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THE COST OF PRODUCING CANNING PEAS IN UTAH 1945-1961

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U.S. U. ARCHIVES

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SUMMARY

1. Forty-two growers of canning peas in Cache and Box Elder Counties were surveyed in 1961. The pea enterprises ranged from 3 to 60 acres with an average of 10.6 acres.
2. The average cost of producing an acre of canning peas was \$111.75 or \$79.92 per ton. Material cost accounted for 29.6 percent of the total cost; overhead, 29.7 percent; labor, 20.9 percent; and power and machine; 19.8 percent.
3. The average man labor requirement for growing canning peas was 18.3 hours per acre. Harvesting operations accounted for 64.7 percent of the total.
4. Total receipts for shelled peas and vines were \$116.50 per acre or \$83.32 per ton. Net return was \$4.75 per acre or \$3.40 per ton. Net return was calculated by subtracting total cost from total receipts.
5. Assuming that farm operators owned the capital that was used in enterprises studied, the average return to the farm family was \$38.91 per acre or \$27.80 per ton.
6. When the records were divided into two groups on the basis of whether the net return was positive, the averages of the 20 most profitable enterprises were more favorable than the 22 least profitable enterprises in higher receipts per acre and per ton, lower costs per acre and per ton, higher yields, larger enterprises, and lower labor requirements per acre.
7. Comparisons of comparable studies made in 1946, 1951, and 1961 show a decrease in manure application, total labor input, tractor and horse hours, and proportion of labor performed by the operator and his family. Noticeable increase occurred in use of commercial fertilizer, fixed capital investment, and the hired labor.
8. Comparisons show costs have increased 30 percent and receipts decreased 15 percent between 1946 and 1961.

COST OF PRODUCING CANNING PEAS IN UTAH 1946 - 1961

Since 1946, the cost of producing canning peas has been investigated on a continuing basis by the Utah Agricultural Experiment Station. The original comprehensive study was made in 1946. A second study was completed in 1951. The most recent study was made in 1961. In between the major studies annual costs of production have been calculated.

In each of the three major studies data were collected from farmers in Cache and Box Elder Counties by survey methods.

This report consists of two major sections. First, data for 1961 are presented and discussed in some detail. Second, trends in costs from 1946 to 1961 are discussed.

The 1961 Study

Forty-two producers of canning peas in Cache and Box Elder Counties for the 1961 crop year were interviewed and the information recorded on prepared schedules. Detailed information was obtained on costs, returns, and practices used. Wherever possible, receipts from peas sold, cost of seed, fertilizers, and insecticides, were taken from reports given the producer by the processor and from other records in the farmer's possession. Enterprises smaller than 3 acres were not included in the study. Those included ranged from 3 to 60 acres with an average of 10.3 acres.

Growers produced peas for canning companies under a written contract which guaranteed a market, and specified price and conditions under which the crop would be grown. The predetermined price per grade was arrived at by a farmers' bargaining committee and representatives of the canning companies. The canning company provided seed of the desired variety at a contract price. Field representatives of the canning companies advised on planting, growing and harvesting the crop.

Seed-bed preparation typically consisted of fall plowing of the land, one harrowing and one floating or leveling operation previous to seed planting. The peas were planted with a grain drill at an average rate of 4 to 5 bushels (240 to 300 pounds) of seed per acre. During the growing season the land was generally flood or sprinkle or subirrigated two or three times. Canning company equipment and personnel were used for dusting or spraying on fields threatened by weeds or insects. Most vines were custom cut with a company-owned swathing machine. The farmer was charged \$3.25 a ton of shelled peas for cutting the vines. The canning company also provided loading services to the farmer at a cost of \$3.25 per ton of shelled peas. A few farmers cut their pea vines with a hay mower and hand loaded them or loaded them with a mechanical loader. Vines were hauled to the viner and dumped in front of the hopper. Here Mexican laborers pitched them into the viner at a cost of \$6 a ton of shelled peas or the farmers pitched the vines directly into the chute. As the vines passed through the viner the peas were shelled, partially cleaned, and boxed for delivery to the canning factory, vines and other refuse were conveyed to a stack near the viner shed. The canning crops association was responsible for stacking vines and allocating the silage. The association sold the silage to pea growers or other farmers for feed. The receipts were divided among the pea growers according to the amount of vines delivered minus the cost of stacking.

MAN LABOR REQUIREMENTS

Man labor requirements were grouped into three main classes: (1) land preparation, (2) planting and growing, and (3) harvesting the crop. Operations classified as land preparation were manuring, fertilizing, plowing, harrowing, disking, floating, and ditching. Included in planting and growing were drilling, dusting, and irrigating. Harvesting included cutting, loading, hauling, and unloading vines.

The average labor requirement for all operations was 18.28 hours per acre (table 1). Preparing the land required an average of 2.98 man hours per acre or 16.3 percent of the total man hour requirement.

Table 1. Total hours of man-labor required to produce an acre of peas, Cache and Box Elder Counties, Utah, 1961

Operations	Man hours per acre hours	Percent each is of the total percent	Percent each is of group classification percent
Preparation:			
Manuring	.61	3.3	20.5
Fertilizing	.19	1.0	6.4
Plowing	1.17	6.4	39.2
Discing & harrowing	.54	3.0	18.1
Floating	.36	2.0	12.1
Ditching	.11	.6	3.7
Subtotal	<u>2.98</u>	<u>16.3</u>	<u>100.0</u>
Planting & growing:			
Drilling	.50	2.7	14.4
Irrigating	2.90	15.9	83.3
Dusting	.08	.4	2.3
Subtotal	<u>3.48</u>	<u>19.0</u>	<u>100.0</u>
Harvesting:			
Cutting	.76	4.2	6.4
Loading	1.25	6.8	10.6
Hauling	3.43	18.8	29.0
Unloading	6.38	34.9	54.0
Subtotal	<u>11.82</u>	<u>64.7</u>	<u>100.0</u>
Grand total labor	18.28	100.0	-

Planting and growing operations required 3.48 hours or 19.0 percent of the total labor required. Dusting required .08 hour per acre as only a few acres were dusted in 1961. Drilling required only .5 hours, while irriga-

ting required 2.9 hours or 83.3 percent of the labor required for these operations.

Harvesting required an average of 11.82 man hours. This was 64.7 percent of the total hours required to grow peas. The farmers were unable to spread the peak labor demand for harvesting over any appreciable length of time, and as a result much labor had to be hired (64.8 percent of the labor required for harvesting). This amounted to 9.42 man hours while operator and family contributed 2.40 man hours.

COST OF PRODUCTION

The total cost of producing canning peas in 1961 averaged \$111.75 per acre or \$84.08 per ton (table 2) and ranged from \$79 to \$173 per acre.

Inputs of canning pea production and their costs at 1961 price level are presented in four cost groups as follows: (1) material, (2) overhead, (3) labor, and (4) power and machine cost.

Material cost

Material cost was 29.6 percent of total cost and amounted to \$33.06 per acre. This included the cost of barnyard manure, commercial fertilizer, seed, fees, sprays, dusts, and miscellaneous costs. Seed cost was the largest single item under material cost (71.5%). Seeding rate averaged 4.8 bushels of seed per acre. The canning company sold the seed at a contract price of \$4.92 per bushel.

Commercial fertilizer used cost \$5.74 per acre. Compared to past years more commercial fertilizer was applied and less manure. The cost of commercial fertilizer was charged at the market price for the kind and quality applied. All of the current years application was charged against the current crop. While it is recognized

Table 2. Cost of producing canning peas, Cache & Box Elder Counties, Utah, 1961

Item	Quantity per acre	Cost per acre	Cost per ton	Percent of total per acre	Percent each is of group cost per acre
Material costs:		dollars	dollars	percent	percent
Manure	2.000 ton	2.28	1.72	2.0	6.9
Commercial fertilizer	.072 ton	5.74	4.32	5.1	17.4
Seed	4.800 bu.	23.64	17.78	21.2	71.5
Fees	-	.84	.64	.8	2.5
Other	-	.06	.04	.1	.2
Spraying or dusting	-	.50	.37	.4	1.5
Total		<u>33.06</u>	<u>24.87</u>	<u>29.6</u>	<u>100.0</u>
Overhead costs:					
Int. on cap. investment	437.20 at .05	21.86	16.44	19.6	65.9
Int. on money in crop	20.00 at .06	1.20	.90	1.1	3.6
Land taxes	-	5.28	3.98	4.7	15.9
Water taxes	--	1.40	1.06	1.2	4.2
Building depreciation	-	.14	.11	.1	.4
Misc. overhead	-	3.32	2.50	3.0	10.0
Total		<u>33.20</u>	<u>24.99</u>	<u>29.7</u>	<u>100.0</u>
Labor costs:					
Operator & family	8.6 hrs.	11.10	8.35	9.9	47.4
Hired	9.7 hrs.	12.32	9.27	11.0	52.6
Total	18.3 hrs.	<u>23.42</u>	<u>17.62</u>	<u>20.9</u>	<u>100.0</u>
Power & machine costs:					
Tractor	5.4 hrs.	16.29	12.26	14.6	73.8
Truck	2.9 hrs.	5.78	4.34	5.2	26.2
Total	-	<u>22.07</u>	<u>16.60</u>	<u>19.8</u>	<u>100.0</u>
Grand total	-	111.75	84.08	100.0	-

that there may be a residual carry-over value no good method has been developed to measure or value it.

Manure was valued at \$1.15 per ton in the field. Manure value was not completely used up in the year when it was applied and had a carry-over effect for several years. Data were obtained on the amount of manure applications in 1961 and in the two years preceding. Its value was charged to the canning pea enterprise on the following basis: 50 percent of the 1961 application, 30 percent of the 1960, and 20 percent of the 1959 application.

The grower authorized the canner to withhold from amounts due him and pay to the canning crops association a fee equal to 1 percent of his gross receipts from shelled peas less the cost of seed. The average deduction for fees was \$.84 per acre.

Pea fields infested with insects or weeds were sprayed by canning company personnel at a cost to the grower of \$4 per acre. The average cost per acre was \$.60 of which \$.10 was labor and included in hired labor. Not all farmers had their fields sprayed or dusted.

A few farmers rented a pea drill from the canning factory. This averaged \$.06 per acre and was included under other material costs.

Overhead costs

Overhead costs were the second largest cost items and comprised 29.7 percent of the total cost of \$33.20 per acre. Interest on capital invested was the largest overhead item of \$21.86 or 65.9 percent of overhead costs. Interest on fixed capital investment was charged at 5 percent for the entire year. If peas were used as a nurse crop adjustment in value was made. Interest on operating money was charged at 6 percent. Money used to produce the crop was invested from the time it was expended until the farmer received his check for the shelled peas, therefore interest was charged for the time the

money was used. Interest on money in the crop amounted to \$1.20 or 3.6 percent of overhead costs.

The average land tax per acre was \$5.28 while water charges averaged \$1.40 per acre.

Building depreciation cost \$.14 per acre. Many growers had no housing facilitations for equipment.

A charge equal to 10 percent of the total of all other overhead charges was added to the overhead costs to offset any use of farm capital which was not directly chargeable to the canning pea enterprise.

Cost of man labor

Operator and family labor was valued in terms of its alternative earning power in similar employment. Average hourly rates charged were \$1.29 for operator and family labor, \$1.27 for hired labor. Hired labor amounted to 52.6 percent of total labor cost or \$12.32. The operator and his family furnished 47.4 percent of the total labor or \$11.10 per acre. Average cost of labor was 19.8 percent of total costs.

Power and machine cost

Charges for mechanical power were made on the basis of the cost of custom work for the same operation. Charges for tractor power also included tractor equipment and attachments used. Tractors were the general source of power. Cost for their use was \$16.29 per acre which was 73.8 percent of total power and machine cost. Truck cost was incurred when hauling vines to viner stations. Average truck cost amounted to \$5.78 per acre or 26.2 percent of total power cost. Average power and machine cost was 19.8 percent of total cost.

Receipts

Total receipts included gross returns from shelled peas and the net value of the vines. The price of the peas was based on a grade determined by a tenderometer reading of a sample from each load delivered to the viner. The contract prices ranged from \$51.50 per ton for grade 12 to \$121.50 for grade 1 peas. The average price per ton in 1961 was \$76.05 which was approximately the price for number 8 peas.

The silage made from the vines was either fed by the grower or sold to livestock growers. In Cache County the price received for pea silage was \$5 per ton and in Box Elder County, \$7. The cost of stacking the vines was subtracted from the gross value of the pea silage in figuring the net value for vines.

Receipts from canning peas averaged \$106.34 per acre, and the value of pea silage was \$10.16 per acre making total receipts of \$116.50 per acre (table 3).

Table 3. Gross receipts and net returns from canning peas production, Cache and Box Elder Counties, 1961

<u>Item</u>	<u>Per enter- prise dollars</u>	<u>Per acre dollars</u>	<u>Per ton of Shelled Peas dollars</u>
Receipt from peas	1,092.12	106.34	76.05
Value of vines as silage	<u>104.36</u>	<u>10.16</u>	<u>7.27</u>
Total receipts	1,196.48	116.50	83.32
Total cost	<u>1,147.72</u>	<u>111.75</u>	<u>79.92</u>
Net returns	48.76	4.75	3.40

Net return amounted to \$4.75 per acre or \$3.40 per ton of shelled peas. The net return on individual enterprises ranged from \$125 to a minus \$90 per acre. About half of the growers had a minus return after they had been paid for labor, land, and capital at going rates.

Returns to operator and family labor, capital, and management

While operator and family labor, capital, and management are all costs to the enterprise, they are also returns to the operator and his family if they use their own capital. When price of operator and family labor was added to his net returns they amounted to \$15.85 per acre or \$11.33 per ton of shelled peas (table 4). By adding to \$15.85 the charge for interest for both operating and fixed capital, a return to the operator and his family's labor and management, and to capital resulted. If the operator owned all the capital used, he received \$38.91 per acre from the canning pea enterprise for his labor, capital and management.

Since approximately half of the enterprises studied in 1961 had a negative net return, the records were divided for comparison on the basis of negative or positive net return (table 5). Twenty enterprises had a positive net return and averaged \$32.43 per acre or \$20.04 per ton of shelled peas. Twenty-two enterprises had a negative net return and averaged -\$45.90 per acre and per ton of shelled peas.

The most profitable enterprise had higher receipts per acre and per ton, lower costs per acre and per ton, higher yields, larger enterprises, and lower labor requirements per acre.

Table 4. Return to operator and family labor, capital, and management for canning peas, Cache and Box Elder Counties, Utah 1961

<u>Item</u>	<u>Per acre</u>	<u>Per ton</u>
	dollars	dollars
Net return	4.75	3.40
Cost of operator & family labor	<u>11.10</u>	<u>7.93</u>
Return to operator & family labor & management	15.85	11.33
Charge for use of capital	<u>23.06</u>	<u>16.47</u>
Return to capital, operator and family labor, and management	<u>38.91</u>	<u>27.80</u>

Table 5. Comparison of enterprises with a positive net return to those with a negative net return and average of all enterprises for canning peas, Cache & Box Elder Counties, Utah, 1961

Item	Unit	Most profit half	Least profit half	Average all enterprises
Receipts per acre	dollars	136.67	80.02	116.50
Costs per acre	dollars	104.24	125.92	111.75
Net return per acre	dollars	32.43	-45.90	4.75
Receipts per ton	dollars	85.18	80.02	83.32
Costs per ton	dollars	65.14	125.92	79.92
Net returns per ton	dollars	20.04	-45.90	3.40
Acres per enterprise	number	14.00	6.90	10.27
Yield per acre	ton	1.62	1.00	1.40
Market value of land per acre	dollars	447.22	451.97	448.90
Hours man labor per acre-preparation operations	hours	2.48	3.88	2.98
Hours man labor per acre-growing operations	hours	2.95	4.20	3.48
Hours man labor per acre-harvesting operations	hours	11.82	11.82	11.82
Hours man labor per acre-total	hours	17.25	19.98	18.28
Average price per ton	dollars	76.78	73.86	76.05
Number of farms	number	20.00	22.00	42.00

CHANGES IN CANNING PEA PRODUCTION

Studies similar to that reported above were conducted in Cache and Box Elder Counties in 1946 and 1951. While the studies are thought to be representative of the area in each year, not all are from the same farmers or farms. Comparative Figures from the three studies are compared in the discussion and four summary tables which follow.

Change in inputs

Some of the physical inputs of canning pea production changed greatly between 1946 and 1951. Most notable was an increase of 157 percent in the use of commercial fertilizer (table 6). By 1961 use of commercial fertilizer was 4.13 times as great as in 1946. Barnyard fertilizers increased 35 percent between 1946 and 1951, but had decreased by 1961 to only half the 1946 level.

Use of fixed capital increased between 1946 and 1961, because of rising land values and machinery prices. It also reflects larger amounts of labor saving capital.

Use of tractor power increased markedly between 1946 and 1951 as a result of replacing horses but decreased significantly by 1961 as a result of increased efficiency in the machine itself plus increased efficiency in its use. Use of truck power followed about the same pattern as the tractor power and for similar reasons. Horses,

Table 6. Comparison of selected input items per acre of canning pea production for 1946, 1951, and 1961, Cache & Box Elder Counties, Utah

Item	Unit	1946	1951	1961	1961 as % of 1946
Manure	tons	4.0	5.4	1.99	50
Commercial fertilizer	lbs.	34.0	87.4	140.40	413
Seed	bu.	4.0	4.4	4.80	120
Operating capital	dol.	20.0	20.0	20.00	100
Fixed capital	dol.	266.0	420.0	437.00	164
Man hours					
Operator & family	hrs.	22.0	21.8	8.60	39
Hired	hrs.	4.0	2.8	9.70	242
Total	hrs.	26.0	24.6	18.30	70
Man hours					
Tractor hours	hrs.	8.5	12.3	5.40	64
Truck hours	hrs.	2.5	3.1	2.90	116
Horse hours	hrs.	19.0	3.3	-	-

which provided about 60 percent of the power requirements in 1946 and about 15 percent in 1951, had disappeared altogether by 1961. In 1946 some plowing and other land preparation operations were performed with horses, but they were used predominately for cutting and hauling vines to the viner shed. In 1951 horses were used to some extent in various land preparations. Hauling manure, harrowing, leveling, and drilling were the operations using horse power most often in 1951. Vines were hauled almost exclusively with trucks and tractor-pulled wagons by 1951.

By 1961 total man labor per acre had decreased to 70 percent of the 1946 level. There was a marked decrease in the amount of total labor supplied by the operator and his family and a great increase in the amount of hired labor. Two noticeable influences were at work in that change. More farm operators had employment off the farm and so hired the work done. Several operators who reported family labor in 1946 and 1951 reported hired labor in 1961. This was the result of the family having grown up and left home.

A more detailed comparison of the labor input among the three studies by operation showed the biggest decrease came in the preparation operations (table 7). This was a result of use of less manure and reduction in number of operations. Some decrease was the result of speeding up of single operations.

Table 7. Comparison of man labor inputs per acre by major division in canning pea production 1946, 1951 and 1961, Cache & Box Elder Counties, Utah

Item	1946	1951	1961	1961 as % of 1946
	hours	hours	hours	percent
Preparation	8.1	6.8	3.0	37
Planting & growing	5.5	4.9	3.5	64
Harvesting	12.3	12.9	11.8	96
Total	25.9	24.6	18.3	71

Table 8. Comparison of costs per acre in canning pea production for 1946, 1951, and 1961, Cache & Box Elder Counties, Utah

Item	Cost per acre			1961 as
	1946	1951	1961	% of 1946
	dollars	dollars	dollars	percent
Materials:				
Manure	4	8	2	
Commercial fertilizer	1	3	6	
Seed	23	27	24	
Miscellaneous	<u>2</u>	<u>1</u>	<u>1</u>	
Total	30	39	33	<u>110</u>
Overhead:				
Interest on operating money	1	1	1	
Interest on capital investment	13	21	22	
Land taxes	3	3	5	
Water & drain	2	2	1	
Miscellaneous	<u>3</u>	<u>3</u>	<u>4</u>	
Total	22	30	33	<u>150</u>
Labor:				
Operator & family	18	22	11	
Hired	<u>3</u>	<u>3</u>	<u>13</u>	
Total	21	25	24	<u>114</u>
Power:				
Tractor	10	17	16	
Truck	3	4	6	
Horses	<u>3</u>	<u>2</u>	<u>-</u>	
Total	16	23	22	<u>138</u>
Grand total	89	117	112	<u>126</u>

CHANGES IN COST OF PRODUCTION

Costs change as a result of changes in the amount or kind of inputs, or changes in the price level, or in all three. Production costs increased \$28 per acre between 1946 and 1951 (table 8). The larger part of this change was the result of increased prices although there was some increase in the level of fertilizer application and some shifting from horse to tractor power.

Although 1961 costs were \$23 per acre higher than in 1946 they had decreased from the 1951 level. Compared to 1951 the costs in 1961 had decreased \$6.00 per acre for material, \$1.00 for labor, and \$1.00 for power. While the cost per unit of labor and power has been increasing the amount used has been decreasing at about the same rate.

CHANGES IN RECEIPTS & NET RETURN

Receipts decreased \$20.00 per acre or 15 percent between 1946 and 1961. Of this \$15.00 was due to lower yields in 1961 and \$5.00 was due to lower prices. The average grade was almost identical. In the same period of time costs per acre increased \$26.00, thus reducing net return \$46.00 per acre to where growers in 1961 had a net return of only \$4.00. Since all costs have been allowed before arriving at net return, the operators' capital and labor have been compensated at going rates and a net return of \$4.00 per acre could be considered a management return. Had the same yields occurred in 1961 as 1946 the net return would have been about \$19.00 per acre or about 38 percent of that in 1946.

In each of the studies attempts were made to determine what practices were most generally associated with success in production. All studies suggested the same answers. Larger enterprises, efficient use of labor, high yields, and peas grading from no. 7 to 8 were most profitable.

Table 9. Comparison of net return per acre from canning pea production, 1946, 1951, and 1961, Cache & Box Elder Counties, Utah

Item	1946	1951	1961	1961 as % of 1946
	dollars	dollars	dollars	percent
Receipts from peas	126	164	106	84
Value of vines	10	11	10	100
Total receipts	136	175	116	85
Total cost	86	117	112	130
Net return	50	58	4	8

CONCLUSIONS

Over the past 15 years, the profitableness of canning pea production has declined, but since our studies show that profits from other enterprises have declined also, it still remains a reasonably rewarding alternative as a cash crop. More efficient use of labor and adoption of labor saving equipment and techniques have resulted in savings in cost of production that have nearly offset the general rise in costs that have occurred in the past 15 years.

Since 1945 acreage of canning peas has declined about 50 percent and commercial production has been discontinued entirely in some areas. In the past, farmers grew peas to give them a greater opportunity to market more labor than could be done with hay and grain, to provide a cash crop, and to provide a nurse crop for alfalfa. Changes in farming have made all these reasons less desirable. Labor per acre has been greatly reduced. Many farmers have more time and opportunities to work away from the farm which to some extent substitute for the cash crop. Noticeably fewer farmers were using peas as a nurse crop in 1961 than in 1951 or 1946. That, however, could have been a temporary condition since the prospects of a late water supply in 1961 were not good and new alfalfa seedings were delayed.

Whether the decline in canning pea acreage will stop or continue will depend upon the producers' attitudes and the profitableness of the crop in comparison to other crops. Many of the disagreeable practices that farmers objected to have been eliminated. There is less waiting at the viner, less night work, and the heavy harvesting work has been lightened. The weather risk still remains which was a reason given by many growers for disliking pea production.

There was less net return per acre in 1961 than in 1951 or 1946, but the "price-cost squeeze" has reduced net return per unit of production for most other farm enterprises. While the contract price for peas has been relatively stable, yields have fluctuated widely. If yields were standardized or held constant at 1946 levels of 1.6 tons of shelled peas per acre and the input adjusted appropriately for that level of yield, net return in 1946 was \$50.00 per acre, \$38.00 in 1951, and \$20.00 in 1961.

Analyses made of records in each of the three studies have all shown that cost per acre and per ton of shelled peas can be reduced by increasing the size of the enterprise, finding ways to increase yields per acre, harvesting peas to grade approximately no. 7 or 8, and working efficiently in all production activities.

