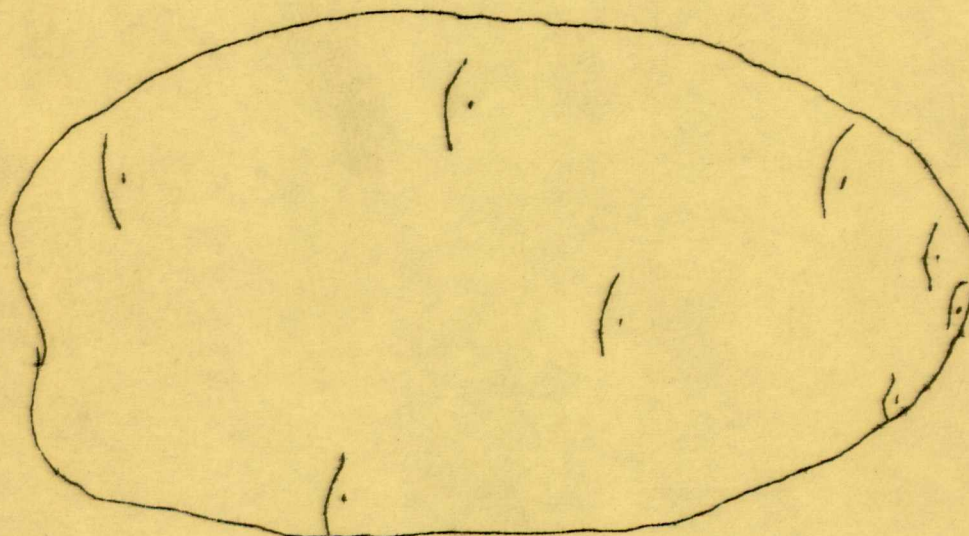

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POTATO FARMS IN ALASKA

1952



ALASKA AGRICULTURAL EXPERIMENT STATION

Don L. Irwin, Director

In cooperation with the

UNITED STATES DEPARTMENT OF AGRICULTURE

SUMMARY

Nearly 150 rural families produced potatoes in the Railbelt area of Alaska during 1952. Only a small proportion of these families were specialized potato farmers. Since potato production is readily adaptable to part-time farming, many of these families grew potatoes on a part-time basis or as a minor enterprise. Twenty-four of the 83 farmers interviewed in the Matanuska Valley specialized in potato production with an average of 11 acres per farm. Thirteen of the 18 farmers in the Tanana Valley grew potatoes as a major enterprise averaging 16 acres per farm. Virtually all of the potatoes on the Kenai Peninsula were grown as a minor enterprise or as a part-time venture. As a source of farm income to Alaskan farmers, potatoes ranked second only to dairy.

A major portion of the money spent by potato farmers in both the Matanuska and Tanana Valleys was for improving service buildings and increasing equipment inventories in 1952.

The net returns on 24 Matanuska Valley potato farms ranged from a loss of \$5,489 to a net gain of \$8,958 and averaged \$3,446. Three farmers lost money in their farm operations. Yield was the major factor influencing income from potatoes in 1952. Farmers with the higher net return obtained 6.8 tons of U. S. No. 1's per acre as compared with 4.4 tons obtained by farmers realizing less from farming. Both groups had approximately the same acreage of potatoes. Farmers with the higher incomes grossed more and spent less in their business venture than did farmers with lower incomes. Savings were incurred on hired labor, feed, seed, machinery repairs, fuel and oil, and fertilizer.

Farmers with the greatest acreage of potatoes netted only \$300 more than those with fewer acres. The former averaged 14 acres of potatoes per farm and the latter 8 acres per farm. Labor costs for farmers with greater acreages were 3 times greater than those for farmers with the lesser acreage. The difference was \$1,171.

The potato yield per acre on 48 Matanuska Valley farms ranged from 0 to 8.7 tons of U. S. No. 1's and averaged 5.6 tons. Twenty-eight of these farmers reported above average yields. Local variations occurred among general areas as to both yield and management practices. Average yield was higher in 1 of the 3 general areas and another area used more fertilizer and seed than the third. However, the rates of fertilizer and seed used per acre have been increasing in all areas in recent years.

A frost in August severely cut average yield in the Tanana Valley. Some fields were a total loss. In spite of the frost, average net returns on 10 potato farms were \$4,019 which was about \$600 more than Matanuska Valley potato growers realized.

Potato farmers on the Kenai Peninsula were severely handicapped by lack of equipment. Many planted and harvested by hand. Potatoes were a common cash crop; 12 of the 19 farmers interviewed produced small acreages.

POTATO FARMS IN ALASKA

Richard A. Andrews 1/

Agricultural Economist

Income from potato sales is very important to the welfare of Alaskan farmers. In terms of dollar values, only dairy products exceeded them in 1952. In terms of number of farmers engaged, nearly 150 producers in the Railbelt area raised potatoes with a surplus for sale. Because most of the work involved occurs in the spring and fall, potato production is well adapted to part-time farming. Farmers, by grading most of their own potatoes, can extend their farm work into the winter months. However, major labor requirements occur during planting and harvesting. Chemical weed killers eliminate much of the summer work.

Every farmer or homesteader with a few cleared acres is a potential potato grower. Increased competition probably will centralize production on the better soils readily accessible to markets.

This report is part of a continuing study undertaken to find which farm practices influence income on Alaska farms and to provide statistical information for a base in solving many other economic problems. Twenty-four potato farmers were interviewed in the Matanuska Valley. In the Tanana Valley 13 potato farmers were interviewed but 3 records were of limited use. Growers from Naptowne to Homer on the Kenai Peninsula also were visited. The number of records is small for detailed analysis. Comparisons are made between areas, except in the Matanuska Valley where certain comparisons are possible between the 12 farms having the largest acreage and the 12 having the lowest acreage and between the 12 farms returning the highest farm income and the 12 returning the lowest.

Potato Farms in the Matanuska Valley

More farmers produced more potatoes in the Matanuska Valley than in any other area. A common practice in the past has been to use potato production as a stepping stone to dairy farming. In some areas, potato farmers also were dairy farming, the combination being a profitable

1/ The author expresses sincere appreciation to the farmers in the Matanuska Valley, the Tanana Valley and the Kenai Peninsula who gave their time and resources to make this study possible. Also, sincere appreciation is expressed to the Matanuska Valley Farmers Cooperating Association who contributed factual information on Alaskan production and to all members of the Agricultural Economic Department for their invaluable suggestions.

utilization of farm resources on their particular farms. In 1952, a majority of the potato farmers had specialized in potatoes with no intention of entering dairying. Several were developing poultry enterprises as a minor source of income and as an outlet for grain produced in the crop rotation.

Land Use

The average Matanuska Valley potato farm contained 175 acres of which 42 were cropland, 6 were native and woods pasture, 107 were woods not pastured and 20 were in the building site, farm roads and wasteland (table 1). This average acreage was increased because several farmers were carrying on or planning to carry on livestock enterprises.

Potatoes were planted on 25 percent of the cropland, vegetables on 5 percent, small grain on 14 percent, hay and silage on 24 percent, green manure on 1 percent, seeded pasture on 21 percent and 10 percent was left idle or fallow. Most of the idle or fallow land was newly cleared and was reported on 10 farms.

Half of the potato growers cleared from 2 to 17 acres in 1952, averaging 8 acres per farm. Sixteen rented land in addition to what they owned and 9 rented land out. Several of the farmers rented entire homesteads of which only a few acres were cropland. Two of the 24 leased their farms, 1 with option to buy.

Minor Enterprises

Minor enterprises can play an important part in the farm organization on potato farms. Grain and roughage, raised in rotation with potatoes, can be put to good use in feeding poultry, milk cows or beef animals. Livestock on the farm cause everyday chores and during peak demands for family labor these may become burdensome if the enterprise is very large. Vegetable production can be complimentary to potatoes because it involves nearly the same machinery. By varying planting and harvesting dates labor requirements can be adjusted so that some conflicts can be avoided.

Nineteen of the 24 potato farmers carried on a minor enterprise of some kind ranging from a small poultry flock or a single beef animal to a considerable acreage of vegetables. The other 5 had non-farm sources of income. Sales from these minor enterprises brought in over 18 percent of the cash returns as well as providing food for home consumption. As a source of income, vegetables were the most important with 62 percent of the farmers growing from 0.5 to 21 acres; 33 percent of the farms had over 1 acre. Poultry was next in importance with over half of the 24 potato growers reporting flocks. However, only 5, or 21 percent, had over 100 laying birds at the end of the year. Forty-two percent reported beef animals or milk cows. At the end of the year hogs were reported on only 12 percent of the farms.

Table 1. Average acreage per potato farm and in specified crops and proportion of cropland in specific crops, Matanuska Valley, 1947 ^{1/}, 1949 ^{1/}, 1950 ^{1/}, 1951 and 1952.

Item	Average acreage per farm					Percent total cropland				
	1947	1949	1950	1951	1952	1947	1949	1950	1951	1952
Number of farms reporting	12	20	23	15	24	12	20	23	15	24
Land use										
Cropland										
Potatoes	12	10	6	7	11	21	28	19	16	25
Vegetables & fruit	1	1	1	^{2/}	2	2	3	3	^{4/}	5
Small grain	15	7	4	8	6	27	20	13	18	14
Hay ^{3/}	19	9	10	13	8	34	25	32	30	20
Silage	--	1	2	1	2	--	3	7	2	4
Green manure ^{3/}	--	--	1	1	1	--	--	3	2	1
Idle & fallow	5	4	3	4	4	10	12	10	9	10
Seeded pasture	3	3	4	10	8	5	9	13	23	21
Total cropland	55	35	31	44	42					
Other land	129	150	138	--	--					
Native & wood pasture	--	--	--	35	6					
Woods not pastured	--	--	--	89	107					
Other	--	--	--	10	20					
Total land in farms	184	185	169	178	175					

^{1/} Data for 1947 are from the report by Mimms, O. L., J. L. Paschal, and W. U. Fuhriman, Some Economic Aspects of Farming in Alaska, tables 6 and 8, pp. 31 and 34. Values given therein are rounded to the nearest whole number. Data for 1949 and 1950 from Moore, C. A., Farming in the Matanuska and Tanana Valleys of Alaska, table 1, page 8.

^{2/} One-half acre or less.

^{3/} In 1947 crops plowed under for green manure were included with hay.

^{4/} Less than 0.5 percent.

Income and Expenses

Nearly 80 percent of the cash receipts on these 24 potato farms was from potatoes (table 2). Vegetables were a much less important second enterprise, bringing \$743 compared to \$6,660 from potatoes. Eggs provided \$313, and sale of livestock including poultry, amounted to \$285.

Capital improvement expenses amounted to \$2,512 per farm in 1952. Average machinery, building and livestock inventories increased on these 24 farms. The high cost of hired labor at \$1.50 to \$2.25 per hour has greatly encouraged the substitution of machinery for labor. In spite of this trend, average labor expense at \$1,067 per farm was the largest non-inventory expense of potato farmers. Fertilizer expense amounting to \$800 and custom work at \$563 were relatively low when one considers the intensive use of cropland on these farms. All other major expense items ranged at less than \$500 per farm.

It should be noted that machinery repairs at \$468 accounted for more than 10 percent of the average investment in machinery at the end of the year. This figure is rather high in view of the fact that much of the equipment is relatively new and is used over small acreages. Repairs run high because many partially decayed roots, stumps and small rocks are picked up in working parts of the machines, and because some machines may have been operated out of proper adjustment, thus adding to the strain, wear and tear being placed upon them.

The average family used farm produce valued at \$780 during 1952. This, added to sales of farm produce, dividends, ACP payments and other farm receipts amounted to \$9,217 of farm income. Net returns from farming amounted to \$3,446 when adjusted for changes in inventories, depreciation and other expenses. Nineteen of the 24 families reported non-farm earnings of \$2,120 making a total family income for the year of about \$5,500. Although this income may seem low to many people, it is important to note that most of these families are relatively new to Alaska and to potato farming. Two out of 3 of these families had been on their farms for 6 years or less. Nearly all of them were just getting started and were not in position to utilize time and equipment to the best advantage. Actually, 1952 was the first or second year of potato farming for 6 families.

Although the average returns from farming amounted to \$3,446, 3 of the 24 families reported a net loss for the year ranging from \$5,489 to \$1,120. The remaining 21 reported net returns ranging from \$314 to \$8,958. There is no clear cut single reason for this spread. The solution involves weather, management, location, crop varieties and many other factors.

Table 2. Summary of expenses and income on 24 potato farms, Matanuska Valley, 1952.

Farm expenses	Amount	Farm income	Amount
	Dollars		Dollars
Cash		Cash-direct sales	
Machinery purchases	1,441	Potatoes	6,660
Building improvements	1,071	Vegetables	743
Labor	1,067	Eggs	313
Fertilizer	800	Livestock	285
Custom work	563	Grain & hay	154
Feed	488	Other farm sales	67
Seed	478	Total direct sales	8,222
Machinery repairs	468		
Fuel & oil	414	Non-direct sales	
Livestock & poultry purchases	224	Rents, ACP payments, Coop	
Interest	143	overage & dividends, etc.	215
Rent	141	Total farm cash received	8,437
Insurance	72		
Taxes	70	Non-cash returns	
Electricity	67	Increase in livestock	
Hauling charges	30	inventory	399
Auto & truck license	27	Increase in machinery	
Veterinary & breeding	18	inventory	942
Miscellaneous	412	Increase in building	
Total expense	7,994	inventory	882
		Gross returns	10,660
		Less farm expense	7,994
		Net returns	2,666
		Production for home	
		consumption	780
		Net returns from farming	3,446 1/2

1/ Average non-farm income on 19 farms reporting was \$2,120.

Analysis of High and Low Income Farms

When the 24 farms were separated into two equal groups on the basis of net returns from farming, there was a difference of \$4,394 between the averages of the two groups. The average net return for the high income group was over 4 times that of the low income group (table 3). Low income farmers raised 11 acres of potatoes compared to 10 acres for the high income group. The low income group spent more money for hired labor, fertilizer, feed and seed, machinery repairs and fuel and oil.

The answer to their situation seems to lie in farm organization. In the first place, 10 of these low income farmers were employed off the farm for a major portion of the year as compared to 8 in the high income group. The low income group spent more for machinery and buildings. This indicates that several were preparing for another type of farming. The fact that the low income group had 13 acres of seeded pasture compared to 5 acres in the other group indicates that a number of those in the first group were transitional toward livestock farming. Also average cropland on the low income farms was 47 acres compared to 36 acres on the others.

Sales per acre of the low income group were appreciably below those of the high income group. They raised an average of 5.4 tons of potatoes per acre of which 4.4 were U. S. No. 1's compared to 8.0 tons per acre of which 6.8 tons were No. 1's in the high income group. Not only were total yields lower, but the proportion of No. 1's was only 81 percent compared to 85 percent on the high income farms.

Seven had farm storage for their potatoes as did 7 of the high income group. One of the low income group was raising a potato variety which was not recommended for this area by the Experiment Station.

Farmers in both the higher and lower income groups carried nearly the same minor enterprises. More farmers in the high income group raised vegetables, whereas more farmers in the lower income group carried beef animals.

Size of Potato Enterprise Related To Income

The 24 records represented a range of from 5 to 19 acres of potatoes with an average of 11 acres. They were sorted into two equal groups with potato acreages ranging from 5 to 10 acres and from 11 to 19 acres.

The farmers growing the smaller acreage averaged 8 acres of potatoes as compared to 14 on the more intensive farms. They had smaller farms, 140 acres compared to 211 acres, but had more cropland in use, 48 acres compared to 35 acres (table 4). Less than 20 percent of their cropland was in potatoes and vegetables compared to 39 percent on the intensive

Table 3. Summary of expense and income on 24 potato farms by income, Matanuska Valley, 1952.

Farm expense	12 low income 12 high income	
	Dollars	Dollars
Cash		
Machinery purchases	1,612	1,268
Building improvements	1,456	687
Labor	1,207	928
Fertilizer	888	712
Custom work	580	545
Feed	496	479
Seed	521	437
Machinery repairs	479	457
Fuel & oil	433	396
Livestock & poultry purchases	105	342
Interest	152	134
Rent	136	146
Insurance	63	81
Taxes	85	55
Electricity	57	77
Hauling	37	24
Auto & truck licenses	29	24
Veterinary & breeding	12	23
Miscellaneous	390	434
Total Expense	8,738	7,249
Farm income		
Cash-direct sales		
Potatoes	5,333	7,987
Vegetables	518	968
Eggs	104	522
Livestock	401	169
Grain & hay	140	167
Other farm sales	90	44
Total direct sales	6,586	9,857
Non-direct sales		
Rents, ACP payments, coop overage & dividends and others	210	218
Total farm cash received	6,796	10,075
Non-cash returns		
Increase in livestock inventory	172	627
Increase in machinery inventory	1,033	849
Increase in building inventory	1,309	454
Gross returns	9,310	12,005
Less farm expenses	8,738	7,249
Net returns	572	4,756
Production for home consumption	675	885
Net returns from farming	1,247 ^{1/}	5,641 ^{2/}

^{1/} Average non-farm income on 11 farms reporting was \$2,760.

^{2/} Average non-farm income on 8 farms reporting was \$1,239.

potato farms. Conversely, 75 percent of their land was in grain and forage production as compared to 36 percent on the other farms. It was to be expected that this group would have more livestock, or plans for more livestock, than would the group of intensive potato farmers. The 12 farms with the smaller acreage had an average of 21 animal units per farm and 4 farms had over 20 units. In comparison, the 12 farms with the greater acreage had an average of 14 animal units per farm and only 3 had over 20 units.

Table 4. Average acreage per farm in specified crops and proportion of cropland in specified crops on 24 potato farms by potato acreage, Matanuska Valley, 1952.

Land use	8 acres average		14 acres average	
	Acres	Percent	Acres	Percent
Potatoes	8	16	14	39
Vegetables and fruit	2	3	3	8
Small grain	6	13	5	14
Hay	13	28	3	10
Silage	2	4	1	4
Green manure	<u>1/</u>	<u>1/</u>	1	3
Idle	3	6	5	14
Seeded pasture	14	30	3	8
Total cropland farmed	48	100	35	100
Native and woods pasture	10		2	
Woods not pastured	75		141	
Other	7		33	
Total land farmed	140		211	

1/ Less than 1/2 of 1 percent.

Three of the 12 farmers with lower acreages of potatoes definitely plan to develop dairy farms. Another 2 were just getting started and had farmed only 1 or 2 years. Six earned a larger income from non-farm employment than they netted from farming.

Those in the lower acreage group netted \$3,301 from their farm operations in 1952 while those in the higher acreage group netted \$3,591, less than \$300 difference (table 5). If both groups had obtained the same yield of U. S. No. 1's per acre the difference in income would have been greater. Those in the higher acreage group averaged 5.3 tons of U. S. No. 1's as compared with 5.9 tons obtained by those in the lower acreage group. One of the farmers in the high acreage group lost a large part of his crop to frost.

Among the various expense items, the greatest difference between the 2 groups occurred in labor. On the farms with the larger acreages, \$1,653 was spent on labor which was about 3 1/2 times the \$482 spent by the farmer having the smaller acreage. The latter, by having fewer acres, was able to use family labor more efficiently. Those with the larger acreage spent more for custom work including bulldozing and clearing land. Also, they used \$596 for home consumption which was \$369 less than that used by farmers with the smaller acreage. In addition, those with the lower acreage relied more on non-farm income.

Equipment and Buildings

Potato farmers had an average of \$8,669 invested in buildings and equipment on December 31, 1952, with \$4,147 in equipment and \$4,522 in buildings. Most of the equipment purchased in 1952 was of a labor saving nature such as bin loaders, vegetable washers and tiers, chain saws, and hydraulic scoops. By December 31, all but 1 potato grower had, at least, 1 wheel type tractor (this one had a garden tractor). Four track type tractors were reported on the 24 farms. Trucks were owned by 88 percent of the farmers, disk harrows by 79, spike or spring tooth harrows by 88 percent and cultivating equipment by 63 percent. Only 42 percent reported potato planters with 79 percent reporting diggers. Potato picker-uppers were reported by 25 percent.

On-the-farm storage is convenient at harvest and cuts hauling time during this critical season. Also, more family labor can be utilized in grading the potatoes if storage is owned. Root cellars were reported on 58 percent of the farms. Apparently, ownership of a root cellar was not a major item influencing income because of the 14 farmers having them, 7 were in each group. Unless a portion of the root cellar was used for machinery storage, there was a lack of machinery storage space on most farms. No special building for machinery storage was reported and only 3 garages were found on the 24 farms. Seven sheds were reported but they were not used for machinery storage. Fifteen farmers reported barns in which some storage might be available.

Fifty-eight percent of the farmers reported poultry houses and 25 percent reported greenhouses for use in minor enterprises.

Table 5. Summary of expenses and income on 24 potato farms, by acreage of potatoes, Matanuska Valley, 1952.

Farm expense	8 acre ave.	14 acre ave.
	Dollars	Dollars
Cash		
Machinery purchases	1,280	1,602
Building improvements	1,091	1,052
Labor	482	1,653
Fertilizer	504	1,096
Custom work	359	766
Feed	338	638
Seed	413	545
Machinery repairs	480	455
Fuel & oil	362	467
Livestock & poultry purchases	60	387
Interest	172	113
Rent	116	166
Insurance	66	78
Taxes	88	52
Electricity	58	76
Hauling	4	56
Auto & truck licenses	24	29
Veterinary & breeding	20	15
Miscellaneous	256	569
Total cash expense	<u>6,173</u>	<u>9,815</u>
Farm income		
Cash-direct sales		
Potatoes	5,111	8,209
Vegetables	711	775
Eggs	133	493
Livestock	323	247
Other farm sales	243	198
Total direct sales	<u>6,521</u>	<u>9,922</u>
Non-direct sales		
Coop coverage & dividends, ACP payments, rents & others	165	266
Total farm cash received	<u>6,686</u>	<u>10,188</u>
Non-cash returns		
Increase in livestock inventory	245	554
Increase in equipment & machinery inventory	803	1,080
Increase in building inventory	775	988
Gross returns	<u>8,509</u>	<u>12,810</u>
Less farm expense	<u>6,173</u>	<u>9,815</u>
Net returns	<u>2,336</u>	<u>2,995</u>
Products for home consumption	<u>965</u>	<u>596</u>
Net returns from farming	3,301 <u>1/</u>	3,591 <u>2/</u>

1/ Average non-farm income on 8 farms reporting was \$3,149.

2/ Average non-farm income on 11 farms reporting was \$1,370.

Labor Utilization

To view labor utilization on the potato farms and to give consideration to the various livestock and vegetable enterprises, productive man work units were used. ^{2/} Stateside conversion factors common to northern states were used and the various weights for all practical purposes are adequate as a base for simple comparison. The average number of productive man work units per farm was 177.3 units of which 31.3 were utilized in livestock and 146 units in various crops. Only 84.2 units were in potato production. Non-farm work was not included. The range was from 52 units to 405 per farm. No appreciable difference occurred between the average productive man work units per farm in the group of 12 farmers with the lower net returns and the group of 12 farmers with high net returns, 173.5 and 181.2 respectively. However, among the former group, 5 had 125 or less productive man work units as compared with only 2 in the latter group.

Potato Production

The leading variety of potatoes planted in 1952 was the Arctic Seedling with 30 of 35 producers growing this variety. Other varieties reported included White Bliss, Kennebec, Green Mountain, Teton and Columbia Russets. The Knik variety was raised only for seed. The quantity of seed used per acre ranged from 700 to 1,200 pounds averaging 916 pounds per acre. Thirteen used 1,000 or more pounds per acre. From 300 to 1,600 pounds of fertilizer were used per acre with an average of 774 pounds.

The use of both seed and fertilizer has increased since 1949. The following lists the average rates of seed and fertilizer used:

	Average seeding rate	Average fertilizing rate
1949 ^{3/}	766	517
1950 ^{3/}	752	630
1951	831	699
1952	916	774

One farmer began plowing potato land on April 25, however, most plowing was done between May 1 and May 30 (table 6). The customary time of planting was between May 10 and May 30 with some fields planted as early as April 30 and some as late as June 15. Harrowing began on

^{2/} A productive man work unit represents one 10 hour work day.

^{3/} Moore, C. A. Op. cit., page 29, table 14.

May 30 and cultivation lasted until August 15 when the last man hilled his potatoes. An early harvest was made on August 20 but most of the potatoes were dug between September 15 and September 30.

Over half of the 96.8 hours of labor used to raise, harvest and grade an acre of potatoes in 1952 was utilized in harvesting. A little less than a quarter of the labor used was for cultural practices of preparing the seed, planting, fertilizing and tending the crops. More than a fifth of the labor was used in grading and a very small proportion was used in preparing the soil. Tractors were used for an average of 13.6 hours per acre; over half of this was for cultural practices of planting, harrowing, cultivating and hilling. Only 2.7 hours per acre of tractor time were used in preparing the land and 4.0 hours in harvesting the potatoes.

The average cost of raising, harvesting and grading an acre of potatoes was \$413.99 of which \$361.22 was variable cost and \$52.77 was overhead (table 7). Buildings and equipment are used in practically all farm enterprises. Only the cost attributable to potatoes was charged against the potato enterprise. Seed is usually saved from the previous crop and is not always a cash outlay. By subtracting the seed cost from the cash variable costs totaling \$250.84 there remains \$196.34 which many farmers consider the cost of producing an acre of potatoes, but the other costs listed in table 7 are real and, if not covered, will be felt in worn-out buildings and equipment although it may take a few years for full realization.

The cost of producing potatoes has been increasing over the past 3 years. It has risen from \$389.21 per acre in 1950 4/, to \$403.40 in 1951 to \$413.99 in 1952. Much of the increased cost lies in the increase per unit cost of fertilizer and labor. Increases of \$1.10 per 100 pounds of fertilizer and \$0.25 per hour of labor totaled \$33.25 in the cost of producing an acre of potatoes in 1952. The difference between 1952 and 1950 was \$24.15 which is less than increases in cost of labor and fertilizer. This indicates that some costs have been cut since 1950. Production is more efficient than it was only 2 years ago.

To complete the picture of cost and returns per acre of potatoes, table 8 was compiled. The potato farmer received, on the average, \$115 per ton of U. S. No. 1 potatoes and \$20 per ton was assumed to be the price received for grade outs. With an average yield of 6.7 tons of potatoes, gross returns were \$666 per acre in 1952 less \$414 expenses leaving an average profit of \$252 per acre or \$38 per harvested ton.

4/ Moore, C. A. Op.cit., page 19, table 14.

Table 6. Labor and tractor hours required to produce and harvest an acre of potatoes, by operation, Matanuska Valley, 1952.

Operation	Time of performance			Times over	Size of crew	Man hours		Tractor hours	
	Earliest	Usual	Latest			Time to perform operation	Ave. all fields	Time to perform operation	Ave. all fields
Land preparation									
Flowing	4/25	5/1 to 5/30	6/15	1	1	1.3	1.2	1.3	1.2
Disking				1-3	1	1.2	0.9	1.2	0.9
Harrowing				1-3	1	0.7	0.6	0.7	0.6
Other						9.8	0.8	0.3	1/
Total land preparation						13.0	3.5	3.5	2.7
Culture									
Cutting & treating seed				1	1-6	7.9	7.7	—	—
Planting & fertilizing	4/30	5/10 to 5/30	6/15	1	1-4	5.1	5.1	2.4	2.4
Harrowing	5/30	6/5 to 6/25	7/1	1-3	1	1.0	0.6	1.0	0.6
Cultivating & hilling	5/1	6/15 to 7/20	8/15	1-5	1-2	3.9	3.9	3.7	3.7
Weeding & hoeing				1-3	1-5	7.0	5.3	—	—
Other						1.8	0.2	1.8	0.2
Total culture						26.7	22.8	8.9	6.9
Harvest									
Beating down vines				1	1	1.0	0.2	1.0	0.2
Digging	8/20	9/15 to 9/30	10/10	1	1	3.8	3.8	3.8	3.8
Picking up & sacking				1	4-12	37.0	37.0	—	—
Hauling				1	1-5	8.2	8.2	2/	2/
Total harvest						50.0	49.2	4.8	4.0
Grading				1	2-8	21.3	21.3		
Total time per acre required to grow potatoes						111.0	96.8	17.2	13.6

1/ Less than .05 of an hour.

2/ Truck hours 3.6 hours hauling.

Table 7. Fertilizer, seed, labor and power input and average total cost of producing an acre of potatoes, Matanuska Valley, 1952.

Expense items	Quantity per acre	Unit cost	Average cost per acre
	Pounds	Dollars	Dollars
Variable costs			
Cash items			
Fertilizer	774.0	.0636	49.22
Seed ^{1/}	916.0	.0595	54.50
Seed dip	.6	2.25	1.35
Sacks ^{2/}	Number		
Harvest	67.0	.15	10.15
Market	112.0	.30	33.60
Labor	Hours		
Picking up and sacking	37.0	1.75	64.75
Grading	21.3	1.75	<u>37.27</u>
Total cash costs			250.84
Non-cash items			
Labor	38.5	1.75	67.38
Power			
Tractor	13.6	2.50	34.00
Truck	3.6	2.50	<u>9.00</u>
Total non-cash costs			<u>110.38</u>
Total variable costs			361.22
Overhead cost			<u>52.77</u> ^{3/}
Total cost per acre of producing potatoes			413.99

^{1/} Although most farmers use homegrown potato seed, it is usually considered a cash item.

^{2/} Harvest sacks last about 2 years and number is based on average yield. Market sacks are based on average yield of U. S. No. 1's.

^{3/} Breakdown of overhead cost includes \$16.69 for buildings, \$26.08 for machinery and \$10 for land.

Table 8. Gross returns, costs and net returns per acre of potatoes, Matanuska Valley, 1952.

Item	Unit	Returns and costs	
		Tons	Dollars
Gross returns per acre			
U. S. No. 1's @ \$15 per ton <u>1/</u>	5.6		644
Culls graded out @ \$20 per ton <u>2/</u>	<u>1.1</u>		<u>22</u>
Total	6.7		666
Cost of raising and harvesting			<u>414</u>
Profit per acre			252
Profit per ton (total yield)			38

1/ Average price of U. S. No. 1 potatoes after storage cost on farms reporting.

2/ Assumed average price of graded out potatoes to cover sales of U. S. No. 2 potatoes for cattle feed and for discarded potatoes.

Potato Yields

Average yield was the chief factor affecting income on potato farms in 1952, and was influenced greatly by many conditions. Weather, local climates, soil conditions, seed variety, and management practices all have great effects on yields. One farmer had virtually a crop failure due to being located in a frost pocket and being struck by an early frost in August. How many other farmers were affected similarly for a part of their crop was not determined. Another farmer reported below average yields because his potatoes were planted on first year cleared ground while another maintained that his best crops were from new ground planted the year after clearing. Lack of organic material in the soil cannot be offset by use of increasing amounts of chemical fertilizer. Thin top soil over gravelly subsoil usually results in low yields except during wet years. Diseased seed or the use of varieties not well adapted to Alaska usually result in lower yields.

Variations can be noted in production practices used between areas. Potato farmers in the Wasilla area used 834 pounds of fertilizer per acre as compared with 571 north of Palmer. Also, slightly more seed was used per acre by farmers in the former area than by farmers on the latter soil types. Weeds were a major problem on several farms but this situation is being eased through use of chemical weed killers. Five out of 32 farmers reported using weed killers in 1952.

Table 9 depicts the average yields on potato farms. The range in U. S. No. 1's was from 0 to 8.7 tons averaging 5.6 tons per acre. Of the 48 farmers reporting, 26 obtained above average yields. Most of those experiencing an average yield of less than 4 tons per acre reported one or more of the difficulties mentioned above. The number of acres planted had little effect on average yield in 1952 because both larger and smaller growers experienced high and low yields.

Table 9. Number of farms reporting potato yields by yield per acre, Matanuska Valley, 1952.

Yield per acre	U. S. No. 1	Total Production
<u>Tons</u>	Number	Number
Less than 4.0	11	4
4.0 - 4.9	6	7
5.0 - 5.9	6	4
6.0 - 6.9	10	8
7.0 - 7.9	11	7
8.0 and over	<u>4</u>	<u>18</u>
Total farms	48	48

The problem of localized climatic conditions can be seen by the difference in average yields on the two areas, (1) the benches north of Palmer and (2) the Valley floor south of Palmer and in the Butte area. The average yield of U. S. No. 1's north of Palmer was 6.4 tons per acre as compared with 3.1 tons south of Palmer. This low yield was due to several growers experiencing almost crop failure due to frost. Not one of

the farmers interviewed in the sections South of Palmer and in the Butte area obtained over 5.4 tons per acre. However, several growers south of town were located on localized benches or in areas with better air drainage. As a result they experienced higher yields. The difference in average yield between north of Palmer and the Wasilla area was not appreciable with yields of 7.3 tons of which 6.4 were U. S. No. 1's and 7.3 tons of which 6.0 were U. S. No. 1's respectively. Weather conditions were reported in all areas in the Valley as lowering yields.

Potato Farming in the Tanana Valley

Potatoes were the main source of farm income on most farms in the Tanana Valley in 1952. A frost in the latter part of August caused drastic losses on some farms. Almost 100 percent loss was experienced in some fields, but other fields were relatively untouched by the frost.

Land Use and Minor Enterprises

The average cropland on the 13 farms was 44 acres of the 181 acre average holdings (table 10). Aside from land fallow and idle or in green manure, over half of the cropland (16 of the 29 acres) was planted to potatoes in 1952. This followed the findings in 1949 and 1950. Green manure crops play an important part in the cropping system as demonstrated by use of 2 acres in 1949, 5 in 1950 and 9 in 1952 for this purpose. Vegetables were the most important minor enterprise on potato farms. Five of the 13 farmers raised 2 or more acres of vegetables and 2 more produced 3/4 of an acre. The acreage of feed crops (grain, hay and seeded pasture) increased from 6 acres in 1949 and 3 in 1950 to 11 in 1952. Only 4 farmers had roughage consuming animals of which 1 had horses, 1 a goat, 1 had sheep and goats and 1 had young dairy stock, goats and hogs. These enterprises were of minor importance but represent attempts at establishing livestock enterprises. Only 2 farmers reported poultry. One was a small laying flock that was liquidated during the year the the other was a fryer enterprise.

Potato Production

Teton was the leading variety of potato produced by the farmers interviewed; 6 of 13 farmers produced it solely. The remaining 7 produced single and combinations of varieties including Teton, White Bliss, Arctic Seedling and others. Seed used per acre ranged from 500 to 1,000 pounds and averaged 753 pounds. Rates of fertilizer used per acre ranged from 400 to 1,000 pounds. Of 8 farmers reporting, 2 used 1,000 pounds, 3 used 700 and 3 used 550 or less. They averaged 702 pounds per acre. Six of the 8 reporting treated their seed with some type of dip.

Table 10. Average acres per potato farm and in specified crops, Tanana Valley, 1949, 1950 1/, and 1952.

Item	1949	1950	1952
Number of farms reporting	10	9	13
Land use	Acres per farm		
Cropland			
Potatoes	13	10	16
Vegetables & fruit	1	2	2
Grain	--	2	4
Hay	3	1	3
Green manure	2	5	9
Fallow & idle	12	9	6
Seeded pasture	<u>3</u>	<u>--</u>	<u>4</u>
Total	34	29	44
Other land	134	207	--
Native and wood pasture	--	--	1
Woods not pastured	--	--	119
Other	<u>--</u>	<u>--</u>	<u>17</u>
Total land	168	236	181

1/ Moore, C. A. Op. cit., page 17, table 7.

One of the 8 farmers plowed for potatoes as early as May 3 and the latest plowed on June 10, but most of the spring plowing was done between May 10 and May 30. Two farmers fall-plowed all or part of their potato ground. The earliest planting was May 13, the latest June 15 with most planting done between May 13 and May 31. Six farmers harrowed for weeds after planting. Cultivation began around June 15 and lasted as late as August 15 for the last hilling. Five of the 8 hand-hoed and weeded. Most of the potatoes were dug between September 1 and September 15; however, one began as early as August 27.

Income and Expenses

The Tanana Valley potato farmers increased their machinery and service buildings inventories an average of \$3,614 in 1952. New

construction and improvement of root cellars were the major improvements added. Aside from these building improvements and equipment purchases, the use of which continues over a period of years, labor was the largest expense amounting to an average of \$1,890 per farm (table 11). In view of the high cost of labor, the substitution of machinery for labor explains part of the expenditure of \$1,846 for machinery. The other expense item of more than \$1,000 was fertilizer costing \$1,105. The next item, fuel and oil, amounted to only \$510 per farm. Cash expenses averaged \$10,566 of which 3/4 was for building improvements, machinery purchases, labor and fertilizer.

Over 75 percent of the \$10,468 cash farm income came from sale of potatoes and 12 percent was from vegetable sales. These were the 2 most important sources of farm income. The net returns from farming, including \$378 worth of products used in the home was \$4,019, about \$600 more than Matanuska Valley potato growers realized in the same year.

Potato Farming on the Kenai Peninsula

The potato enterprise usually is a part-time venture or of minor importance in the farm organization on most Kenai Peninsula farms. Acreages were very small. Of the 12 growers, only 4 had an acre or more planted in 1952. Only 1 of the 19 farmers interviewed had a digger and no one had a planter. However, another digger and one planter were owned by rural families not presently in production. Many of the farmers had to plant and dig potatoes by hand. In addition, winter storage space was very limited. These limitations are unfavorable to large scale, specialized production. With the shortage of markets and lack of marketing facilities, it is little wonder that the 12 acres of potatoes were spread among 12 of the 19 rural families interviewed.

Land use information was obtained from 16 of the 19 rural families. A total of 312 acres of cropland was found in all 16 tracts. Of this, less than 4 percent was planted to potatoes in 1952.

The average yield was 6.3 tons. However, higher yields can be obtained as shown by one farmer producing 10 tons of U. S. No. 1's per acre in 1951.

Table 11. Summary of expenses and income on 10 potato farms, Tanana Valley, 1952.

Farm expense	Amount	Farm income	Amount
	Dollars		Dollars
Cash		Cash-direct sales	
Building improvement	2,918	Potatoes	7,888
Labor	1,890	Vegetables	1,254
Machinery purchases	1,846	Other sales	285
Fertilizer	1,105	Total direct sales	<u>9,427</u>
Fuel & oil	510	Non-direct sales	
Machinery repairs	479	A.C.P. payments	198
Custom work	427	Machine rent	15
Seed	234	Other	828
Feed	212	Total farm cash received	<u>10,468</u>
Taxes	133	Non-cash	
Interest	106	Increase in livestock	
Livestock purchases	70	inventory	125
Electricity	54	Increase in machinery	
Hauling charges	51	inventory	1,032
Insurance	47	Increase in building	
Rent	27	inventory	2,582
Auto & truck license	25	Gross returns	<u>14,207</u>
Veterinary & breeding	4	Less farm expenses	<u>10,566</u>
Miscellaneous	<u>428</u>	Net returns	<u>3,641</u>
Total expense	<u>10,566</u>	Products for home	
		consumption	378
		Net returns from farming	<u>4,019</u> ^{1/}

^{1/} Average non-farm income was \$2,082.