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**ESTIMATED
COST
OF PRODUCING
LIMA BEANS
IN THE
COLUMBIA BASIN**

COOPERATIVE EXTENSION SERVICE • COLLEGE OF AGRICULTURE • WASHINGTON STATE UNIVERSITY • PULLMAN

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ESTIMATED COSTS OF PRODUCING LIMA BEANS

COLUMBIA BASIN, WASHINGTON

by

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INTRODUCTION

The Columbia Basin area grows most of the Lima beans produced in Washington. Most of the Lima's produced in the Basin area are for processing, usually on a contract basis. In recent years, the contract price for Lima beans has been in the range of \$140 to \$160 per ton, as shown below. However, the price received by a farmer varied depending on the processing firm and on the quality of his beans at harvest.

Lima Bean Production in the Columbia Basin

<u>Year</u>	<u>Acres Harvested</u>	<u>Avg. Yield Per Acre (tons)</u>	<u>Avg. Price Per Ton \$</u>	<u>Avg. Price Per Acre \$</u>
1969	4,472	1.7	149.70	254.50
1970	1,792	1.6	145.70	233.12
1971	2,644	1.2	160.00	190.00
1972	2,639	1.7	156.00	265.20

Data from U.S. Bureau of Reclamation annual crop reports.

In the Basin area, Lima beans are commonly grown in rotation with such crops as green peas, sweet corn, winter wheat and sugar beets.

OBJECTIVE OF THE STUDY

The primary purpose of the study was to gather and analyze data on the usual costs of producing Lima beans in the Columbia Basin area. A similar study was conducted in 1968. Since that time, however, the costs of producing beans had increased significantly.

The usual procedure for a cost-of-production study is to determine production costs for the previous year's crop. At the time of the study, however, growers reported rapidly increasing costs of farm labor, supplies, other needed items, interest and taxes, etc. Therefore, it was considered more timely to update the earlier data by anticipating costs for the upcoming (1974) crop season. For

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the most part, local suppliers were able and willing to provide information on the price of their supplies and services for the ensuing months. Thus, the overall objective of the study was to anticipate the 1974 costs of producing Lima beans in the Columbia Basin area.

Specific objectives of the study were:

1. Anticipate the total annual costs per acre when producing 50 acres of Lima beans in 1974 on a 400-acre Columbia Basin farm that was surface irrigated.
2. Estimate the total annual costs per ton of beans produced for yields ranging from 1.0 to 3.0 tons per acre.
3. Determine the per acre returns a Lima bean grower could expect in 1974 for his labor and management at selected crop yield and price levels.

SOURCE OF THE DATA

The data were compiled from information provided by a select group of successful Lima bean growers from the Quincy and Royal Slope areas. The committee members reported the normal cultural practices, time and equipment requirements, and the amount and price of needed supplies. Additional information, as needed, was obtained from other growers, local suppliers, credit sources, etc. After the data were assembled, they were reviewed by the committee members, other local industry representatives, Cooperative Extension Service personnel, and others familiar with Lima bean production in the study area.

Because of the procedure used, and the variable conditions under which beans were being produced in the Columbia Basin area, the data in this report do not reflect "average" production costs for all beans produced in the study area. However, the data should be useful to growers and others interested in the information as a cost guide, but only until data from their own operations can be assembled and analyzed. Space is provided in each table so farm operators can insert their own cost data as they become available.

ANNUAL PRODUCTION COSTS PER ACRE

Annual operating costs were computed by determining and listing the "usual" production practices and then the associated costs per acre for labor, machinery fuel and repairs, fertilizer and other needed materials. Then the cash and non-cash overhead costs were added to the operating costs to determine total annual costs per acre.

Operating Costs:

The pre-plant operations were projected to be \$76.17 per acre for 1974, as shown in Table 1. Fertilizer materials and their application accounted for \$48.00 of that amount while the land preparation operations were projected to be \$19.55 per acre.

Plant-to-harvest costs totaled \$66.38 per acre. The costs related to cor- rugation and irrigation labor were expected to be nearly \$15.00 per acre; nitrogation expenses were expected to be \$11.00 per acre; and estimated pest control costs were \$32.25 per acre. The cost of seed was to be carried by the processor until the grower was paid for his crop, so no entry was made for seed expenses in that section of Table 1 dealing with operating costs.

Harvesting of the crop was also to be handled by the processor, so no ex- pense was included for that operation.

Cash Overhead:

Cash overhead charges include such non-operating expenses as real estate and personal property taxes, irrigation charges, general overhead items, and interest on annual operating capital. They were projected to be \$38.38 per acre for 1974.

An overhead charge amounting to 6 percent of cash operating costs was included for such unitemized expenses as liability and property insurance, business travel, utilities, other office expenses, etc.

The financial situation of the operator determines whether the interest on operating capital should be a cash or non-cash expense. It is a cash expense for those farmers that borrow their operating capital, but a non-cash oppor- tunity cost item for those that use their own money to finance the operating expenses. For this study, it was handled as a cash item.

Non-Cash Overhead:

The non-cash costs include charges for the operator's labor (\$14.19 per acre), a charge of \$30.00 for seed, and the investment overhead expenses of \$98.30 per acre. Investment overhead consists of the annual charge for depreciation of needed equipment and buildings, and the amount due to interest on the needed investment in equipment, buildings and land. Details on the annual depreciation and interest on investment are shown in Table 2.

For the study, it was assumed the operator would not have any outstanding debt on his capital investment items, even though it was realized that many operators would not have clear title to their land and machinery. On that basis, interest on the investment in the operation was entered as a non-cash expense.

Total Costs per Acre:

For the farming conditions previously outlined for this study, the expected costs of producing Lima beans in the Columbia Basin in 1974 were projected at \$309.23 per acre.

THE CAPITAL INVESTMENT

Table 2 estimates the capital investment in the farming operation that would be directly due to Lima bean production. Each item was listed separately, then its current value, its estimated remaining years of life, the anticipated salvage value, and the portion to be used for bean production. Since most

items would also be used for producing other crops, only a portion of their total annual depreciation and interest charges were assessed against the bean crop.

Notice that Table 2 does not include the operator's family residence or family automobile, as those items would be related to personal living rather than crop production.

The data in Table 2 show an annual charge of \$14.34 per acre for depreciation of the equipment and buildings, and \$83.96 for interest in equipment, buildings and land. Those amounts do not include the annual charges for operating or repairing the equipment and buildings.

Also shown in Table 2 are the expected cash costs per hour of operation for the needed field equipment.

MONTHLY CASH OUTFLOW PER ACRE

Table 3 estimates the outflow of cash per acre by the month in which it was expected to occur. Such information is helpful to farmers wanting to plan their cash needs throughout the season. The expenses projected for February were mainly for machinery repairs, which were usually done during the winter months.

COSTS PER TON OF LIMA BEANS PRODUCED

The yield per acre obtained by a grower would have considerable effect on his costs of producing a ton of beans. Table 4 was prepared to illustrate the effect of yield differences on the total costs per acre and on the costs of producing each ton. Those yield differences may be due to field or climatic conditions, or due to the method and timing of such field operations as land preparation, fertilizing, irrigating, pest control, and harvest.

Table 4 suggests the grower's per acre costs of producing Lima beans in 1974 would be relatively constant regardless of the crop yield. But the costs per ton might range from as low as \$103 to over \$300 per ton, depending on the individual farm situation and the annual crop yield.

LABOR AND MANAGEMENT RETURNS PER ACRE AT SELECTED YIELDS AND PRICES

From the data previously discussed, it was possible to also project an operator's labor and management income per acre at various yields and prices. Table 5 data indicate the operator's income for his labor and managerial ability might range from about -\$200.00 to over \$400.00 per acre, depending on the yield and quality of the crop, and the average price paid by the processor per ton.

The amounts shown in Table 5 do not represent the operator's total cash income per acre. To determine his cash income per acre, it is necessary to add the \$98.30 per acre of non-cash expenses that were charged as annual depreciation and interest on investment in the capital items. Those items are equipment, buildings and land. There was also a cash charge of \$7.18 per acre for interest on the needed operating capital which needs to be considered. Many farmers do not have to borrow all their annual operating capital, so their cash costs would be reduced accordingly.

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TABLE 1. ESTIMATED PER ACRE COSTS OF PRODUCING LIMA BEANS
COLUMBIA BASIN, WASHINGTON

	Labor		Machinery Fuel and Repairs	Materials and Other	Total Per Acre	Your Estimate
	Hours Per Acre	Costs ^{1/}				
<u>Pre-plant</u> ^{2/}		\$	\$	\$	\$	\$
Ditch cleanup, repair	.1	.30	.40	.75	1.45	
Fertilizer (100N, 50P ₂ O ₅ , 60K ₂ O, 5Zn)				45.00	45.00	
- custom apply				3.00	3.00	
Plow	.6	1.80	2.55		4.35	
Disc and pack, 2X	.8	2.40	4.12		6.52	
Pre-plant herbicide	.1	.30	.40		.70	
- materials				chem=6.50	6.50	
Corrugate	.43	1.29	1.88		3.17	
Pre-irrigate	.8	2.40			2.40	
Disc and harrow	.4	1.20	1.88		3.08	
<u>Plant to Harvest</u>						
Plant ^{3/}	.5	1.50	1.78		3.28	
- planter rental				1.00	1.00	
Cultivate and corrugate, 2X	1.0	3.00	3.85		6.85	
Irrigation, 7X	4.0	12.00*			12.00	
Fertilizer (60N, Nitrogate)				11.00	11.00	
Weed control (hand), 3X		25.00*			25.00	
Insect control - materials				chem=4.50	4.50	
- custom apply (aerial)				2.75	2.75	
<u>Harvest</u>						
Paid by processor						
<u>Cash Overhead</u>						
Taxes (R.E. & P.P.)				11.50	11.50	
Irrigation charges				12.00	12.00	
General Overhead (6% of cash operating costs)				7.70	7.70	
Interest on Oper. Capital (6 mo. @ 9%)				7.18	7.18	
TOTAL CASH COSTS PER ACRE		37.00	16.86	112.88	166.74	
Seed (100 lbs. @ 30¢) ^{3/}				30.00	30.00	
Operator's labor		14.19			14.19	
<u>Investment Overhead</u>						
Depreciation - equip., bldgs.				14.34	14.34	
Int. on Investment - equip., bldgs., land				83.96	83.96	
TOTAL NON-CASH COSTS PER ACRE		14.19		128.30	142.49	
TOTAL COSTS PER ACRE		51.19	16.86	241.18	309.23	

Costs based on 50 acres of Lima beans on a 400-acre surface irrigated farm.

* These operations usually hired.

^{1/} Labor charged at \$3.00 per hour, which includes FICA, State Industrial Insurance and Social Security.

^{2/} Consult your Cooperative Extension Service agent or fieldman for local recommendations on specific cultural practices.

^{3/} Seed cost borne by processor until after harvest.

TABLE 2. CAPITAL INVESTMENT

	Current Value	Remaining Life (Years)	Salvage Value	% Due to Beans	Annual Costs		Annual Costs (Your Estimate)		Cash Costs per Hour		
					Deprec.	Int., 8%	Deprec.	Int., %	Fuel	Repairs	Total
Tractor, 100 hp, D	\$ 8,000	5	\$ 1,500	15	\$ 195	\$ 96	\$	\$	\$ 1.60	\$ 1.95	\$ 3.55
Tractor, 50 hp, D	4,500	5	1,000	15	105	54			.80	1.15	1.95
Plow, 4 bottom	1,400	5	100	20	52	22				.70	.70
Disc, tandem, 12'	1,500	3	50	25	121	30				.80	.80
Harrow, spike, 15'	300	6	0	25	12	6				.35	.35
Packer, Schmizer, 13'	720	5	300	20	17	11				.80	.80
Cultivating equipment	700	7	100	12	10	7				.30	.30
Corrugator (ditcher)	400	4	100	10	8	3				.70	.70
Corrugator, headland	450	4	75	20	18	7				1.25	1.25
Sprayer	400	4	100	15	11	5				.50	.50
Irrigation equipment	225	6	0	100	38	18					
Pickup	4,500	8	1,200	12	50	43			.050*	.040*	.090*
Shed and shop	6,000	15	0	12	48	58					
Shop equipment	4,000	15	0	12	32	38					
Land, 50 acres @ \$950				100		3,800					
TOTAL - 50 acres					717	4,198					
- per acre					14.34	83.96					

*Costs per mile.

TABLE 3. MONTHLY CASH OUTFLOW PER ACRE

	Total Per Acre	J	F	M	A	M	J	J	A	S	O	N	D
	\$	\$	\$	\$	\$	\$	\$	\$	\$	\$	\$	\$	\$
Ditch cleanup, repair	1.15		.15	1.00									
Fertilize - materials	45.00					45.00							
- apply	3.00					3.00							
Plow	2.55		.40			2.15							
Disc, pack, 2X	4.12		.52			3.60							
Pre-plant herbicide - apply	.40		.15			.25							
- materials	6.50					6.50							
Corrugate	1.88		.38			1.50							
Disc, harrow	1.88		.30			1.58							
Plant	1.78		.38			1.40							
- planter rental	1.00					1.00							
Cultivate, corrugate, 2X	3.85						1.90	1.95					
Irrigate, 7X	12.00					2.00	2.50	2.50	3.00	2.00			
Fertilize - nitrogate	11.00							11.00					
Weed control, 3X	25.00						8.00	9.00	8.00				
Insect control - apply	2.75								2.75				
- materials	4.50								4.50				
<u>Cash Overhead</u>													
Taxes	11.50				11.50								
Irrigation charges	12.00				12.00								
General Overhead	7.70		.90	.10	.50	1.50	1.30	1.30	1.50	.60			
Int. on Oper. Capital	7.18										7.18		
TOTAL CASH COSTS PER ACRE	166.74		3.18	1.10	24.00	69.48	13.70	25.75	19.75	2.60	7.18		
YOUR ESTIMATE													
ACCUMULATED COSTS PER ACRE	166.74		3.18	4.28	28.28	97.76	111.46	137.21	156.96	159.56	166.74	166.74	
YOUR ESTIMATE													

TABLE 4. ESTIMATED COSTS PER ACRE AND PER TON
AT SELECTED YIELDS

	Yield, Tons per Acre				
	1.0	1.5	2.0	2.5	3.0
<u>CASH COSTS</u>	\$	\$	\$	\$	\$
Pre-plant	66.48	66.48	66.48	66.48	66.48
Plant to harvest	61.88	61.88	61.88	61.88	61.88
Cash overhead	38.38	38.38	38.38	38.38	38.38
TOTAL CASH COSTS - per acre	166.74	166.74	166.74	166.74	166.74
- per ton	166.74	111.16	83.37	66.70	55.58
<u>NON-CASH COSTS</u>					
Seed	30.00	30.00	30.00	30.00	30.00
Operator's labor	14.19	14.19	14.19	14.19	14.19
Investment overhead	98.30	98.30	98.30	98.30	98.30
TOTAL NON-CASH COSTS - per acre	142.49	142.49	142.49	142.49	142.49
- per ton	142.49	94.99	71.24	57.00	47.50
TOTAL ANNUAL COSTS - per acre	309.23	309.23	309.23	309.23	309.23
- per ton	309.23	206.15	154.62	123.69	103.08

TABLE 5. OPERATOR'S LABOR AND MANAGEMENT RETURNS PER ACRE
AT SELECTED YIELDS AND PRICES^{1/}

Price Per Ton	Yield, Tons per Acre					Your Estimate
	1.0	1.5	2.0	2.5	3.0	
	\$	\$	\$	\$	\$	\$
100	-195.04	-145.04	-95.04	-45.04	4.96	
120	-175.04	-115.04	-55.04	4.96	64.96	
140	-155.04	- 85.04	-15.04	54.96	124.96	
160	-135.04	- 55.04	24.96	104.96	184.96	
180	-115.04	- 25.04	64.96	154.96	244.96	
200	- 95.04	4.96	104.96	204.96	304.96	
220	- 75.04	34.96	144.96	254.96	364.96	
240	- 55.04	64.96	184.96	304.96	424.96	
260	- 35.04	94.96	224.96	354.96	484.96	
280	- 15.04	124.96	264.96	404.96	544.96	
300	4.96	154.96	304.96	454.96	604.96	
320	24.96	184.96	344.96	504.96	664.96	
340	44.96	214.96	384.96	554.96	724.96	
360	64.96	244.96	424.96	604.96	784.96	
380	84.96	274.96	464.96	654.96	844.96	
400	104.96	304.96	504.96	704.96	904.96	

^{1/} Operator also has \$98.30 per acre cash income due to annual charge for depreciation and interest on investment.