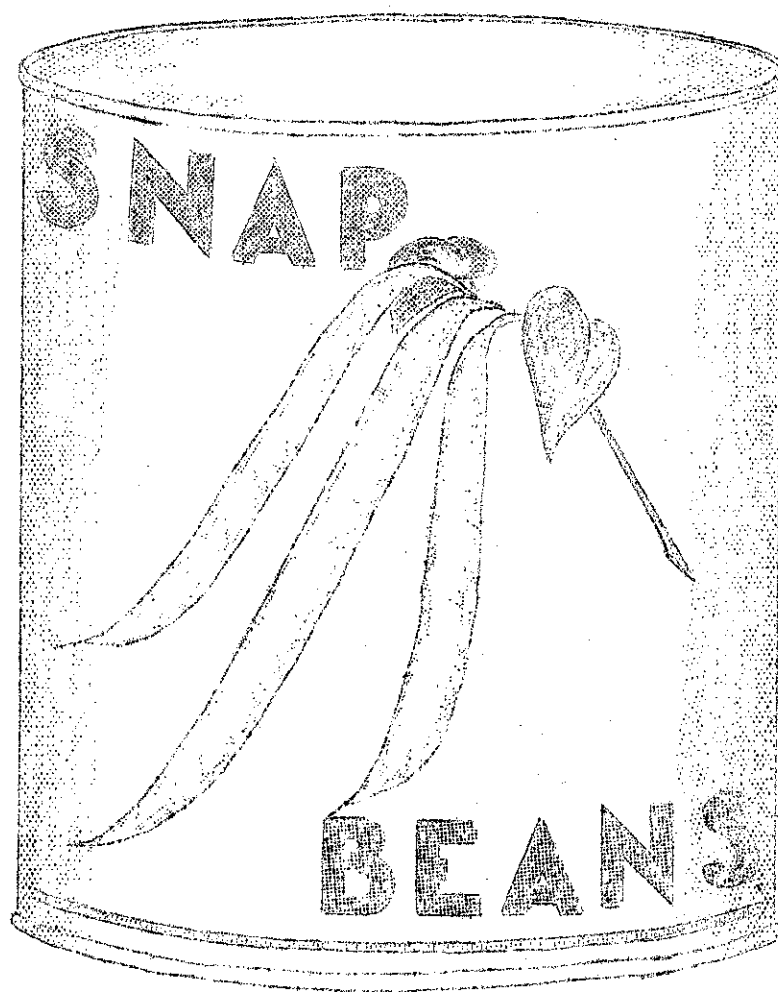


# CANNING FACTORY



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## COSTS AND RETURNS IN GROWING AND HARVESTING

## CANNING FACTORY SNAP BEANS

Donald B. Ferguson\*

Canned vegetables lend themselves well to shipment to our Allies and to our 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 costs and returns of the 1941 crops.

This report on snap beans for canning is one of the four made on the survey, and is based on a farm-to-farm survey of fifty-six growers in Erie County<sup>1</sup> and fifty-five growers in Wayne County, New York.

## Canning Factory Snap Beans in New York and the United States

Snap beans are one of the important vegetable crops grown for canning in New York State. From 1936 to 1940 the New York acreage of snap beans grown for canning averaged about 7,650 acres (table 1). In 1941, a total of 8,950 acres of snap beans were grown for canning in New York. This was an increase of about 17 per cent over the five-year average, and a further increase of about 40 per cent was made in 1942. The United States acreage of snap beans for canning during the years 1936 to 1940 averaged about 60,350 acres and in 1941 totaled 87,800 acres.

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

Year	Acres	Yield short tons	Production short tons	Farm Price
- - - New York - - -				
1936-40 Av.	7,658	1.6	12,620	\$ 51.06
1941	8,950	1.7	15,200	67.80
1942	12,500	2.1	26,200	88.00
- - United States - -				
1936-40 Av.	60,356	1.7	103,704	\$ 44.45
1941	87,800	1.6	144,320	53.40
1942	131,060	1.7	227,400	75.38

\* 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.

<sup>1</sup> Includes seven growers in the adjoining area of Chautauqua County.

Yields of snap beans for canning in New York average about the same as do yields for the whole country. The 1936-40 average yield in the United States was about 1.7 tons per acre, while in New York the yield averaged about 1.6 tons per acre. The yield of snap beans per acre in 1941 was about average. For the United States the yield averaged 1.6 tons in 1941 and for New York 1.7 tons per acre.

Prices of snap beans for canning in New York average higher than do those for the country. For the five years, 1936-40, the average price for snap beans in New York was \$51.06 per ton as compared with \$44.45 per ton paid growers as an average over the United States. The 1941 price in New York averaged \$67.80 as compared with an average of \$63.40 for the United States. Prices for snap beans 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.

#### Rates Charged for Power and Machinery

Flat rates were used in calculating the cost of power and machinery for growing snap beans on the farms surveyed (tables 2 and 3). Horse work was charged at the rate of \$.19 per hour. This was the average cost per hour of horse work on New York cost account farms for 1940. The average cost of operating tractors of the different sizes on New York cost account farms for the years 1938-40 were used. These costs averaged \$0.43 per hour for one-plow tractors, \$0.48 per hour for two-plow tractors, and \$0.64 per hour for the three-plow tractors.

TABLE 2. 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 smaller	.063
Automobile (per mile)		.04

The 1938-1940 average cost of operating trucks on New York cost account farms was charged for the use of trucks on these farms. This amounted to \$0.04<sup>1</sup>/<sub>2</sub> per mile for trucks, one ton or smaller in size, and \$0.063 per mile for one and a half ton or larger trucks. A 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 3).

TABLE 3. 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	Planter, corn or bean	.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 for labor in Erie County was 31 cents per hour as compared with an average of 27 cents per hour in Wayne County (table 4). Labor hired especially for snap beans was charged at the rate actually paid by each grower. The cost of the other labor or the regular farm labor and labor of the operator and his family was calculated for each farm and charged at that rate. This calculation included the cash wages and also the cash value of room, board, and privileges.

TABLE 4. HOURS AND COST OF LABOR IN GROWING AND HARVESTING SNAP BEANS  
ERIE AND WAYNE COUNTIES, 1941

	Hours Labor Per Acre	Average Rate Per Hour	Average Rate Paid Pickers Per Pound
Erie County:			
Growing	48	\$ 0.29	----
Harvesting	195	.31	\$ 0.01 3/4
Total	243	\$ 0.31	----
Wayne County:			
Growing	24	\$ 0.31	----
Harvesting	302	.26	\$ 0.01 2/3
Total	326	\$ .27	----

Most of the harvest labor was paid on a piece-work basis, or so much a pound of beans picked. The beans in Erie County were picked at an average rate of about 1 3/4 cents per pound. Growers in Wayne County paid an average of about 1 2/3 cents per pound for picking. The growers estimated the rate at which the beans were picked and hours spent by the pickers. The average rate per hour for

harvesting was calculated from this estimate plus the cost of time spent supervising the pickers and hauling the beans.

## AVERAGE COSTS AND RETURNS

### Description of Farms

Of the fifty-six farms in western New York from which information was obtained on costs and returns from snap beans, 49 were in Erie County and 7 in the adjoining area of Chautauqua County. For convenience throughout the report they will be called the Erie County group. These 56 growers had an average of 35.5 acres of snap beans per farm in 1941 (table 5). The range in acreage per farm was from one to 140 acres. Most of the growers surveyed in the Erie County area were in the town of Brant. They grew many of their beans on their home farms, but also grew many on land rented from the Indians of the nearby reservation.

TABLE 5. FACTORS IN GROWING CANNING FACTORY SNAP BEANS  
ERIE AND WAYNE COUNTIES, 1941

	56 Farms Erie County	55 Farms Wayne County
Acres snap beans per farm	35.5	5.2
Average yield per acre (tons)	1.56	2.35
Fertilizer per acre (pounds)	329	242
Manure per acre (tons)	0.5	2.8
Seed per acre (pounds)	70	50
Man hours per acre, growing	48	24
Man hours per acre, harvesting	195	302
Total man hours per acre	243	326
Returns per acre	\$130.40	\$125.84
Total costs per acre	118.22	117.92
Net returns per acre	\$ 12.18	\$ 7.92
Average price per ton	\$ 82.32	\$ 51.89
Average net cost per ton*	74.50	48.52
Net returns per ton	\$ 7.82	\$ 3.37
Returns per hour of labor	\$ 0.36	\$ 0.29

\* Value of forage and dry beans deducted.

The 55 growers in Wayne County had an average of 5.2 acres of snap beans per farm. The range in acreage per farm was from  $1\frac{1}{4}$  acre to 57 acres. Twenty-three of the Wayne County farmers surveyed had 1 acre or less of snap beans per farm. Of the 55 growers, 10 hired their beans picked on a contract with a labor contractor who furnished all the picking labor. These 10 growers had an average of 17 acres snap beans per farm.

The average yield of 1.56 tons per acre in Erie County was slightly below the State average yield. The average yield of the 55 growers in Wayne County was 2.35 tons per acre. More than 8 per cent of the acreage of beans planted in Erie County was not harvested because the yield did not justify it. The yield per farm in Erie County ranged from a crop failure to 3.3 tons per acre. All of the acres of beans planted in Wayne County were picked at least once. The yield per acre ranged from .6 tons per acre to 5.8 tons per acre. The high yield was obtained on one of the small fields.

An average of 48 hours of man labor was spent in growing an acre of beans in Erie County (table 5). Only half as much labor or 24 hours per acre were spent in growing the beans in Wayne County. Most of the difference in time spent in growing beans between the two areas is accounted for by the difference in practices of cultivation found between the two areas. Nearly 40 per cent of the hours spent growing beans in Erie County were spent hoeing. Very little of this was done in Wayne County. This labor was relatively cheap in Erie County in 1941 but added considerably to the cost of growing the beans. Much of this labor was used for hoeing beans in order to hold the workers on the farms between the time of berry harvest and bean picking. A large part of the acreage in Erie County was cultivated with one-horse walking cultivators, while a large proportion of the acreage in Wayne County was cultivated with tractor cultivators. This also added to the differences in man labor requirements.

An average of 195 hours of labor were required for picking the crop in Erie County as compared with 302 hours per acre in Wayne County. The number of hours required per ton were practically the same in both counties; 125 hours in Erie County and 129 hours in Wayne County.

The returns per acre from beans in Erie County averaged about \$130 as compared with \$126 per acre in Wayne County (table 5). The total cost per acre in both counties averaged about \$118 per acre leaving a net return per acre of \$12 in Erie County and about \$8 in Wayne County. Although the yield was lower in Erie County, the price received per ton of beans was enough higher to more than offset the low yield. The average price per ton received by Erie County growers was about \$82 as compared with \$52 received by the Wayne County growers. The average net cost per ton of growing beans, after deducting the value of forage and dry beans was \$74.50 in Erie County and \$48.52 in Wayne County. This left a net return per ton of \$7.82 in Erie County and \$3.37 in Wayne County. The returns per hour of labor averaged 36 cents in Erie County and 29 cents per hour in Wayne County.

#### Cost Per Acre

Growing costs per acre averaged \$52.35 on the Erie County farms and \$36.18 per acre on the Wayne County farms surveyed (table 6). Harvesting costs averaged about \$66 per acre on the farms surveyed in Erie and about \$82 per acre on those

in Wayne County. The higher harvesting cost per acre in Wayne County is accounted for by the higher yield per acre.

TABLE 6. COST PER ACRE TO GROW AND HARVEST CANNING FACTORY SNAP BEANS  
ERIE AND WAYNE COUNTIES, 1941

Expense	Erie County		Wayne County	
	Cost per Acre	Per Cent	Cost per Acre	Per Cent
<u>Growing Costs:</u>				
Labor	\$13.86	11.7	\$ 7.28	5.2
Horse work	2.00	1.7	3.95	3.3
Tractor work	3.66	3.1	2.32	2.0
Equipment	3.11	2.6	1.95	1.7
Seed	11.41	9.7	5.74	4.9
Fertilizer	5.27	4.5	3.48	3.0
Manure	1.33	1.1	6.06	5.1
Green manure	2.47	2.1	.08	---
Land	8.40	7.1	4.83	4.1
Other, including interest	.84	.7	.49	.4
Total Growing Costs	\$ 52.35	44.3	\$ 36.18	30.7
<u>Harvesting Costs:</u>				
Labor	\$ 61.04	51.6	\$ 79.73	67.6
Trucking and other	4.83	4.1	2.01	1.7
Total Harvesting Costs	\$ 65.87	55.7	\$ 81.74	69.3
Total Growing and Harvesting Costs	\$118.22	100.0	\$117.92	100.0

Man labor represented the most important single item of cost in growing and harvesting snap beans for canning. Of the growing and harvesting costs, man labor represented 63 per cent of the total in Erie County and nearly 74 per cent in Wayne County. Growing costs represented a larger proportion of the total growing and harvesting cost in Erie County than in Wayne County because of the lower yield in Erie County. Seed, which represented nearly 10 per cent of the total cost in Erie County, was the second most important item and was followed by land costs which represented about 7 per cent of the total. In Wayne County seed and manure each equaled about 5 per cent of the total cost. Trucking and other costs connected with the harvesting of the snap beans represented about 4 per cent of the total cost in Erie County, but less than two per cent in Wayne County.

## Amount and Cost Per Acre of Materials and Power

An average of only one-half ton of manure was charged to snap beans in Erie County as compared with 2.8 tons per acre in Wayne County (table 7). The manure was valued at about \$2.60 per ton in Erie County and about \$2.20 per ton in Wayne 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 snap bean 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.

TABLE 7. AMOUNTS PER ACRE AND COST OF MATERIALS AND POWER IN GROWING AND HARVESTING SNAP BEANS FOR CANNING  
ERIE AND WAYNE COUNTIES, 1941

	56 Farms Erie County	55 Farms Wayne County
- Amount per Acre -		
Manure (tons)	0.5	2.8
Fertilizer (pounds)	329	242
Seed (pounds)	70	50
Horse work (hours)	10.5	21.1
Tractor work (hours)	7.4	4.9
- Cost per Unit -		
Manure (per ton)	\$ 2.61	\$ 2.20
Fertilizer (per ton)	32.08	28.78
Seed (per pound)	.163	.115
Horse work (per hour)	.19	.19
Tractor work (per hour)	.50	.47

The Erie County growers used an average of about 330 pounds of fertilizer per acre of snap beans as compared with an average of about 240 pounds per acre used by the Wayne County growers. The fertilizer applied by the Erie growers cost an average of about \$32 per ton as compared with an average of about \$29 for that used by the Wayne growers.

An average of about 70 pounds of seed per acre was used in Erie County while only about 50 pounds per acre was used in Wayne County. The seed used in Erie County cost an average of more than 16 cents per pound while that in Wayne County cost an average of only  $11\frac{1}{2}$  cents per pound.

An average of  $10\frac{1}{2}$  horse hours and 7.4 tractor hours were used in growing and harvesting an acre of snap beans in Erie County as compared with an average of 21.1 horse hours and 4.9 tractor hours in Wayne County. Even though the Erie growers did much of their cultivating with horses their costs for power per acre

were lower than those of the Wayne County growers. The combined horse and tractor work cost an average of \$5.66 per acre in Erie County as compared with \$6.27 per acre in Wayne County. The large acreages of snap beans in Erie County made possible efficient use of power and machinery.

#### Kinds of Fertilizer Used

Commercial fertilizers with a wide variety of analyses were used for snap beans by both Erie and Wayne County growers. Many of the growers used a combination of fertilizers. A 5-10-5 analysis fertilizer was most commonly used in Erie County and represented about one-half of both the value and tonnage of fertilizer applied (table 8). A 4-16-4 analysis fertilizer represented about 25 per cent of the tonnage applied and was used by 14 of the Erie County growers. Superphosphate, used by 5 growers, was third in importance.

In Wayne County 17 growers or 31 per cent of the number from whom records were obtained used no commercial fertilizer. Seven of the Wayne County growers used superphosphate, which accounted for 32 per cent of the tonnage of fertilizer applied. Five of the Wayne growers used a 3-12-6 analysis fertilizer, and 7 used a 4-12-4 analysis.

TABLE 8. KINDS OF FERTILIZER USED FOR CANNING FACTORY SNAP BEANS  
ERIE AND WAYNE COUNTIES, 1941

Fertilizer Analysis	Erie County			Wayne County		
	Number of Farms*	Pounds	Cost	Number of Farms*	Pounds	Cost
5 - 10 - 5	28	330,650	\$ 5,236	3	2,600	\$ 45
4 - 16 - 4	14	165,800	2,914	3	1,750	29
Superphosphate	5	57,800	695	7	22,300	240
3 - 12 - 6	4	22,250	387	5	13,925	221
4 - 12 - 4	5	19,350	304	7	12,250	200
4 - 8 - 12	-	-	-	6	4,200	72
Other	7	56,150	937	9	12,430	192
None	-	-	-	17	-	-
Total	56	653,000	\$10,473	55	69,455	\$999

\* Some growers used more than one kind of fertilizer.

#### Variation in Cost per Ton

The average cost to grow and harvest a ton of snap beans for canning in Erie County was \$75.99 and in Wayne County \$50.09 (figure 1). Few of the growers produced their snap beans at the average cost in either of the counties. Cost

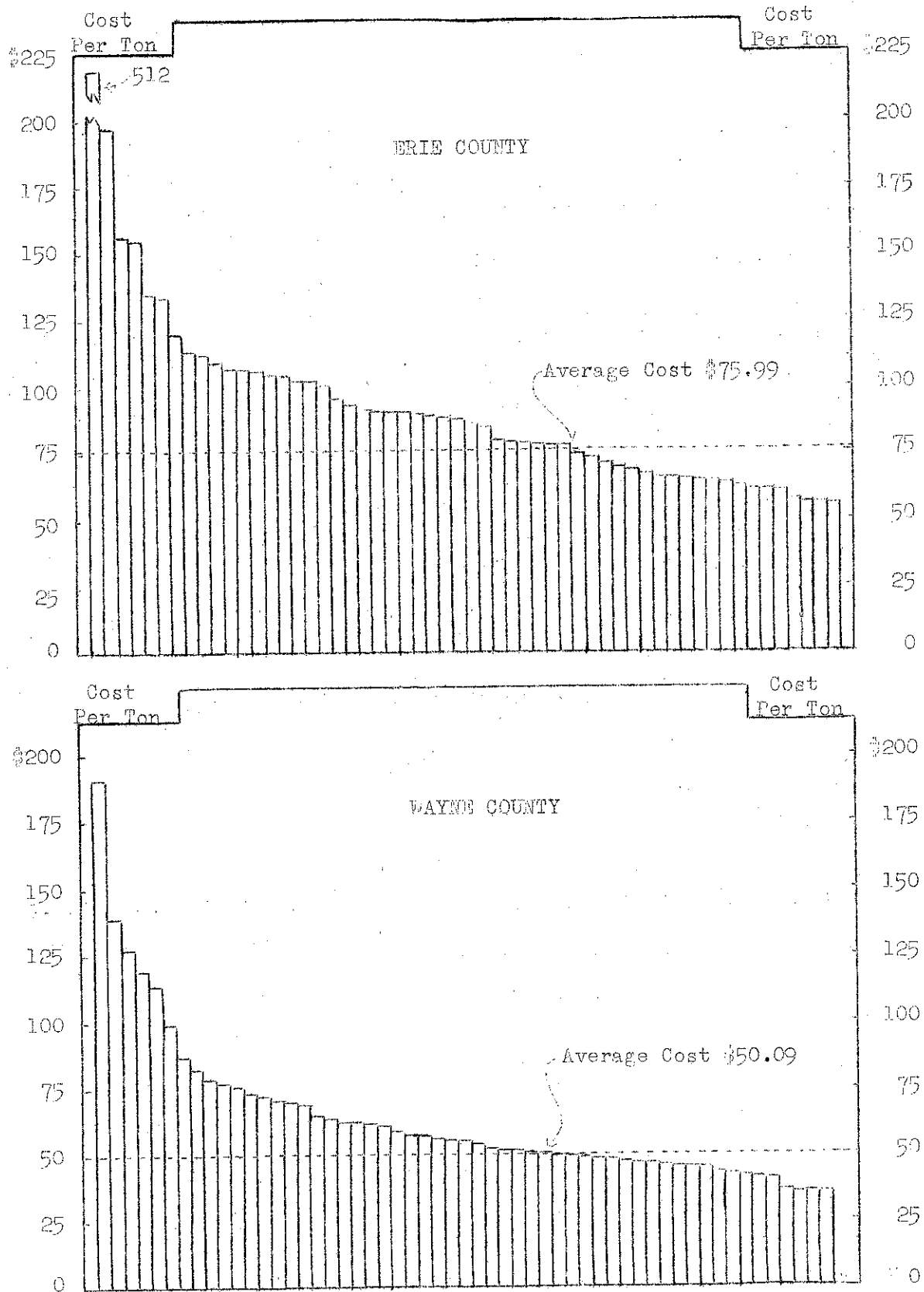


FIGURE 1. COST TO GROW AND HARVEST A TON OF SNAP BEANS FOR THE CANNING FACTORY, 56 ERIE AND 55 WAYNE COUNTY FARMS, 1941.

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

per ton to grow snap beans in Erie County on individual farms varied from about \$56 to \$112. In Wayne County the variation between individual farms was from about \$35 per ton to \$191. In nearly all instances in both Counties the extremely high costs per ton were caused by low yields or near crop failures.

Of the Erie growers 20 produced their snap beans at costs below the average and 36 had costs above the average. In Wayne County 21 of the growers had costs below average for that county and 34 had costs above the average. This indicates that the growers having a lower than average cost were those that had larger than average acreages of snap beans per farm. The 21 growers in Wayne County who had costs below the average had an average of 10 acres of snap beans per farm as compared with an average of slightly more than 2 acres per farm grown by those who had higher than average costs.

The cost to grow and harvest a ton of snap beans was closely associated with the yield per acre. The cost to grow an acre of snap beans varied relatively little compared with the variation in the yield per acre between farms. Thus the growing cost, and so the total cost, tended to be much lower where the yield was high than where it was low. In Erie County the three farms having the lowest yields per acre were the three with the highest cost per ton. And likewise, those farms with the highest yields per acre tended to have the lowest costs per ton.

In Wayne County more than 71 per cent of the snap beans were grown at a cost of between \$40 and \$50 per ton (table 9). In Erie County, where the cost per ton averaged higher, 42.5 per cent of the beans were grown at a cost of from \$60 to \$70 per ton, and 14 per cent were grown at a cost of \$100 or more per ton.

TABLE 9. PRODUCTION OF SNAP BEANS FOR CANNING AT DIFFERENT COSTS  
ERIE AND WAYNE COUNTIES, 1941

Cost per ton to grow and harvest	Erie County			Wayne County		
	Farms	Yield per acre, tons	Per cent of production	Farms	Yield per acre, tons	Per cent of production
Less than \$40	---	---	---	4	3.0	3.5
\$40 to 49	--	---	---	17	2.4	71.3
\$50 to \$59	4	2.7	7.0	12	2.5	16.9
\$60 to \$69	13	1.9	42.5	7	1.8	4.2
\$70 to \$79	9	1.6	22.2	7	1.8	2.4
\$80 to \$99	12	1.3	14.3	3	1.9	.5
\$100 to \$119	11	1.1	13.1	2	1.8	.3
\$120 or more	7	.4	.9	3	1.0	.3
Total	56	1.6	100.0	55	2.4	100.0

### Variation in Labor Returns

The return per hour of labor spent on the enterprise is the amount per hour by which total returns exceeded all costs other than labor costs. The returns per hour of labor varied greatly between farms as did the cost per ton. The average returns per hour of labor for snap beans on the Erie County farms was 36 cents; but the returns to individual growers varied from a minus 61 cents per hour to a plus 68 cents per hour (figure 2). In Wayne County the average returns per hour was 29 cents and the range was from a minus 4 cents per hour to a plus 69 cents per hour. Only 3 of the Erie County growers and 2 of the Wayne County growers failed to get any returns for the time spent on the enterprise after allowing for all costs other than labor, such as for use of land, fertilizer, seed, machinery, and farm power costs. Twenty-eight Wayne County bean growers and 24 of the Erie growers obtained a return for the time spent on the enterprise but not enough to cover all the labor costs involved. Nine of the Erie growers and 3 of the Wayne growers made returns of over 50 cents per hour of labor spent on snap beans.

On a crop like snap beans where a very high proportion of the labor is special labor required for harvesting the crop, the returns per hour of labor that the operator or the regular farm help spends on the enterprise varies much more widely than these figures indicate. If the labor returns per hour are above the labor cost per hour, the difference goes to the operator who usually has contributed a relatively small proportion of the total time spent on the enterprise. This would make his returns per hour rise rapidly. On the other hand, if the returns per hour of labor are below the labor cost per hour, the special laborer receives his pay and the operator makes up the difference in a very low return per hour spent on the enterprise.

In each county growers who had the lowest returns per hour of labor had the highest growing cost per ton. The yield of snap beans per acre probably is the most important factor in determining the return per hour of labor, because the growing cost per acre and the returns per ton of beans vary much less than the yield per acre. The growers with the higher yields usually receive the highest returns per hour of labor spent on the enterprise.

### Relation of Yield of Snap Beans to Cost

The yield per acre is an important factor affecting the cost per ton of growing snap beans. Although the total cost of growing per acre tends to increase with the higher yields, the increase is relatively small compared with the increase in yield, and so the cost of growing and the total cost per ton tend to decrease with the increase in yield. This was particularly true in Erie County.

Growing costs are made up largely of the costs which tend to vary only slightly regardless of the yield. In Erie County the growing cost per acre increased from an average of \$49 per acre for those growers having a yield of less than 1.2 tons per acre to \$54 for those having yields of 1.7 tons or more per acre (table 10). The growing cost per ton for those with the low yields averaged \$53 as compared with \$25 for those with high yields. In Wayne County the group

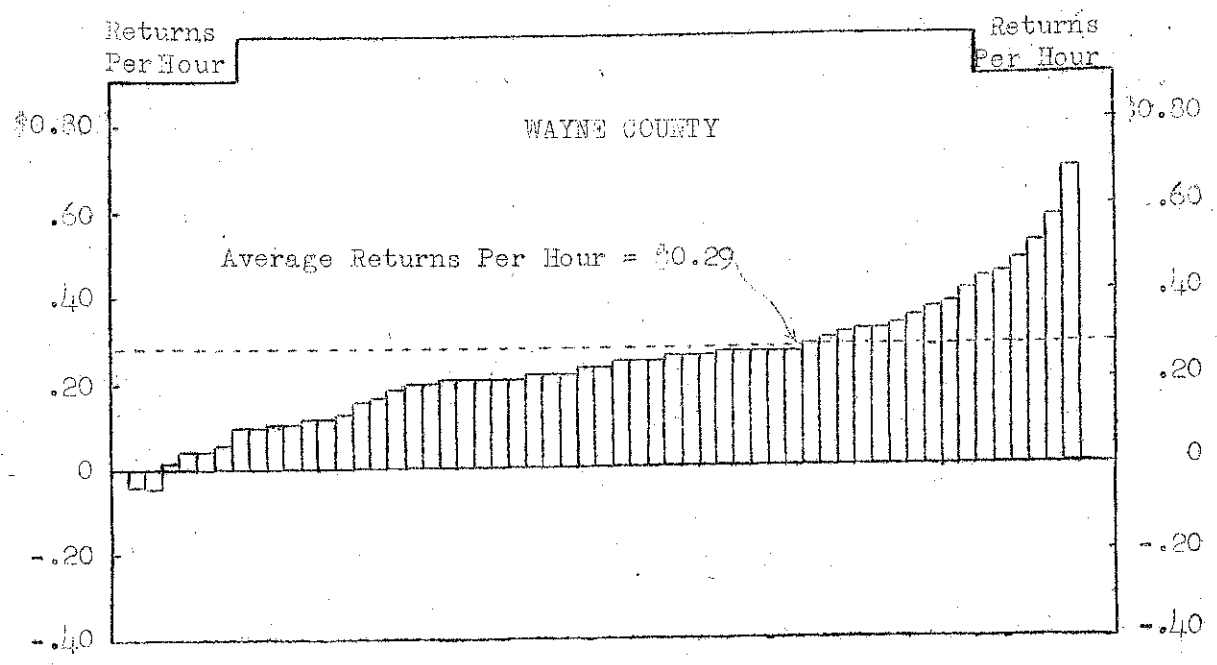
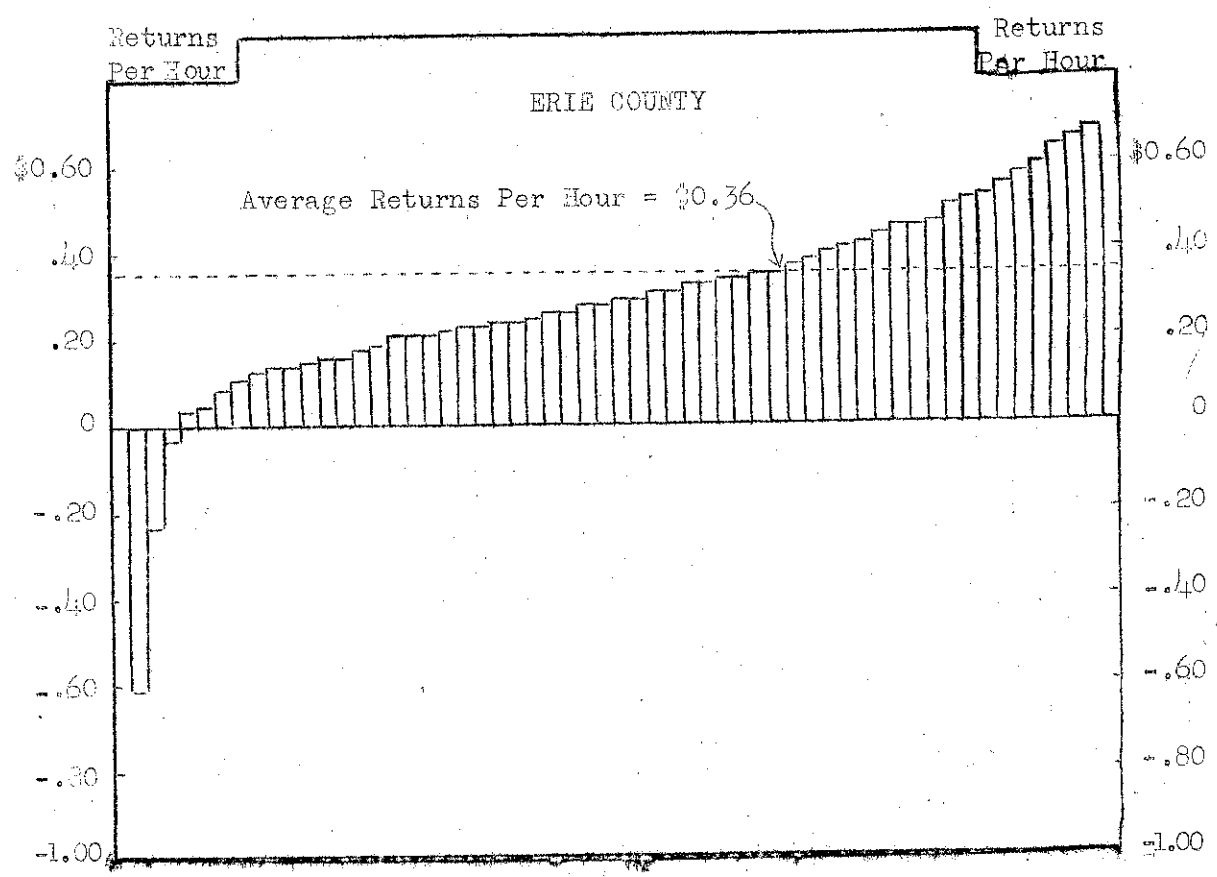


FIGURE 2. RETURNS PER HOUR OF LABOR ON SNAP BEANS,  
56 ERIE AND 55 WAYNE COUNTY FARMS, 1941  
The height of each bar represents the returns on one farm.

with the low yields had growing costs which averaged \$21 per ton as compared with an average of \$13 per ton for those with high yields.

TABLE 10. RELATION OF YIELD OF SNAP BEANS TO COSTS  
ERIE AND WAYNE COUNTIES, 1941

Yield of snap beans per acre, tons		Number of farms	Cost per acre		Total Cost per ton	
Range	Average		Growing	Total	Growing	Total
Erie County						
Less than 1.2	.9	17	\$ 49	\$ 89	\$ 53	\$ 96
1.2 to 1.6	1.4	21	53	116	37	80
1.7 or more	2.2	18	54	144	25	66
Wayne County						
Less than 2.0	1.6	19	\$ 33	\$ 89	\$ 21	\$ 56
2.0 to 2.9	2.4	20	34	115	14	48
3.0 or more	3.6	16	48	181	13	50

The harvesting costs per ton vary less than do the growing costs because they are made up largely of labor costs which tend to vary with the size of crop. The 17 growers in Erie that had the lowest yields produced their snap beans at an average cost of \$96 per ton compared with an average cost of \$66 per ton for the 18 growers with the highest yields per acre. In Wayne County the cost per ton for the group with lowest yields averaged \$56 as compared with \$50 for the group with the highest yields.

#### Relation of Yield of Snap Beans to Labor Requirements

The information obtained showed no pronounced relationship between the yield of snap beans per acre and the man hours required to grow and harvest a ton of snap beans (table 11). Because the harvesting labor represents such a high proportion of the total labor requirements, variations in the labor used in harvesting a ton easily offsets the differences in labor requirements for growing a ton. The amount of labor to pick a ton would be expected to vary not only with the yield but also with the stage of maturity or the size of the beans when they were picked. The yield in tons of beans might be relatively small for at least two reasons, (1) because of a poor crop, and (2) the beans were picked when small or early in maturity. Beans picked when small or early in maturity usually are of high quality and bring a relatively high price per ton. In both counties the groups of farms with the highest yields of beans used the least amount of labor in picking a ton. Because of the variation in the amount of time required to pick a ton as between the different groups, there was no marked trend according to yield in the total man hours required to grow and harvest a ton of snap beans. In both counties the growers with the highest yield had the lowest total labor requirements per ton.

TABLE 11. RELATION OF YIELD OF SNAP BEANS TO LABOR REQUIREMENTS  
ERIE AND WAYNE COUNTIES, 1941

SNAP BEAN YIELD RECORDS, 1944						
Range	Yield of snap beans per acre, tons	Average	Man hours		Total man hours	
			Growing Per acre	Harvesting Per ton	Per Acre	Per Ton
Erie County						
	Less than 1.2	.9	48	122	161	173
	1.2 to 1.6	1.4	46	148	258	180
	1.7 or more	2.2	51	111	292	134
Wayne County						
	Less than 2.0	1.6	20	124	219	137
	2.0 to 2.9	2.4	20	138	350	147
	3.0 or more	3.6	42	113	448	125

#### Relation of Yield of Snap Beans to Returns

The growers with the highest yield of snap beans had the highest returns per acre and also the highest returns per hour of labor spent on the enterprise. Since the growing cost per acre increased only slightly as the yield increased, the net returns per acre increased markedly with the increased yields. In Erie County the growers with an average yield of less than 1.2 tons per acre had an average loss per acre of \$10 as compared with a net return per acre of \$36 for those growers with an average yield of, at least 1.7 per acre (table 12). In Wayne County the net return per acre ranged from a loss of \$5 for growers with an average yield of less than 2 tons per acre to a return of \$15 for those with 3 tons or more per acre.

TABLE 12. RELATION OF YIELD OF SNAP BEANS TO RETURNS  
ERIE AND WAYNE COUNTIES, 1941

Yield of snap beans per acre, tons	Returns per Acre	Net returns per Acre	Returns per hour of labor
Range	Average		
Erie County			
Less than 1.2	.9	\$ 80	-\$ 10      \$ 0.24
1.2 to 1.6	1.4	121	+ 6      .30
1.7 or more	2.2	180	+ 36      .46
Wayne County			
Less than 2.0	1.6	\$ 84	-\$ 5      \$ 0.25
2.0 to 2.9	2.4	128	+ 13      .28
3.0 or more	3.6	196	+ 15      .36

In Erie County, growers who had less than 1.2 tons of snap beans per acre had an average return per hour of labor of \$ 0.24 as compared with an average return of \$ 0.46 per hour of labor for those growers who had a yield of 1.7 tons or more per acre. In Wayne County, the returns per hour of labor varied from \$ 0.25 for those growers with yields of less than 2 tons to \$ 0.36 per hour for those who had 3 tons or more per acre.

#### Relation of Acres of Snap Beans to Costs

The acreage of snap beans grown per farm surveyed in Erie County varied from 1 acre to 140 acres. On the Wayne County farms, the range was from one-fourth of one acre to 57 acres per farm. No definite relationship was shown between the acreage of snap beans grown per farm and yield per acre. The Erie County growers who had less than 10 acres of snap beans had a low yield per acre compared with those who had larger acreages, but in Wayne County the growers with only a small acreage of snap beans had yields as high as those with the larger acreages. (table 13).

TABLE 13. RELATION OF ACRES OF SNAP BEANS PER FARM TO COSTS  
ERIE AND WAYNE COUNTIES, 1941

Range	Acres of snap beans per farm	Number of farms	Average yield, tons	Costs per acre		Cost per ton		
	Average			Growing	Total	Growing	Total	
Erie County								
Less than 10	5.1	15	1.1	\$ 58	\$ 117	\$ 53	\$ 108	
10 to 39	20.7	20	1.7	56	125	33	74	
40 or more	71.2	21	1.5	51	116	33	75	
Wayne County								
Less than 1	.5	14	2.5	\$ 83	\$ 206	\$ 30	\$ 82	
1 to 2	1.5	22	2.4	47	130	20	53	
3 or more	13.1	19	2.3	33	114	14	49	

In both counties, the growing cost per acre tended to be higher on the farms having the lower acreage of snap beans than on the farms having the larger acreages. The difference, however, was much more pronounced in Wayne County than in Erie County. There were few growers in Erie County who had really small acreages of snap beans. In fact there were only five growers who had less than 5 acres. Thus most all the growers in Erie County had acreages large enough to make possible efficient use of labor, machinery, and equipment. In Wayne County 14 of the 55 growers from whom records were taken had less than 1 acre of snap beans. Their growing cost per acre averaged \$83 as compared with an average growing cost of \$33 for those growers who had 3 acres or more per farm. The very small acreages did not permit efficient use of machinery, equipment, and labor. It takes about as long to get machinery out of the barn and to the field to plant and care for

one-fourth acre of a crop as it does to get it out for 10 acres or more. The proportion of the time spent turning at the end of the field is much greater in a small field than in a large ones.

In Erie County, growers who had less than 10 acres of snap beans grew them at an average cost of \$108 per ton, as compared with an average cost of \$74 or \$75 per ton for the beans grown by those who had 10 or more acres per farm. This difference is largely accounted for by the lower yield per acre obtained by those growers with the smaller acreages. In Wayne County growers with 3 acres or more of snap beans per farm produced the beans at an average cost of \$49 per ton as compared with an average cost of \$82 per ton for those growers with less than one acre. The cost per ton for picking as well as the growing cost per ton was higher on the small acreages than on the large acreages of snap beans.

#### Relation of Acres of Snap Beans per Farm to Labor Requirements

Growers in Erie County who had less than 10 acres of snap beans per farm used an average of 68 hours of man labor in growing their snap beans as compared with an average of 45 hours of labor used by those who had 40 or more acres in their enterprise (table 14). The same relationship was true in Wayne County but was even more pronounced. The growers who had 3 acres or more of snap beans in their enterprise spent only one-fourth as much time as those who had less than 1 acre; or an average of 21 hours per acre to grow the beans for those with the larger acreages as compared with 84 hours for those with the smaller acreages. On an average, the Wayne County growers used much less labor in growing their snap beans than did the Erie County growers. Most of the difference is in the amount of time spent hoeing the beans. About 40 per cent of the growing labor was for hoeing in Erie County, while very little of this was done in Wayne County.

TABLE 14. RELATION OF ACRES OF SNAP BEANS PER FARM TO LABOR REQUIREMENTS  
ERIE AND WAYNE COUNTIES, 1941

Acres of snap beans per farm		Man hours growing	Total man hours	Man hours harvesting	Total man hours
Range	Average	per acre	per acre	per ton	per ton
Erie County					
Less than 10	5.1	68	267	183	246
10 to 39	20.7	55	290	140	173
40 or more	71.2	45	229	119	148
Wayne County					
Less than 1	.5	84	493	163	197
1 to 2	1.5	34	380	142	156
3 or more	13.1	21	315	126	135

The data indicated that the most efficient use of labor for picking was made by the growers with the large acreages. In both counties, the total man hours required to grow and harvest a ton of snap beans tended to decrease as the acreage of snap beans per farm increased. In both counties this trend was accounted for by a greater efficiency in the use of labor for both harvesting and growing beans on the larger acreages.

#### Relation of Acres of Snap Beans Per Farm to Returns

The returns per ton of snap beans vary rather widely as compared with the returns per ton of tomatoes, sweet corn, or peas for canning. This is because most of the snap beans are purchased on a graded basis; and the grade as well as the tonnage of snap beans depends to a great extent upon the maturity. Thus the highest yield of snap beans might not necessarily bring the highest returns per acre. For example, although the yield per acre obtained by those Erie County growers with more than 40 acres of snap beans was more than 40 per cent higher than the yield of those with less than 10 acres of snap beans, the returns per acre were only about 2 per cent higher. In both counties net returns (total returns less total cost) tended to be higher on the farms growing the larger acreages of snap beans (table 15). This was due to the differences in the cost of production rather than the yield and returns per acre. In Wayne County, growers who had less than one acre of snap beans had an average return of \$147 per acre as compared with \$126 per acre for those who had more than 3 acres; but those with the small acreages had higher growing costs which resulted in a loss of \$59 per acre as compared with a net return of \$12 per acre for the growers who had the larger acreages. The returns per hour of labor also tended to be higher for those growers who had the largest acreages of snap beans. In both counties the growers having the larger acreages produced beans with less labor and had a higher net return per acre than did the growers with the smaller acreages, and so they obtained higher returns per hour of labor.

TABLE 15. RELATION OF ACRES OF SNAP BEANS PER FARM TO RETURNS  
ERIE AND WAYNE COUNTIES, 1941

Acres of snap beans per farm		Returns	Net returns	Returns per
Range	Average	per acre	per acre	hour of labor
Erie County				
Less than 10	5.1	\$ 126	\$ 9	\$ 0.32
10 to 39	20.7	135	10	.31
40 or more	71.2	129	13	.38
Wayne County				
Less than 1	.5	\$ 147	-\$ 59	\$ 0.18
1 to 2	1.5	123	7	.22
3 or more	13.1	126	12	.31

## Relation of Value of Fertilizer Applied to Cost, Yields, and Returns

All of the Erie County growers applied some commercial fertilizer. Eighte applied less than \$4 worth of commercial fertilizer and, 17 growers applied \$6 worth or more (table 16). Those who applied less than \$4 worth of commercial fertilizer obtained an average yield of 1.4 tons per acre, whereas those who applied \$6 worth or more obtained an average yield of 1.9 tons per acre. Net returns per acre and returns per hour of labor both increased as the amount of fertilizer applied increased.

TABLE 16. RELATION OF VALUE OF FERTILIZER APPLIED TO COSTS, YIELDS, AND RETURNS OF SNAP BEANS, ERIE AND WAYNE COUNTIES, 1941

Range	Cost of fertilizer per acre	Average	Number of farms	Growing cost per acre	Yield per acre	Returns per acre	Net returns per acre	Returns per hour of labor
Erie County								
Less than \$4	\$	2.60	18	\$ 47	1.4	\$ 112	\$ 5	\$ 0.33
\$4 to \$5		5.10	21	50	1.4	120	12	.34
\$6 or more		7.64	17	59	1.9	156	18	.39
Wayne County								
None	\$	----	16	\$ 39	2.0	\$ 108	-\$ 1	\$ 0.24
\$1 to \$4		3.50	21	34	2.3	120	11	.28
\$5 or more		5.80	18	45	3.0	165	2	.38

Of the 55 growers in Wayne County, 16 applied no commercial fertilizer. They obtained an average yield of 2 tons of snap beans per acre as compared with an average yield of 3 tons per acre obtained by those growers who applied \$5 worth or more of commercial fertilizer. The returns per acre and the returns per hour of labor increased as the amount of commercial fertilizer applied increased. The 16 growers who applied no commercial fertilizer had a return per acre of \$108 and a return per hour of labor of 24 cents as compared with returns per acre of an average of \$165 and an average return per hour of labor of 38 cents obtained by those who applied commercial fertilizers valued at \$5 or more per acre.

## Relation of Manure and Fertilizer Expense to Yield and Returns

As the combined value of commercial fertilizer and manure applied per acre increased, the yield per acre of snap beans tended to increase. However, growers who applied exceptionally large amounts of manure and fertilizer obtained yields and returns no higher than did those who applied moderately large amounts. In Erie County, growers who applied more than \$9 worth of manure and fertilizer per