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COSTS & RETURNS IN PRODUCING POTATOES

NORTHERN STEUBEN AREA

NEW YORK, 1946

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Trends

Potato production in New York has changed materially in recent years. Methods have improved, production has become more concentrated both by areas and on farms within areas. Total acreage has declined, but average yields have increased. The trend is toward production on fewer farms, on soils better adapted to potatoes, and with larger acreages per farm.

Production Areas

Within the relatively intensive areas of production, a large proportion of the total number of acres is produced on a small number of large potato farms. Since average yields are generally higher on farms having a large potato acreage, the proportion of total production coming from these large farms is even greater.

In 1946, there were 6,260 potato growers in New York with three or more acres of potatoes per farm. The total acreage for these growers was 144,018 acres. Of the total number of growers, 3,125, or 50 per cent had from three to seven acres per farm. This relatively large number of small growers produced only ten per cent of the total acreage. On the other hand, only 319 growers had 100 acres or more, but had more than one-third of the total acres.

Suffolk and Nassau counties on Long Island had only 18 per cent of the total number of potato growers in the State in 1946. However, this relatively small number of growers had 53 per cent of the total potato acreage for the State. Three per cent of the growers in the area had between three and seven acres of potatoes per farm. One-fifth of the farms, having 100 acres or more, had almost one-half of the total acreage for the area. These large growers, 224 in number, had approximately one-fourth of the total potato acreage in New York State.

The Northern Steuben Area, comprising seven townships in Steuben County and one township in Livingston County, is the most intensive area of potato production in Upstate New York. This area was selected for detailed study. In 1946, there were 708 growers in the area with three or more acres of potatoes. The total acreage for these growers was 18,954 acres. Eleven per cent of the total number of growers and 13 per cent of the total acreage of potatoes in the State were located in this area.

Even within this relatively small but intensive area, potato production was concentrated on a relatively small number of large potato farms. Twenty-nine per cent of the growers had between three and seven acres per farm. This relatively large number of small growers had only five per cent of the total acreage in the area. Only six per cent of the growers had 100 acres or more per farm, but this relatively small number had more than one-third of the total acreage for the area.

Area and Farms Studied

During the summer of 1947, detailed records of costs, returns, and practices followed in potato production were obtained from 205 growers in the Northern Steuben Area for the 1946 crop year. The sample comprised 29 per cent of the total number of growers with three or more acres, and 33 per cent of the total potato acreage in the area.

Crops

The per cent of cropland devoted to potatoes increased consistently with the size of the potato enterprise, averaging seven per cent and 47 per cent for the smallest and largest growers respectively.

Approximately one-fourth of the harvested cropland was devoted to grain crops. Oats were the most important grain crop, comprising from 14 to 18 per cent of the harvested cropland.

The average acreage of small grain, excluding corn for grain, varied from 18 to 51 acres per farm (table 1).

TABLE 1. ACRES OF CROPS PER FARM BY SIZE OF POTATO ENTERPRISE
205 Farms, Northern Steuben Area, New York, 1946

Crops	Acres of potatoes per farm					
	3-7	8-12	13-19	20-29	30-49	50 or more
	Acres per farm					
Potatoes	5	10	16	24	38	90
Other vegetables	3	3	2	4	1	3
Small grain	21	18	27	33	36	51
All corn	4	4	4	3	2	2
Hay	38	41	44	50	48	45
Total	71	76	93	114	126	191

As the size of the potato enterprise increased, the proportion of harvested cropland devoted to hay and roughage decreased, varying from 59 per cent to 25 per cent for the smallest and largest growers respectively. Except for the largest potato growers, hay occupied a larger proportion of harvested cropland than any other crop.

Farm Organization

Total productive man work units is a measure of the total amount of directly productive work accomplished on a farm during the year. Total productive man work units varied from 318 for the smallest growers to 893 for the largest growers (table 2). Considering all productive enterprises, the largest growers had 2.8 times more productive work per farm than the smallest growers.

The per cent of productive man work units on crops, a measure of balance of business between crop and livestock enterprises, varied from 44 per cent for the smallest growers to 88 per cent for the largest growers. Livestock enterprises were more important than crop enterprises on farms having less than 13 acres of potatoes.

The per cent of productive man work units on potatoes is a measure of the importance of the potato enterprise in relation to the total farm business. The smallest growers spent only 15 per cent of the total productive labor on potatoes; whereas, the largest growers spent 71 per cent.

The most important class of livestock on all groups of farms was dairy cattle. Most of the farms surveyed reported dairy cattle.

On farms having less than 30 acres of potatoes, there was an average of approximately nine dairy cows per farm (table 2).

TABLE 2. RELATION OF ACRES OF POTATOES TO FARM ORGANIZATION
205 Farms, Northern Steuben Area, New York, 1946

Item	Acres of potatoes per farm					
	3-7	8-12	13-19	20-29	30-49	50 or more
	Average per farm					
Productive man work units						
Total	318	360	419	476	567	893
Per cent on potatoes	15	21	29	39	54	71
Per cent on crops	44	47	54	66	72	88
Per cent on livestock	56	53	46	34	28	12
Number of cows	9	10	9	9	8	6
Number of hens and pullets	88	138	142	65	117	32
Number of animal units	17	17	19	16	17	11

With the exception of the largest growers, more than one-half of the growers reported hens and pullets. The average number of hens and pullets varied from 32 to 142 per farm.

The number of animal units per farm varied from 11 for growers with 50 acres or more to 19 for growers with 3-19 acres.

Varieties of Potatoes

The growers surveyed reported 19 different variety names in addition to relatively small quantities of mixed varieties. The two most popular varieties were Katahdin and Sebago. These two varieties comprised about 80 to 90 per cent of the total acreage planted.

Fertilizer Analyses

The growers surveyed reported using 13 different analyses of fertilizer in addition to relatively small quantities of mixed or unknown analysis. For the most part, three different analyses were used; namely, 4-8-12, 5-10-10, and 5-10-15. These three accounted for 79 to 99 per cent of the total fertilizer used by the different acreage groups. For each size group, from about one-half to two-thirds of the fertilizer used was 4-8-12.

Crop Disposal

Approximately one-fourth of the total crop of potatoes was disposed of at the time of harvest (table 3). Of the potatoes sold at harvest time, by far the largest proportion was sold through regular channels as table stock potatoes. Nineteen per cent of the total crop was sold at time of harvest for table stock.

Sales to the government at the time of harvest accounted for 7.6 per cent of the total crop of potatoes. In general, the larger growers sold a higher proportion of the crop in this manner than growers with smaller acreages.

Approximately two-thirds of the total crop of potatoes were stored. Generally speaking, shrinkage is the result of storage and grading operations; however, as defined in this study, shrinkage includes cull potatoes disposed of under the price support program. With this exception, shrinkage can be included in the proportion of the total crop stored.

Potatoes from storage were disposed of largely through sales to dealers and others for table stock. A small proportion of the sales to the government was for table stock; however, no distinction as to use of government potatoes was made. In many instances, the ultimate use to be made of the potatoes was not known.

Of the total crop, 12 per cent were sold to the government from storage. There were no consistent differences between the different groups of growers as to potatoes disposed of in this manner.

For the area as a whole, potatoes for home use, livestock feed, and potatoes sold for seed were an insignificant proportion of the total crop.

TABLE 3. DISTRIBUTION OF TOTAL CROP ACCORDING TO USE
205 Farms, Northern Steuben Area, New York, 1946

Acres of potatoes	3-7	8-12	13-19	20-29	30-49	50 or more	All farms
Not stored:							
Seed	0.0%	0.0%	0.0%	0.0%	0.0%	0.1%	0.1%
Table stock	27.5	18.9	11.6	13.9	18.0	20.4	19.0
Government	4.1	2.4	4.8	9.3	12.6	7.9	7.6
Total	31.6	21.3	16.4	23.2	30.6	28.4	26.6
Stored:							
Seed: sold	0.5	0.3	0.4	0.1	0.2	0.6	0.5
saved	6.6	5.6	6.3	5.7	5.0	4.3	4.9
Table stock	40.9	43.0	47.3	49.4	40.0	41.4	42.6
Government	3.8	10.6	11.7	7.1	10.1	14.2	12.0
Home use	3.4	1.7	0.8	0.5	0.4	0.1	0.5
Livestock feed	3.2	5.6	3.0	1.2	1.4	0.3	1.4
Total	58.4	66.8	69.5	64.0	57.1	60.9	61.9
Shrinkage	10.0	11.9	14.1	12.8	12.3	10.7	11.5
Total	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

Relation of Acres of Potatoes to Various Factors

Practices

Yield of potatoes per acre increased consistently with the size of the potato enterprise, varying from 229 to 320 bushels per acre for the smallest and largest growers respectively (table 4). The smallest growers had the widest variation in yields.

TABLE 4. RELATION OF ACRES OF POTATOES TO VARIOUS FACTORS
205 Farms, Northern Steuben Area, New York, 1946

Items	Acres of potatoes					
	3-7	8-12	13-19	20-29	30-49	50 or more
Number of farms	33	35	34	35	35	33
Average acres of potatoes	5	9	16	24	38	90
Bushels of potatoes per acre	229	250	271	279	288	320
Practices						
Man hours per acre	69	70	73	64	68	70
Bushels of seed per acre	20	20	21	22	23	26
Times sprayed and dusted	3.4	4.5	5.3	5.1	5.8	6.7
Times cultivated	4.0	3.5	4.0	3.9	4.0	4.0
Costs and returns						
Returns per acre	$195	$199	$220	$238	$257	$327
Costs per acre	159	162	176	181	189	215
Profit per acre	36	37	44	57	68	112

Of the total number of growers surveyed, 132 applied dust in controlling insects and diseases, 62 applied spray, five applied both spray and dust, and six growers neither sprayed nor dusted. In general, the number of times sprayed and dusted increased with the size of the potato enterprise, varying from 3.4 to 6.7 times for the smallest and largest growers respectively (table 4).

There was no significant difference in the average number of times cultivated between various acre groups (table 4).

The growers studied were largely producers of table stock potatoes. Only four of the growers used certified seed entirely. Approximately one-half of the growers with 30 acres or more used both certified and non-certified seed. Non-certified seed was used in planting from 85 to 98 per cent of the potatoes for all acreage groups.

Bushels of seed per acre varied from 20 to 26 bushels for the smallest and largest growers respectively (table 4). The most common rate of seeding for all groups of growers was from 20 to 25 bushels per acre.

Costs and Returns

Total costs per acre increased directly with the size of the potato enterprise, varying from $159 to $215 per acre for the smallest and largest growers respectively (table 4).

Total returns per acre increased as the acres of potatoes increased. Returns per acre averaged $195 for the smallest growers and $327 for the largest growers (table 4). Returns increased faster than costs resulting in greater profits.

Average profits per acre increased consistently with the size of the potato enterprise, varying from $36 to $112 for the smallest and largest growers respectively (table 4).

Distribution of Total Costs by Items

More than one-fourth of the total costs in producing potatoes consisted of man labor costs. Total man labor costs increased directly with the size of the potato enterprise, varying from $41 to $57 for the smallest and largest growers respectively (table 5).

TABLE 5. RELATION OF ACRES OF POTATOES TO IMPORTANT ITEMS OF TOTAL COSTS
205 Farms, Northern Steuben Area, New York, 1946

Items of costs	Acres of potatoes					
	3-7	8-12	13-19	20-29	30-49	50 or more
Labor - growing	$17	$15	$15	$14	$15	$15
Labor - harvesting	21	25	28	28	29	31
Labor - storing and selling	3	4	5	5	6	11
Power and equipment	27	24	25	23	21	18
Fertility	38	36	39	41	42	42
Spraying and dusting	9	13	14	13	14	13
Seed	25	25	29	32	37	42
Use of land	11	11	12	13	12	14
Storage	5	4	5	6	6	10
Other	3	5	4	6	7	19
Total	159	162	176	181	189	215

In general, total power and equipment costs decreased with the size of the potato enterprise. Average costs were $27 for the smallest growers and $18 for the largest growers (table 5). Power and equipment costs comprised from eight per cent to 17 per cent of total costs for the largest and smallest growers respectively.

The average cost per acre for spraying and dusting for the smallest growers was $9 per acre (table 5). Included in this average were six growers that did not spray or dust. Other than the smallest growers, costs of spraying and dusting averaged about $13 to $14 per acre. Spraying and dusting costs comprised from five per cent to eight per cent of the total costs in producing potatoes.

Seed costs increased consistently with the size of the potato enterprise. The costs of seed averaged $25 for the smallest growers and $42 for the largest growers (table 5). Seed costs varied from 16 per cent to 20 per cent of total costs in producing potatoes.

Land costs averaged approximately $12 per acre for the different acreage groups and varied from $11 to $14 per acre (table 5). Land costs comprised from six to seven per cent of the total costs in producing potatoes.

Storage costs included both hired storage and the use of buildings for storing potatoes. Storage was a relatively unimportant item of total costs, varying from $4 to $10 per acre for the 8-12 and 50 or more acre groups respectively (table 5). Storage costs comprised three per cent of total costs for growers with less than 50 acres of potatoes and five per cent for growers with 50 acres or more.

Combined Effect of Size and Yield on Costs and Returns

Both size of the potato enterprise and rates of production affect costs, returns, and profits in potato production. In order to study the combined effect of size and yield on profits in potato production, the farms were divided into size groups of 3-19 acres

and 20 acres or more. The two size groups were then divided into yield groups as follows: less than 250 bushels, 250 to 300 bushels, and 301 bushels or more per acre.

Because of the tendency for average yields to increase with the size of the potato enterprise, there were relatively large numbers of small growers with low yields and large growers with high yields. Approximately one-half of the growers with less than 20 acres of potatoes had yields of less than 250 bushels per acre. On the other hand, approximately two-fifths of the growers with 20 acres or more had yields of 301 or more bushels per acre.

Increased yields resulted in higher average costs per acre for all groups (table 6). Because of differences in the manner of disposing of the crop and the marketing functions between the large and small growers, average costs per acre were greater for the large growers. Growers with 3-19 acres and yields ranging from 250 to 300 bushels per acre had an average yield and cost per acre of 272 bushels and $172 respectively. Growers with 20 acres or more and the same range in yield as the above growers had an average yield per acre of 276 bushels and an average cost per acre of $187. The same relationship held for growers obtaining 301 or more bushels per acre.

Even with comparable average yields, the larger growers obtained higher returns per acre than the smaller growers. Differences in returns were largely due to differences in the prices received for potatoes. For example, growers with 3-19 acres and yields of 301 or more bushels per acre had an average yield and return of 369 and

$295 per acre. Growers with 20 acres or more had practically the same yield, 370 bushels per acre, but returns were considerably higher, averaging $374 per acre.

The additional costs of obtaining higher yields were more than offset by greater returns. Higher yields together with larger acreages resulted in greater profits. Increased yields resulted in greater profits within both size groups. In the 3-19 acre group, growers with less than 250 bushels per acre made a profit of one dollar per acre, whereas, growers with more than 300 bushels per acre made a profit of $84 per acre. For the 20 or more acre group, growers with yields of less than 250 made a profit of $13 per acre as compared with a profit of $142 per acre for growers with yields of more than 300 bushels per acre.

TABLE 6. RELATION OF ACRES OF POTATOES AND YIELD PER ACRE TO COSTS AND RETURNS
205 Farms, Northern Steuben Area, New York, 1946

Acres of potatoes	Yield per acre: Group (bushels)	Yield per acre: Average (bushels)	Number of farms	Per acre: Costs	Per acre: Returns	Per acre: Profit
3-19	Less than 250	175	48	$141	$142	$ 1
	250 to 300	272	28	172	228	56
	301 or more	369	26	211	295	84
20 or more	Less than 250	207	30	161	174	13
	250 to 300	276	31	187	259	72
	301 or more	370	42	232	374	142

Combined Effect of Acreage, Seed Costs, and Fertility Costs on Costs and Returns

Size of the potato enterprise, seed costs per acre, and fertility costs per acre were important factors affecting profits in potato production.

In order to study the combined effect of these three factors on certain aspects of producing potatoes, the farms were divided into two size groups; those with 3-19 acres and those with 20 acres or more. The two size groups were then divided into two groups on the basis of seed costs per acre. The seed costs groups were as follows: Those with seed costs of less than $30 per acre, and those with seed costs of $30 or more per acre. The seed cost groups were again divided into two groups each on the basis of fertility costs per acre. The fertility cost groups were as follows: those with fertility costs of less than $40 per acre, and those with fertility costs of $40 or more per acre (table 7).

TABLE 7. RELATION OF ACRES OF POTATOES, SEED COSTS PER ACRE, AND FERTILITY COSTS PER ACRE TO YIELD PER ACRE
205 Farms, Northern Steuben Area, New York, 1946

Acres of potatoes	Seed costs per acre	Fertility costs per acre	Number of farms	Acres of potatoes per farm	Yield per acre
3-19	Less than $30	Less than $40	47	9	216
		$40 or more	22	10	262
	$30 or more	Less than $40	16	11	269
		$40 or more	17	12	334
20 or more	Less than $30	Less than $40	9	28	246
		$40 or more	18	35	308
	$30 or more	Less than $40	28	62	285
		$40 or more	48	53	324

Because of the tendency for small growers to have lower seed and fertility costs than large growers, an unequal distribution of farms in the different groups resulted. Almost one-half of the small growers had low seed and fertility costs, and almost one-half of the large growers had high seed and fertility costs (table 7).

A precise relationship between size, seed costs, and fertility costs to yield per acre could not be determined. However, some general relationships were observed. The highest average yields for both small and large growers resulted from a combination of high seed costs and high fertility costs, averaging 334 and 324 bushels per acre respectively (table 7). The lowest average yields resulted from a combination of low seed costs and low fertility costs for both small and large growers, averaging 216 and 246 bushels per acre respectively.

Total costs per acre increased directly with both seed and fertility costs. Costs werehigher for the large growers than for the small growers having the same range in seed and fertility costs. For both large and small growers, the highest average costs per acre resulted from a combination of high seed costs and high fertility costs, averaging $211 and $222 per acre respectively. The lowest average costs per acre resulted from a combination of low seed costs and low fertility costs, averaging $140 per acre for small growers, and $148 per acre for large growers (table 8).

Total returns per acre were also greater with a combination of high seed costs and high fertility costs per acre. The highest average returns resulted from a combination of high seed costs and high fertility

TABLE 8. RELATION OF ACRES OF POTATOES, SEED COSTS PER ACRE, AND FERTILITY COSTS PER ACRE TO COSTS AND RETURNS
205 Farms, Northern Steuben Area, New York, 1946

Acres of potatoes	Seed costs per acre	Fertility costs per acre	Per acre		
			Costs	Returns	Profit
3-19	Less than $30	Less than $40	$140	$171	$ 31
		$40 or more	177	203	26
	$30 or more	Less than $40	184	235	51
		$40 or more	211	279	68
20 or more	Less than $30	Less than $40	148	194	46
		$40 or more	183	248	65
	$30 or more	Less than $40	189	286	97
		$40 or more	222	322	100

costs, averaging $279 and $322 per acre for the small and large growers respectively. The lowest returns were obtained by both small and large growers with low seed costs and low fertility costs, averaging $171 and $194 per acre respectively. The large growers had higher average returns per acre than small growers with the same range in seed costs and fertility costs for all groups (table 8).

Average returns increased faster than average costs so that average profits per acre tended to increase with size, seed costs, and fertility costs: the only exception being that profits were lower for small growers with low seed costs and high fertility costs than for small growers with low seed costs and low fertility costs. The large growers made greater average profits than small growers largely because of the advantages in selling. With the exception referred to above, the higher seed and fertility costs were profitable, resulting in greater profits with increases in seed and fertility costs (table 8).