67.67	267.13	349.19	491.93	
85	-167.77	-18.03	130.67	342.73	430.19	581.93	
90	-122.77	35.97	193.67	418.33	511.19	671.93	

1/ Costs do not include marketing charges or annual assessments, but do include such non-cash items as the operators labor and management, depreciation and interest on the current investment in the hop operation.

2/ Yields expressed in terms of the land in hops, but calculations based on total acreage.

Note: The net incomes shown in Table 5 do not include the amounts retained by the operator for (1) his labor, (2) his managerial income, (3) his financial investment in the operation, and (4) his share of the depreciation allowance. At the 1680-pound level these items can total $351 per acre or more, as indicated below:

Item	Per Acre	Per Pound
	$	$
Labor	--	--
Management	53.00	.0351
Interest - operating capital	19.00	.0126
- land, equipment, buildings, etc.	155.78	.1030
Depreciation	123.76	.0818
	$351.54	$.2325

To simplify the presentation of information, it was sometimes necessary to use trade names. No endorsement of named products was intended nor was criticism of unnamed products implied.