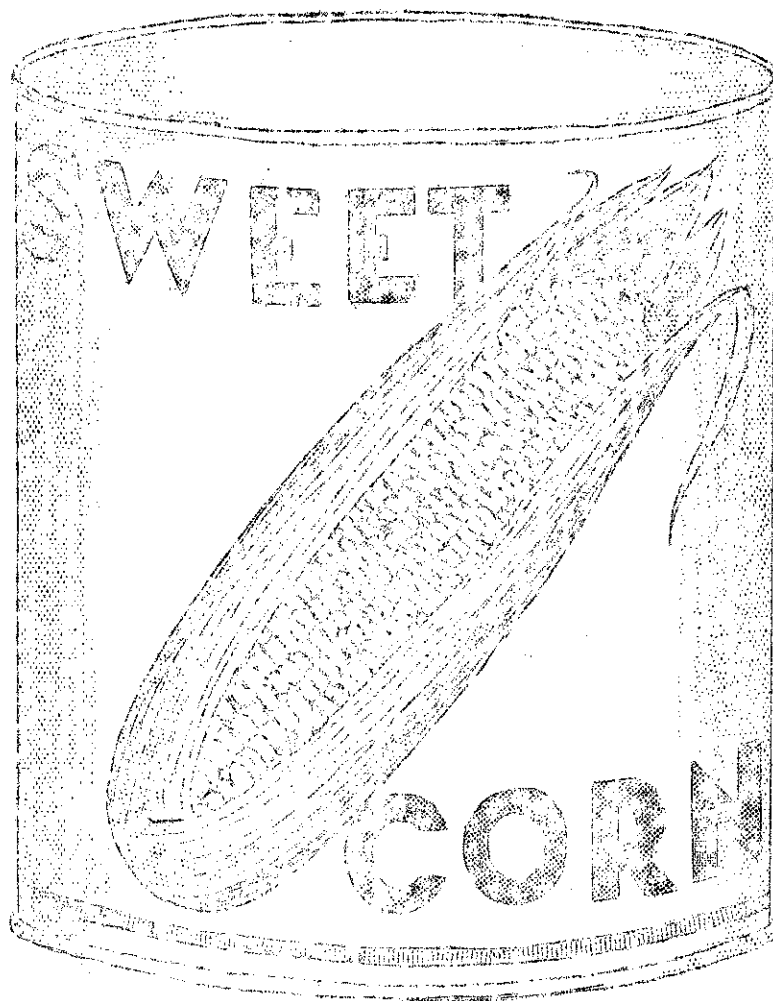


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Costs and Returns in Growing and Harvesting

CANNING FACTORY



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COSTS AND RETURNS IN GROWING AND HARVESTING CANNING FACTORY SWEET CORN

Donald B. Ferguson*

Canned vegetables lend themselves well to shipment to our Allies and to the Armed Forces all over the world. The importance of canning crops as a source of food was recognized early in World War II, and steps were made to increase production of those crops. So that growers and administrators of the food program might better know the cost of producing these crops, the Department of Agricultural Economics of the New York State College of Agriculture made a survey in the summer of 1942 of growers of the four major canning crops - snap beans, tomatoes, sweet corn, and peas. The survey covered the cost and returns of the 1941 crop.

This report on sweet corn for canning is one of four made on the survey and is based on a farm-to-farm survey of 65 growers in Livingston County and 55 growers in Ontario County, New York.

Canning Factory Sweet Corn in New York and United States

Sweet corn is one of the most important vegetable crops grown for canning in New York State. From 1936 to 1940 the New York acreage of sweet corn grown for canning averaged about 20,500 acres (table 1). In 1941 a total of about 25,000 acres of sweet corn was grown for canning in New York. This was an increase of about 22 per cent over the five-year average. The United States acreage of sweet corn for canning averaged about 344,400 acres during the five years 1936 to 1940 and in 1941 totaled 444,270 acres.

TABLE 1. ACREAGE, YIELD, PRODUCTION, AND FARM PRICE OF CANNING FACTORY SWEET CORN IN NEW YORK AND THE UNITED STATES, 1936-1940, 1941, and 1942

Year	Acres	Yield ¹ tons	Production tons	Farm Price
- New York -				
1936-40 Av.	20,520	2.2	45,440	\$ 11.54
1941	25,000	2.5	62,500	10.90
1942	24,200	2.6	62,900	13.30
- United States -				
1936-40 Av.	344,370	2.40	772,200	\$ 9.77
1941	444,270	2.56	1,135,700	9.68
1942	468,510	2.66	1,245,000	13.50

¹ Corn in the husk. New York growers are paid on a basis of husked or clean corn.
 * This study was started by C. A. Becker, now Lt. (j.g.) USNR, who made up the field blanks and directed the field work with the collaboration of the writer.

The average yield of sweet corn in New York is slightly less than for the country as a whole. The 1936-40 average yield in New York was about 2.2 tons of corn, in the husk, per acre as compared with the average yield in the United States of about 2.4 tons per acre. In 1941 the average yield of sweet corn in New York was 2.5 tons per acre or an average of three-tenths of a ton per acre higher than the five-year average. The average yield in the United States in 1941 was somewhat above the five-year average.

The farm price of sweet corn for canning in New York normally averages higher than for the country as a whole. For the five years, 1936-40, the average price of sweet corn per ton, in the husk, in New York was \$11.54 as compared with an average of \$9.77 in the United States. In 1941 the price in New York averaged \$10.90 and in the United States \$9.68. These prices are all on the basis of corn in the husk.

In New York growers are paid for sweet corn on the basis of the "test" of the corn. They are paid for the tonnage of husked corn or clean corn which they deliver to the canning factories. The average test in New York in recent years has been about 70 per cent. This test varies from farm to farm and area to area in the state according to the quality of the corn and to the proportion of the total crop that is delivered to the canning factory. A ton of corn that tests 70 per cent yields 1,400 pounds of husked or clean corn. Calculated on this basis the average yield of husked corn in the state for the years 1936-40 was 1.55 tons per acre and in 1941 was 1.75 tons per acre (table 2). The average price on this basis for the years 1936-40 was \$16.49 per ton and in 1941 was \$15.57 per ton. Prices for sweet corn were supported at a higher level for the crops of 1942 and 1943 by the United States Department of Agriculture to encourage a continued high rate of production at a time when costs had risen.

TABLE 2. YIELD AND FARM PRICE OF CANNING FACTORY SWEET CORN IN NEW YORK
BASED ON AN AVERAGE TEST OF 70 PER CENT

Year	Yield tons	Farm Price
1936-40 Av.	1.55	\$ 16.49
1941	1.75	15.57
1942	1.82	19.00

Rates for Power and Machinery

Flat rates were used in calculating the costs of power and machinery for growing sweet corn on the farms surveyed. Horse work was charged at the rate of \$0.19 per hour. This was the average cost per hour of horse work on New York cost account farms for 1940. The average costs of operating tractors of the various sizes on New York cost account farms for the years 1938 to 1940 were used. These costs averaged \$0.43 per hour for one plow tractors, \$0.48 per hour for two plow tractors, and \$0.54 per hour for three plow tractors (table 3).

TABLE 3. RATES CHARGED FOR POWER

Item	Size	Rate Used
Horse work (per hour)		\$ 0.19
Tractor work (per hour)	1 plow	.43
	2 plow	.48
	3 plow	.64
Truck use (per mile)	1 ton or smaller	.045
	1½ ton or larger	.063
Automobile use (per mile)		.04

The 1938 to 1940 average cost of operating trucks on New York cost account farms was charged for the use of trucks on these farms. This amounted to \$0.045 per mile for trucks one ton or smaller in size and to \$0.063 per mile for one and one half ton or larger trucks. The rate of \$0.04 per mile was charged for automobile use.

Charges for the use of machinery were based upon information obtained by Professor J. P. Hertel in a survey of the cost of operating farm machinery on 438 farms in Chenango and Ontario Counties (table 4).

TABLE 4. COST OF OPERATING FARM MACHINERY*

Implement	Rate per Acre	Implement	Rate per Acre
Walking plow	\$ 0.33	Lime sower	\$ 0.23
Tractor plow, one bottom	.85	Roller	.04
Tractor plow, two bottom	.49	Horse-drawn cultipacker	.07
Horse-drawn disk	.13	Tractor-drawn cultipacker	.06
Tractor-drawn disk	.11	Cultivator, 1 horse	.08
Harrow, spring tooth	.05	Cultivator, 2 horse	.17
Harrow, spike tooth	.04	Cultivator, tractor	.36
Grain drill	.26	Corn planter	.35
Manure spreader - \$ 0.10 per ton			

* Hertel, J. P., Cost of Operating Equipment on New York Farms, 1936, A.E. 209.

Labor Rates.

The average cost of labor used in growing and harvesting sweet corn was \$0.36 per hour in Livingston County and \$0.34 per hour in Ontario County (table 5). Labor hired especially for sweet corn was charged at the rate actually paid by each grower. The cost of the other labor or the regular farm labor and the labor of the operator and his family was calculated for each farm and charged at that rate. This calculation included cash wages, or equivalent, and also the cash value of room, board, and privileges.

TABLE 5. HOURS AND COST OF LABOR FOR GROWING AND HARVESTING SWEET CORN
LIVINGSTON AND ONTARIO COUNTIES, 1941

	Hours Labor Per Acre	Average Rate Per Hour
Livingston County		
Growing	17	\$ 0.35
Harvesting	18	.37
Total	35	\$ 0.36
Ontario County		
Growing	15	\$ 0.34
Harvesting	24	.34
Total	39	\$ 0.34

Most of the growing labor for sweet corn was provided by the regular farm labor force. However, in Livingston County about one-third of the labor used in growing the corn was hired for hoeing. About two-thirds of the labor used for harvesting sweet corn in Livingston County was hired especially for that job, and the rest was done by the regular labor force. In Ontario County, about one-third of the harvest labor was special help.

AVERAGE COSTS AND RETURNS

Description of Farms

The 65 growers from whom records were obtained in Livingston County, grew an average of 17.1 acres of sweet corn per farm in 1941 (table 6). The range in acreage of sweet corn per farm was from 4 to 90 acres. Eleven of the 65 records were obtained on sweet corn grown on the Genesee River Valley flats. These 11 growers gave information on an average of 45.6 acres of sweet corn per farm. Some of them gave information on only part of their total acreage of sweet corn. The 54 up-land growers had an average acreage of 11.3 acres per farm.

Since farmers in New York are paid for sweet corn on the basis of husked or clean corn, all calculations in this report such as yield per acre and cost of producing sweet corn per ton are made on the basis of husked or clean corn. The average yield on the farms surveyed in Livingston County was 2.34 tons per acre. The yield of the sweet corn grown on the Genesee River Valley flats averaged 2.66 tons per acre as compared with 2.08 tons per acre for sweet corn grown on the up-lands in Livingston County. The yield per acre on individual farms varied from .27 tons per acre on one farm that had a partial crop failure to 4.44 tons per acre on one of the river bottom fields.

The 55 growers from whom records were obtained in Ontario County grew an average of 5.8 acres of sweet corn per farm in 1941. The acreage per farm ranged from 2 to 20 acres. The average yield per acre on these Ontario County farms was 2.55 tons of husked corn per acre. The yield on individual farms ranged from

TABLE 6. FACTORS IN GROWING CANNING FACTORY SWEET CORN
LIVINGSTON AND ONTARIO COUNTIES, 1941

	65 Farms Livingston County	55 Farms Ontario County
Acres of sweet corn per farm	17.1	5.8
Average yield per acre (tons)	2.34	2.55
Fertilizer per acre (pounds)	159	105
Manure per acre (tons)	2.5	2.6
Seed per acre (pounds)	8.7	9.6
Man hours per acre, growing	17	15
Man hours per acre, harvesting	18	25
Total man hours per acre	35	40
Returns per acre	\$ 41.63	\$ 43.79
Total cost per acre	37.42	39.59
Net returns per acre	\$ 4.21	\$ 4.20
Average price per ton	\$ 15.34	\$ 15.55
Average net cost per ton*	13.55	13.90
Net returns per ton	\$ 1.79	\$ 1.65
Returns per hour of labor	\$ 0.48	\$ 0.44

* Value of silage and stalks deducted.

.56 tons per acre to 6.05 tons per acre. Slightly less than one per cent of the planted acreage in Ontario County was unharvested because of crop failure. In Livingston County only about six-tenths of one per cent of the planted acreage was unharvested.

An average of 35 hours of man labor were required to grow and harvest an acre of sweet corn in Livingston County. The labor requirements in Ontario County averaged 40 hours per acre. An average of 18 hours of labor were used for harvesting an acre of sweet corn in Livingston County as compared with 25 hours per acre in Ontario County. Part of this difference is accounted for by the higher yield per acre in Ontario County, but most of the difference apparently was due to more efficient use of harvest labor in Livingston County.

The returns per acre on the Livingston County farms averaged \$41.63 as compared with \$43.79 on the Ontario County farms. The total growing and harvesting cost in Livingston County averaged \$37.42 per acre as compared with \$39.59 per acre in Ontario County. The net returns per acre averaged \$4.21 in Livingston County and \$4.20 in Ontario County.

The average price received per ton of sweet corn was about the same in both counties, averaging \$15.34 in Livingston County and \$15.55 in Ontario County. The average net cost of growing and harvesting a ton of sweet corn, after deducting the value of stalks and silage, was \$13.55 in Livingston County and \$13.90 in Ontario County. This left a net return of \$1.79 per ton in Livingston County and \$1.65 per ton in Ontario County.

The returns per hour of labor spent on sweet corn averaged \$0.48 in Livingston County and \$0.44 in Ontario County.

Cost per Acre

Growing costs per acre averaged \$28.65 in Livingston County and \$28.38 in Ontario County (table 7). Harvesting costs averaged \$8.77 per acre in Livingston County and \$11.21 per acre on the farms in Ontario County.

TABLE 7. COST PER ACRE TO GROW AND HARVEST CANNING FACTORY SWEET CORN
LIVINGSTON AND ONTARIO COUNTIES, 1941

Expense	Livingston County		Ontario County	
	Cost per Acre	Per cent	Cost per Acre	Per cent
<u>Growing Costs:</u>				
Labor	\$ 6.01	16.1	\$ 5.28	13.4
Horse work	1.73	4.6	3.06	7.7
Tractor work	2.64	7.1	2.62	6.6
Equipment	2.33	6.2	2.19	5.5
Seed	2.18	5.8	1.78	4.5
Fertilizer	2.64	7.1	1.67	4.2
Manure	5.03	13.5	5.77	14.6
Green manure	.09	.2	.69	1.7
Land	5.62	15.0	4.80	12.1
Other, including interest	.38	1.0	.52	1.3
Total Growing Cost	\$ 28.65	76.6	\$ 28.38	71.6
<u>Harvesting Costs:</u>				
Labor	\$ 6.67	17.8	\$ 8.32	21.1
Trucking and other	2.10	5.6	2.89	7.3
Total Harvesting Cost	\$ 8.77	23.4	\$ 11.21	28.4
Total Growing and Harvesting Costs	\$ 37.42	100.0	\$ 39.59	100.0

Labor represents the most important single item of cost in growing and harvesting sweet corn for canning. Of the total growing and harvesting costs, labor represented about 34 per cent of the total in both Livingston and Ontario Counties. Land cost was the second most important item of cost in growing and harvesting sweet corn in Livingston County and represented 15 per cent of the total. This was followed by manure costs which represented 13.5 per cent of the total. In Ontario County the manure cost averaged 14.6 per cent of the total and land cost only slightly more than 12 per cent of the total for growing and harvesting corn. In both counties manure was a more important item in the cost of growing sweet corn than commercial fertilizer which represented about 7 per cent of the total cost in Livingston County and 4 per cent in Ontario County. Trucking and other costs connected with harvesting sweet corn represented 5.6 per cent of the total cost in Livingston County and 7.3 per cent in Ontario County.

The Amount and Cost per Acre of Materials and Power

An average of 2.5 tons of manure was charged to sweet corn in Livingston County as compared with 2.6 tons per acre in Ontario County (table 8). The manure was valued at an average of \$2.03 per ton in Livingston County and \$2.26 per ton in Ontario County. This value per ton included the value of the manure at the barn as estimated by the growers and also the cost of applying it. In determining the charge for manure 40 per cent of that applied to the sweet corn land in 1941, 30 per cent of that applied in 1940, 20 per cent of that applied in 1939, and 10 per cent of that applied in 1938 was used.

The Livingston County growers used an average of 159 pounds of commercial fertilizer per acre compared with an average of 105 pounds per acre used by the

TABLE 8. AMOUNTS PER ACRE AND COST OF MATERIALS AND POWER IN GROWING AND HARVESTING SWEET CORN FOR CANNING
LIVINGSTON AND ONTARIO COUNTIES, 1941

	65 Farms Livingston County	55 Farms Ontario County
- Amount per Acre -		
Manure (tons)	2.5	2.6
Fertilizer (pounds)	159	105
Seed (pounds)	8.7	9.6
Horse work (hours)	9.1	18.8
Tractor work (hours)	5.4	6.1
- Cost per Unit -		
Manure (per ton)	\$ 2.03	\$ 2.26
Fertilizer (per ton)	33.27	31.78
Seed (per pound)	.25	.19
Horse work (per hour)	.19	.19
Tractor work (per hour)	.49	.48

Ontario growers. The fertilizer applied by the Livingston growers cost an average of \$33.27 per ton, and that used by the Ontario growers an average of \$31.78 per ton.

An average of 8.7 pounds of seed were used per acre in Livingston County and an average of 9.6 pounds per acre in Ontario County. Most of this seed was distributed by the canning factory. The seed in Livingston County cost an average of \$0.25 per pound and that in Ontario County cost an average of \$0.19 per pound.

An average of 9.1 horse hours and 5.4 tractor hours were used in growing and harvesting an acre of sweet corn in Livingston County as compared with an average of 18.8 horse hours and 6.1 tractor hours used in Ontario County. The difference in the amount of power used between the counties can partly be accounted for by the difference in the size of the sweet corn enterprise per farm between the two counties. The larger acreages planted to sweet corn in Livingston County made possible a more efficient use of power and machinery.

Kinds of Fertilizer Used

Twenty-four of the 65 Livingston County growers and 30 of the 55 Ontario growers applied no commercial fertilizer before canning factory sweet corn (table 9). Twenty-three of the Livingston County growers used a fertilizer with a 3-12-6 analysis. This made up slightly more than half of the commercial fertilizer used by the Livingston County growers. A 2-12-6 analysis fertilizer was the second most popular in Livingston County.

The fertilizer used most commonly in Ontario County was one with a 4-12-4 analysis. Superphosphate was also used by 6 of the Ontario growers and represented about one-fifth of the tonnage applied.

TABLE 9. KINDS OF FERTILIZER USED FOR SWEET CORN FOR CANNING
ONTARIO AND LIVINGSTON COUNTIES, 1941

Fertilizer Analysis	Livingston County			Ontario County		
	Number of Farms	Pounds	Cost	Number of Farms	Pounds	Cost
3 - 12 - 6	23	93,275	\$ 1,590	2	700	\$ 12
4 - 12 - 4	4	20,050	332	9	13,700	222
2 - 12 - 6	6	32,750	538	1	562	9
Superphosphate	2	8,300	117	6	7,950	77
Other	6	22,300	363	7	13,600	213
None	24	--	---	30	--	---
Total	65	176,675	\$ 2,940	55	36,512	\$ 533

Variation in Cost per Ton

The average cost to grow and harvest a ton of sweet corn for canning in Livingston County was \$15.97 and in Ontario County was \$15.54 (figure 1). There was a rather wide range in cost between individual farms and few growers produced their sweet corn at near the average cost in either of the counties. In Livingston County the cost on individual farms ranged from \$8.02 per ton to more than \$149 per ton on one farm where the yield was very low. In Ontario County the range was from \$6.36 per ton to more than \$54 per ton. In both counties the extremely high costs per ton were caused by low yields. Of the Livingston growers, 30 produced their sweet corn at costs below the average and 35 had costs above the average. In Ontario 30 of the growers had costs below average for that county and 25 had costs above the average. The cost to grow and harvest a ton of sweet corn was closely associated with the yield per acre. The cost to grow and harvest an acre of sweet corn varied much less between farms than did the yield per acre. Thus the cost per ton tended to be lower where the yield was high than where it was low. In both counties the farmers with the lowest yield per acre had the highest cost per ton.

About 22 per cent of the sweet corn grown in Livingston County and about 32 per cent of that grown in Ontario County was grown at a cost of less than \$12.00 per ton (table 10). About 28 per cent of that grown in Livingston County and nearly 30 per cent of that in Ontario County was grown at an average cost of from \$12 to \$14 per ton. In Livingston County 18.5 per cent of the sweet corn and in Ontario county 10.9 per cent was grown at a cost of more than \$20.00 per ton.

TABLE 10. ACREAGE, YIELD, AND PERCENTAGE OF PRODUCTION OF CANNING FACTORY
SWEET CORN PRODUCED AT DIFFERENT COSTS,
LIVINGSTON AND ONTARIO COUNTIES, 1941

Cost per Ton to Grow and Harvest	Livingston County			Ontario County		
	Acres	Yield	Per cent	Acres	Yield	Per cent
		per Acre, tons	of Production		per Acre, tons	of Production
Less than \$12	1,610	3.5	21.7	810	3.2	31.5
\$12 to \$14	2,950	2.5	28.5	822	2.9	29.6
\$15 to \$17	2,590	2.2	21.8	685	2.3	19.0
\$18 to \$20	1,260	2.0	9.5	330	2.2	9.0
\$21 to \$23	1,890	2.0	14.4	60	2.3	1.7
\$24 or more	835	1.3	4.1	490	1.5	9.2
Total	11,135	2.3	100.0	3,197	2.6	100.0

Variation in Labor Returns

The returns per hour of labor spent on the enterprise is the amount per hour by which total returns exceed all costs other than labor costs. The returns per hour of labor varied greatly between farms similarly as did the cost per ton,

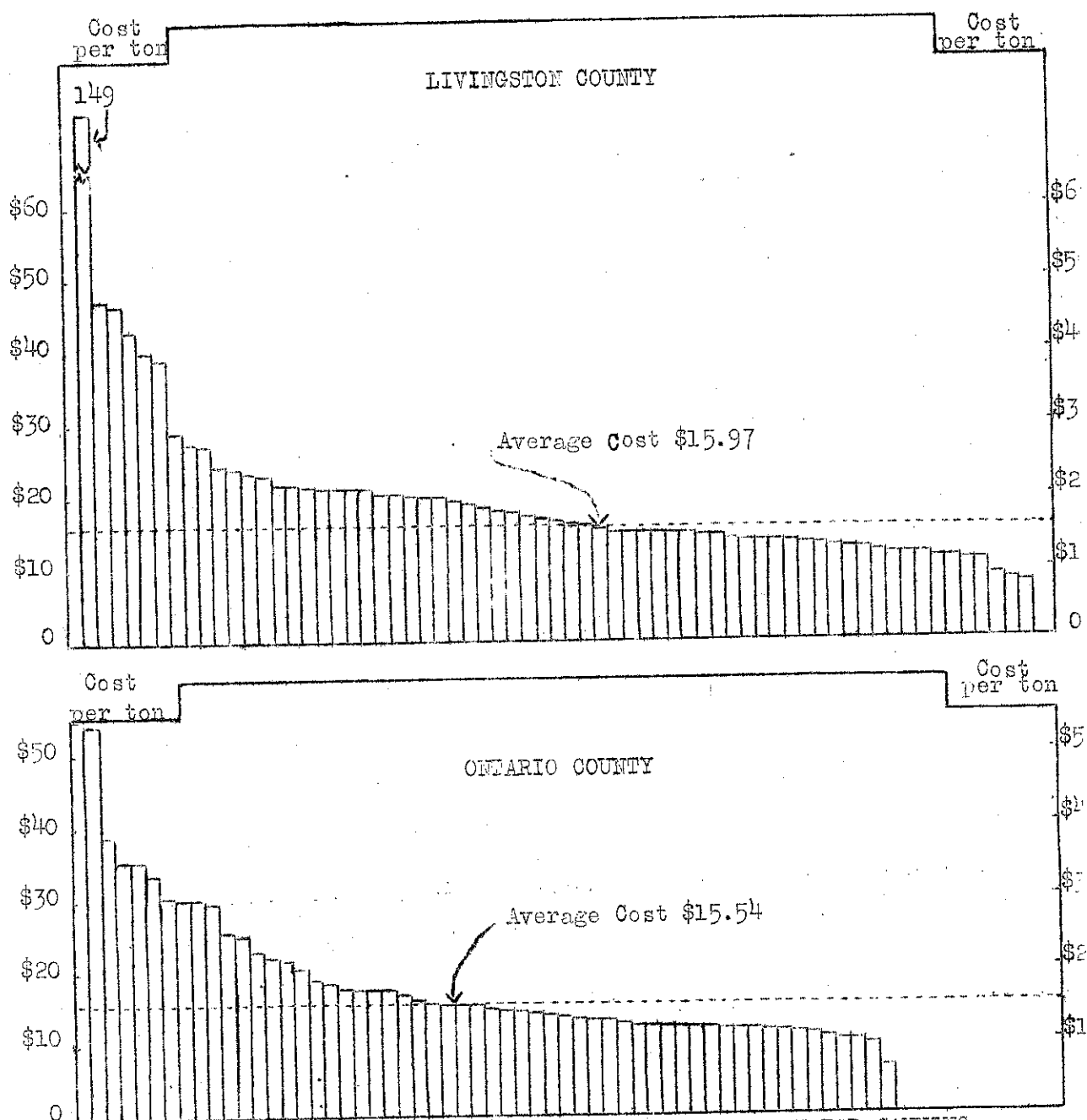


FIGURE I COST TO GROW AND HARVEST A TON OF SWEET CORN FOR CANNING
65 LIVINGSTON AND 55 ONTARIO COUNTY FARMS, 1941

The height of each bar represents the cost on one farm.

The returns per hour of labor on sweet corn for the Livingston County farms averaged \$0.48 per hour and on the Ontario County farms \$0.44 (figure 2). The returns to individual growers in Livingston County varied from a loss of \$2.50 per hour to a return of \$1.47 per hour. The range in Ontario County was from a loss of \$0.46 per hour to a return of \$1.66 per hour.

Eight of the Livingston County growers and nine of the Ontario County growers failed to get any return for the time spent on the enterprise after allowing for all the costs other than the labor, such as for use of land, fertilizer, seed, and machinery and farm power costs. Twenty-two of the Livingston County growers, and 11 of the Ontario County growers obtained some returns for the time spent on the enterprise but not enough to cover all the labor costs involved. Five of the Livingston growers and three of the Ontario growers had a return of more than \$1.00 per hour spent on the enterprise.

The returns per hour of labor were closely associated with the yield per acre. The growing cost per acre and the returns per ton of sweet corn varied much less than did the yield per acre. In both counties, growers with the highest yields per acre had the highest returns per hour of labor and those with the lowest yields per acre had the lowest returns per hour of labor.

Relation of Yield of Sweet Corn to Costs

The yield per acre is an important factor affecting the cost per ton of growing sweet corn for canning. Although the total cost of growing and harvesting an acre of sweet corn tends to increase with the higher yields, the increase is relatively small compared with the increase in the yields and so the cost of growing and the total cost per ton tends to decrease with the increase in yields.

Growing costs are made up largely of the costs which tend to vary only slightly regardless of the yield. In Livingston County the growing cost per acre increased from an average of \$27 on those farms with less than 1.8 tons of sweet corn per acre to \$31 per acre on farms with a yield of 2.5 tons or more of sweet corn (table 11). The growing cost per ton of sweet corn decreased, however, from an average of about \$18 per ton on those farms with the low yields to about \$10 on those farms with the high yields. The harvesting costs also decreased somewhat as the yield increased so that the total cost per ton decreased from an average of about \$23 per ton on those farms having less than 1.8 tons per acre to \$13 per ton on the farms with the highest yields.

The 17 growers in Ontario County with the lowest yield produced their sweet corn at an average cost of about \$22 per ton as compared with an average cost of \$13 per ton for those growers with the highest yields. Most of this decrease in cost per ton was accounted for by the decrease in growing costs per ton as was the case in Livingston County.

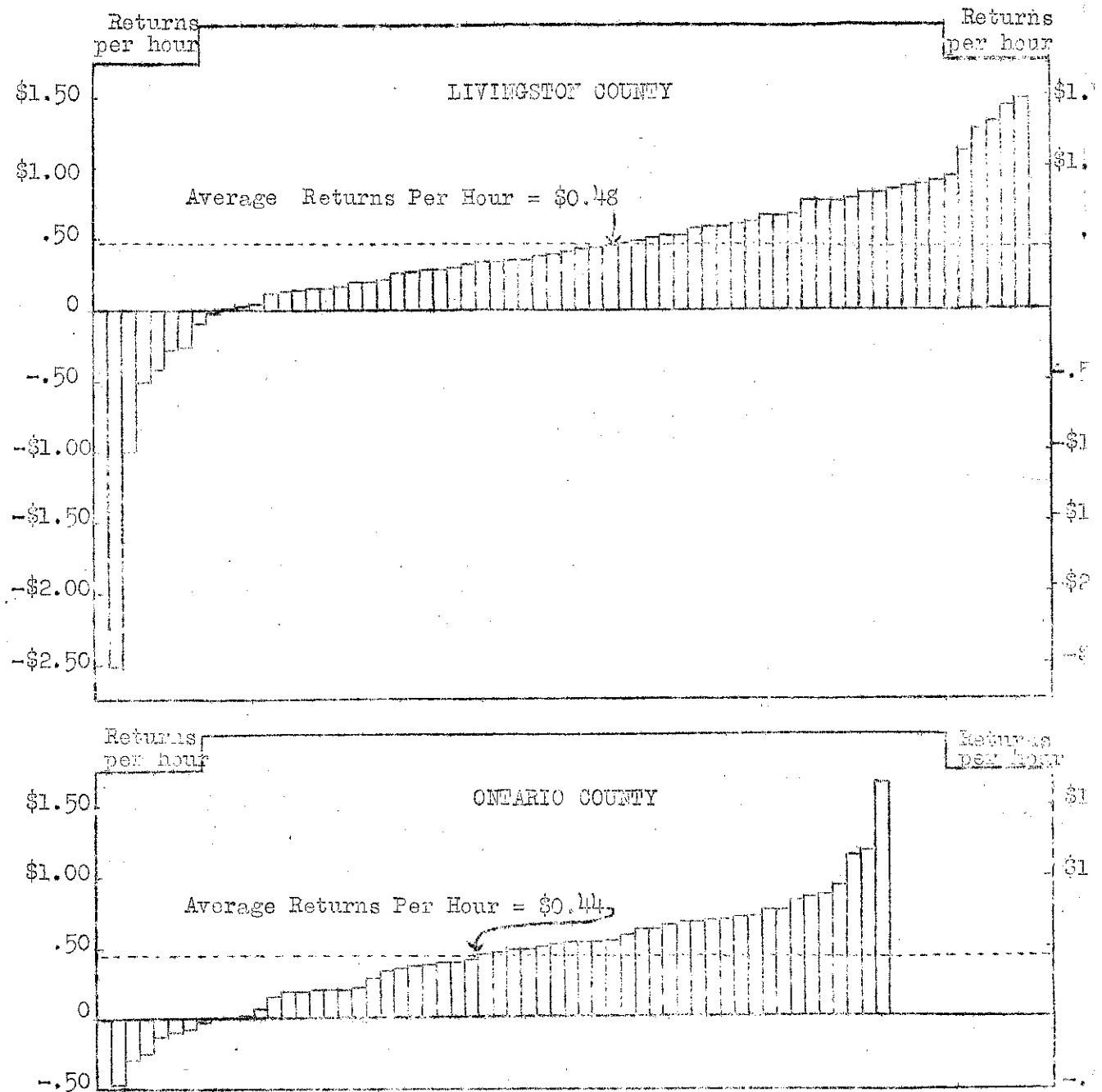


FIGURE 2 RETURNS PER HOUR OF LARGE ON SWEET CORN FOR CANNING
65 LIVINGSTON AND 55 ONTARIO COUNTY FARMS, 1941

The length of each bar represents the return on one farm.

TABLE 11. RELATION OF YIELD OF SWEET CORN TO COSTS
LIVINGSTON AND ONTARIO COUNTIES, 1941

Yield of Sweet Corn
Per Acre, Tons

Number
of

Cost Per Acre

Cost Per Ton

Range

Average

Farms

Growing

Total

Growing

Total

Livingston County

Less than 1.8

1.5

25

\$ 27

\$ 34

\$ 18

\$ 23

1.8 to 2.4

2.1

20

27

36

13

17

2.5 or more

3.2

20

31

42

10

13

Ontario County

Less than 2.0

1.6

17

\$ 26

\$ 35

\$ 16

\$ 22

2.0 to 2.9

2.6

18

28

39

11

15

3.0 or more

3.5

20

31

45

9

13

Relation of Yield of Sweet Corn to Labor Requirements

In Livingston County there appeared to be no relationship between the yield of sweet corn and the number of hours used to grow an acre of it. In Ontario County, however, those growers who obtained the higher yields used more labor in growing an acre than did those who got the lower yields. In both counties the total number of hours required to grow and harvest an acre of sweet corn increased as the yield increased. The amount of labor required to harvest an acre increased at about the same rate as the yield.

TABLE 12. RELATION OF YIELD OF SWEET CORN TO LABOR REQUIREMENTS
LIVINGSTON AND ONTARIO COUNTIES, 1941

Yield of Sweet Corn Per Acre, Tons		Acres Sweet Corn	Man Hours Per Acre		Man Hours Per Ton	
Range	Average	Per Farm	Growing	Total	Harvesting	Total
Livingston County						
Less than 1.8	1.5	13.4	18	31	9	21
1.8 to 2.4	2.1	17.6	14	34	9	16
2.5 or more	3.2	21.4	19	40	7	12
Ontario County						
Less than 2.0	1.6	6.1	11	30	12	19
2.0 to 2.9	2.6	6.1	16	40	9	16
3.0 or more	3.5	5.3	19	50	9	14

An average of 21 hours of labor were spent growing and harvesting a ton of sweet corn on the Livingston farms with yields of less than 1.8 tons per acre as compared with an average of 12 hours where the yield was 2.5 tons or more per

acre (table 12). In Ontario County, the farms with the lowest yields used 19 hours of labor per ton as compared with 14 hours per ton used on farms with the highest yields.

Relation of the Yield of Sweet Corn to Returns

The growers with highest yields of sweet corn had the highest returns per acre and also the highest returns per hour of labor spent on the enterprise. Since the growing costs per acre increased only slightly as the yield increased, the net returns per acre tended to increase with the yield. In Livingston County, the growers with an average yield of less than 1.8 tons per acre had an average loss per acre of \$8 as compared with a net return per acre of \$15 for those growers with an average yield of 2.5 or more tons per acre (table 13). In Ontario County, the net returns per acre varied from an average loss of \$4 per acre for those growers with a yield of less than 2 tons per acre to an average net return of \$13 per acre for those with an average yield of 3 tons or more per acre.

In Livingston County growers with an average yield of less than 1.8 tons per acre had a net return per hour of labor of \$0.11 as compared with a return per hour of \$0.74 obtained by those growers who had an average yield of 2.5 or more tons per acre. In Ontario County the returns per hour of labor varied from an average of \$0.22 for those who had a yield of less than 2 tons per acre to an average of \$0.60 per hour for those who had an average yield of 3 or more tons per acre.

TABLE 13. RELATION OF YIELD OF SWEET CORN TO RETURNS
LIVINGSTON AND ONTARIO COUNTIES

Yield of Sweet Corn Per Acre, Tons		Returns Per Acre	Net Returns Per Acre	Returns Per Hour of Labor
Range	Average			
Livingston County				
Less than 1.8	1.5	\$ 26	\$ -8	\$ 0.11
1.8 to 2.4	2.1	38	2	.43
2.5 or more	3.2	57	15	.74
Ontario County				
Less than 2.0	1.6	\$ 30	\$ -4	\$ 0.22
2.0 to 2.9	2.6	43	4	.42
3.0 or more	3.5	58	13	.60

Relation of Acres of Sweet Corn per Farm to Cost

The acreage of sweet corn grown per farm surveyed in Livingston County varied from 4 to 90 acres. On the Ontario County farms the range was from 2 acres to 20 acres per farm. The Livingston County records were divided into two groups. Those in which the sweet corn was grown on the river flats was put in one group.

and those in which the sweet corn was grown on up-land soil were put in another group. In 1941 the sweet corn yields on the river flats were higher than on the up-land soil. Also the acreage of sweet corn per farm was higher on the river flats than on the up-land. There was no apparent relationship between the acreage of sweet corn grown per farm and the yield per acre (table 14).

TABLE 14. RELATION OF ACRES OF SWEET CORN PER FARM TO COSTS
LIVINGSTON AND ONTARIO COUNTIES, 1941

Acres of Sweet Corn Per Farm		Number of Farms	Average Yield, Tons	Costs Per Acre		Total Cost Per Ton
Range	Average			Growing	Total	
Livingston County						
Upland						
Less than 8	5.5	17	2.0	\$ 32	\$ 40	\$ 20
8 to 10	9.2	18	2.1	29	38	18
11 or more	18.6	19	2.1	29	37	17
Flats						
5 to 90	45.6	11	2.7	28	37	14
Ontario County						
Less than 4	2.4	13	2.7	\$ 30	\$ 43	\$ 16
4 to 5	4.6	22	2.6	32	42	16
6 or more	9.4	20	2.5	26	38	15

The growing costs per acre tended to vary only slightly between farms, but in both counties the growing costs per acre tended to be somewhat higher on the farms having the small acreages of sweet corn than on the farms having the larger acreages. The growers with the larger acreages were apparently able to make more efficient use of labor, machinery and equipment than were the growers with the smaller acreages. The differences, however, were not large.

In Livingston County, the up-land growers with less than 8 acres of sweet corn had a total cost per ton of \$20 as compared with a total cost per ton of \$17 for those growers with 11 or more acres of sweet corn on the up-land. The growers on the river flats had the same total costs per acre as did the growers on the up-land with 11 or more acres per farm, but the growers on the flats had a higher yield which reduced their cost per ton to \$14.

In Ontario County, the somewhat lower growing cost per acre incurred by the growers with the larger acreages was nearly offset by the slightly smaller yield they obtained. And so there was little difference between the total cost per ton on farms with less than 4 acres of sweet corn and the cost on those with 6 or more acres.

Relation of Acres of Sweet Corn per Farm to Labor Requirements

Growers with larger acreages of sweet corn were able to make more efficient use of their labor in growing the crops than were those with the smaller acreages. In Livingston County the growers on the up-land with less than 8 acres of sweet corn used an average of 19 hours of labor in growing the crop as compared with an average of 14 hours used by those growers with 11 or more acres of sweet corn per farm (table 15). The growers with the large acreages on the river flats used an average of 19 hours of labor per acre. This was as high as the amount used by the growers with small acreages on the up-land area and was accounted for by the labor hired for hoeing the crops on the flats. Little time was spent hoeing sweet corn on the up-land.

In Ontario County growers with less than 4 acres of sweet corn per farm used an average of 24 hours of labor in growing the crop. Those with 6 acres or more used an average of only 13 hours of labor per acre in growing. In both counties it took about as long to harvest a ton of sweet corn on the large acreages as on the small acreages. The total man hours required per ton were somewhat smaller on the farms with the large acreages of sweet corn than on those with small acreages because of the more efficient use of labor in growing the crops.

TABLE 15. RELATION OF ACRES OF SWEET CORN PER FARM TO LABOR REQUIREMENTS
LIVINGSTON AND ONTARIO COUNTIES, 1941

ACRES OF SWEET CORN PER FARM TO LABOR REQUIREMENTS LIVINGSTON AND ONTARIO COUNTIES, 1941					
Acres of Sweet Corn Per Farm		Man Hours Per Acre		Man Hours Per Ton	
Range	Average	Growing	Total	Harvesting	Total
Livingston County					
Upland					
Less than 8					
8 to 10	5.5	19			
11 or more	9.2	16	35	8	18
Flats	18.6	14	34	9	17
			30	8	14
5 to 90	45.6	19	39	8	15
Ontario County					
Less than 4					
4 to 5	2.4	24	52	10	19
6 or more	4.6	16	41	9	16
	9.4	13	38	10	15

Relation of Acres of Sweet Corn per Farm to Returns

In both Livingston and Ontario Counties there was relatively little difference in the returns per acre between farms with the large acreages of sweet corn and those with the small acreages (table 16). In Livingston County the returns per acre on the flats was higher than on the up-lands because of higher yields

In Livingston County the net returns per acre increased as the acreage of sweet corn per farm increased because of both a slight increase in the returns per acre and a somewhat lower growing cost per acre on the farms with the larger acreages.

TABLE 16. RELATION OF ACRES OF SWEET CORN PER FARM TO RETURNS
LIVINGSTON AND ONTARIO COUNTIES, 1941

Acres of Sweet Corn Per Farm		Returns Per Acre	Net Returns Per Acre	Returns Per Hour of Labor
Range	Average			
Livingston County				
Upland				
Less than 8	5.5	\$ 35	\$ -4	\$0.22
8 to 10	9.2	36	-2	.33
11 or more	18.6	37	1	.41
Flats				
5 to 90	45.6	48	10	.60
Ontario County				
Less than 4	2.4	\$ 46	\$ 3	\$0.41
4 to 5	4.6	46	4	.43
6 or more	9.4	42	5	.46

In both counties the returns per hour of labor tended to be higher on farms with the larger acreages than on those with the smaller acreages. This was a result of the combination of higher net returns per acre and lower labor requirements per acre on farms with the larger acreages than on those with smaller acreages. In Livingston County the returns per hour of labor varied from an average of \$0.22 per hour on farms with less than 8 acres of sweet corn to an average of \$0.41 per hour on farms with 11 or more acres of sweet corn. The farms with sweet corn on the river flats in Livingston County had the highest returns or an average of \$0.60 per hour of labor. This was largely the result of the higher yield obtained on those farms.

Relation of Value of Fertilizer and Manure Applied to Costs, Yields, and Returns

In both counties growers who applied moderate amounts of fertilizer and manure per acre obtained higher yields than did those who applied no fertilizer or small amounts per acre (table 17). Those growers who applied large amounts of manure and fertilizer obtained yields no higher on the average than did those who applied moderate amounts. Therefore, the growers who applied large amounts of fertilizer and manure per acre had lower returns per hour of labor than did those who applied moderate amounts because their costs in growing the sweet corn per acre were much higher. In both counties growers who applied a combined value of

manure and fertilizer of \$10 or more per acre, added growing costs which were not repaid in higher yields or returns per acre.

TABLE 17. RELATION OF VALUE OF FERTILIZER AND MANURE APPLIED TO COSTS, YIELDS, AND RETURNS
LIVINGSTON AND ONTARIO COUNTIES, 1941

Value of Fertilizer and Manure Per Acre	Number of Farms	Acres Sweet Corn Per Farm	Growing Costs Per Acre	Yield Per Acre Tons	Returns Per Hour of Labor
Range	Average				
Livingston County					
Less than \$4	\$ 1.80	17	12.8	\$ 21	1.9
\$4 to \$9	5.40	25	24.0	26	2.5
\$10 or more	16.70	23	12.8	40	2.5
Ontario County					
None	\$ 0	13	6.1	\$ 20	2.3
Less than \$10	5.30	27	5.8	26	2.6
\$10 or more	18.40	15	5.6	40	2.6

Relation of Date of Planting to Yield of Sweet Corn

Data for one year's results is not sufficient evidence upon which to base a recommendation as to the most desirable time of planting sweet corn. Weather varies from year to year and many variables of weather and soil must be considered over a period of years. However, it is interesting to note and record the variations in the yield obtained from sweet corn according to the date of planting. In 1941 the highest average yield was obtained from the late sweet corn. In both counties sweet corn planted in the first two weeks of June returned the highest yields. In Livingston County sweet corn planted before the middle of May returned an average yield of 2 tons per acre as compared with an average of 3.1 tons per acre obtained from corn planted after June 10 (table 18). In Ontario County sweet corn planted in May yielded an average of 2.2 tons per acre as compared with an average of 2.7 tons per acre obtained from corn planted in June.

TABLE 18. RELATION OF DATE OF PLANTING TO YIELDS OF SWEET CORN
LIVINGSTON AND ONTARIO COUNTIES, 1941

Date of Planting	Acres	Yield per Acre, Tons
Livingston County		
May 1 to 15	162.5	2.0
May 16 to 23	222.5	2.1
May 24 to 31	355	2.2
June 1 to 9	230	2.6
June 10 to 18	143.5	3.1
Ontario County		
May 20-31	117	2.2
June 1 to 7	132	2.7
June 8 to 30	70.5	2.7