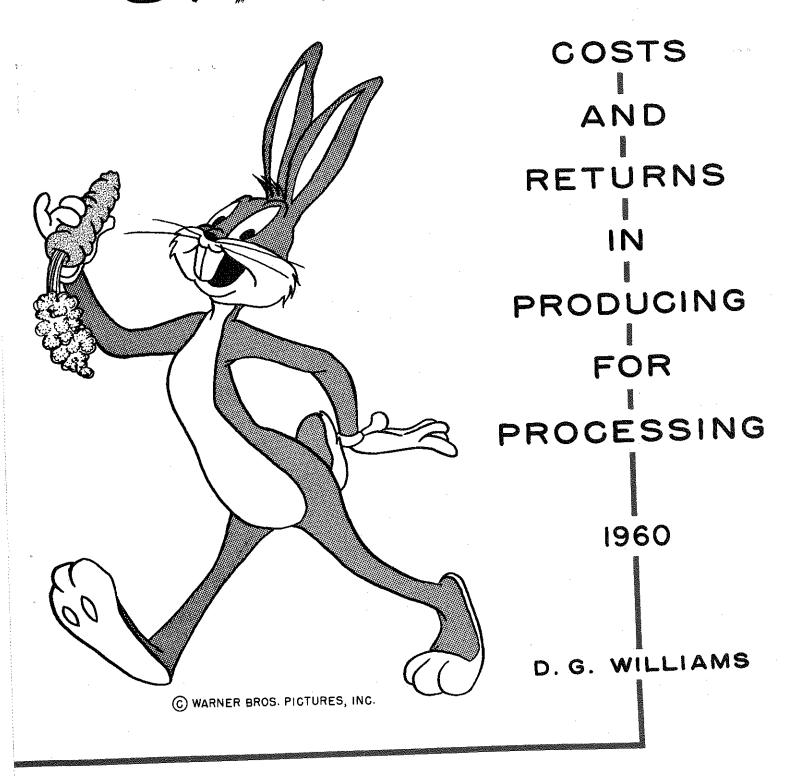
CARROTS



Department of Agricultural Economics

Cornell University Agricultural Experiment Station

New York State College of Agriculture

A Unit of the State University of New York

Cornell University, Ithaca, New York



BURBANK, CALIFORNIA

WEST COAST
LEGAL DEPARTMENT

April 28, 1961

Mrs. Naomi Westbrook
Department of Agricultural Economics
New York State College of Agriculture
353 Warren Hall
Cornell University
Ithaca, New York

Dear Mrs. Westbrook:

Enclosed please find a Copyright License, executed by an authorized officer of our company, pursuant to which you are granted permission to use our copyrighted cartoon character "BUGS BUNNY", as specified therein.

Also enclosed are two sketches of "BUGS BUNNY" which you may use for the purpose set forth in the Copyright License.

I would appreciate it if you would send a copy of the bulletin containing the approved "BUGS BUNNY" art work to me for our files when it is printed.

Yours very truly,

HOWARD BARTON

HB:no Encl. (1-2)



COPYRIGHT LICENSE

WARNER BROS. PICTURES, INC., a	Delaware corporation, as
Owner and Copyright Proprietor of the ficidentified as "BUGS BUNNY"	titious cartoon character, hereby grants to
NEW YORK STATE COLLEGE OF AGRICULTURE	, CORNELL UNIVERSITY
a license to reproduce and use, free of cleartoon character as and only as depicted hereto on and only on a bulletin on costs subject to the following conditions:	d in the drawings attached
(a) In connection with such recartoon character the copyright notice "Inc." must be reproduced; and	production of the aforesaid © Warner Bros. Pictures,
(b) No copies of the aforement will be used apart from the aforesaid use exploitation for commercial purposes what with any commercial product in any way wh	, in connection with any soever, or in connection
Any violation of the conditions or (b) above will result in immediate can License.	listed in paragraphs (a) cellation of this Copyright
DATED this 28th day of Ap	<u>ril</u> , 19 <u>61</u> .
WA	RNER BROS. PICTURES, INC.
By	Assistant Treasurer

FALL CARROTS FOR PROCESSING

California led in production of carrots, growing 45 per cent of the nation's crop in 1959. New York State was third, producing 6 per cent of the crop (table 1). When only early fall carrots, for both processing and fresh market, are considered, New York State was the leader, followed by Oregon, Wisconsin and Texas.

Table 1.

MAJOR AREAS OF CARROT PRODUCTION

	Produ	iction	Per cent
State	1949-57	1959	Total production 1959
Maintania di Ambiangan - da da matania gambaga da mbalif da alpaniagan bawa da bigada na bisa da mali na di ma	1,000) cwt.	Per cent
California Texas New York Oregon Wisconsin Arizona Washington Michigan Eight other states	6,147 3,088 1,108 389 600 985 361 659	6,237 2,435 783 616 544 532 520 460 1,498	45 18 6 5 4 4 4 1
TOTAL	15,191	13 , 625	100

Source: Crop Reporting Service USDA, Vegetables - Fresh Market, Annual Summary, 1959

Trends

Although the acreage of carrots in New York remained fairly constant from 1955 to 1959, the average for this period was about 1,000 acres below that of the preceding 5 years. Yield per acre changed little during the period 1955 to 1959 and averaged about 15 tons. This was slightly more than the preceding 5 year average and was above the national average. The price fluctuation from year to year has been large. Generally New York prices have been above the average of the major competing states (table 2).

Table 2.

FALL CARROT PRODUCTION United States and New York State

	Are	ea.	Yield pe	r acre	Price pe	er cwt.
Year	Early fall group*	New York	Early fall group*	New York	Early fall group*	New York
	<u>ac</u>	res	C.M.	rt.	do	<u>llars</u>
1949-54 1955 1956 1957 1958 1959	18,910 15,680 18,140 19,040 21,090 16,700	4,200 3,000 3,300 3,000 3,000 2,900	242 241 254 227 23 ⁴ 25 ⁴	283 290 320 300 320 270	1.87 2.10 1.64 2.06 1.55 1.84	1.65 2.50 1.68 2.01 1.95 2.14

Source: Crop Reporting Board, USDA, Vegetables-Fresh Market, Annual Summaries

*Group - Early Fall Carrots - includes the following states:
Oregon, Washington, Idaho, Utah, New Mexico, Illinois, Minnesota,
Wisconsin, Michigan, Pennsylvania, New York, Massachusetts, Texas.

Relative Importance of Carrots in New York

Carrots were grown on 2,900 acres in New York State in 1959. This amounted to less than 1.5 per cent of all land in vegetables for sale in the State in 1959. The income from carrots was 5 per cent of the returns for all vegetables grown. The counties leading in both fresh and processing carrot production were Wayne, Ontario, Monroe, Genessee, and Orange in that order.

The Study

This study was undertaken to obtain information on costs and returns in carrot production and to determine the growing, harvesting and marketing factors affecting the costs and returns.

From lists supplied by processors and county agricultural agents a random sample of growers was selected. During November 1960 data were collected on the business organization and the costs and returns in carrot production for the 1960 year. Twenty-five complete records on the enterprise were obtained in Western New York (figure 1). Eleven records were from upland and fourteen muckland farms.

For analysis the carrot enterprises studied were divided into two groups according to kind of soil, muckland or upland (mineral soils). The size of muck carrot enterprises ranged from 4.5 to 45.0 acres and averaged 16 acres per farm. The upland enterprises ranged from 5.0 to 37.0 acres and averaged 20 acres of carrots.

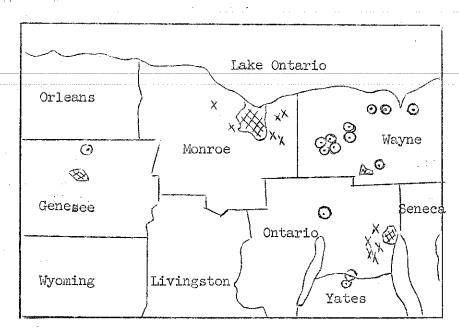


Figure 1.

LOCATION OF CARROT GROWERS
25 Farms, Western New York, 1960

X Upland farms O Muck farms

DESCRIPTION OF FARMS STUDIED

Table 3. CHARACTERISTICS OF UPLAND FARMS

II Farm	s, western	New York	70U
	Average	Farms	reporting
Item a	cres all	24.1	Acres per
	farms	Number	farm
Total crop acres Woods Farmstead & waste	137 8 18	11 7 9	137 12 22
Total land used	. 163		
Major crops:			
Carrots	20	11	20
Cabbage	5	. 14	14
Beets	18	5	40
Red kidney beans	20	3	75
Small grain	20	3 8	27
Hay	20	5	43

Upland Enterprises

The upland enterprises were located on farms which ranged in size from 5 to 366 tillable acres. These farms were located near Rochester or Geneva. Of the average of 163 acres operated, 38 acres were rented. With one exception vegetable cropswere a major source of income for the farmers. Two operators reported doing some work off the farm. Dairy cattle was the predominant livestock enterprise. Two growers also reported small poultry flocks (table 3).

Table 4. CHARACTERISTICS OF MUCKIAND FARMS

1_{j}	+ Farms,	Western	New York,	1960
	Av	erage	Farms r	eporting
Item	acr	es all		Acres per
	f	arms	Number	farm
Total crop aca	res	83 .	14	83
Woods		6 *	5	16
Farmstead & wa	aste	37	11	48
Total		126		
Land double co	copped	(11)	8	20
Total land	used	137		
Major crops:		7.7	2).	16
Carrots		16	14	20
Spinach		13	9	10
Potatoes		5 5	7 2	38
Snapbeans		10	2	68
Celery		11	4	14
Small grain		9)4	32
Hay		2	'Τ	<i>J</i> –

Muckland Enterprises

The muck farms were generally smaller than the upland farms (table 4). There was an average of 83 tillable acres, 10 of which were rented. One farm had only 10 tillable acres and another had 352 tillable acres.

The growing of vegetables was the major source of income on these farms with only 3 operators reporting livestock enterprises. Seven growers worked off their farms from 12 to 150 days. Many of these growers considered carrots a major source of income

PRACTICES AND INPUTS USED IN GROWING

Labor

Growing an acre of carrots requires about 40 hours of labor on the upland and 33 hours on the muck (table 5). The upland growers performed an average of 21 separate operations including four fittings, four cultivations, three sprays and two hand weedings. The muck growers averaged 20 operations by using one less hand weeding. Fittings ranged from 2 to 7 times and spray applications from 2 to 6 times. Replanting was done by one upland grower and 6 muck growers. An average of 5 acres was replanted by each.

Variations from farm to farm in the labor required to grow an acre of carrots were large. The range was 18 to 70 hours on the upland and 8 to 56 hours on the muck farms. On the upland farms 36 and muck farms 43 per cent of the growers used less than 30 hours of labor to grow an acre. For the upland farms 36 and for the muck farms 14 per cent of the growers used more than 50 hours labor. Tractor use per acre was less variable from farm to farm than might be expected, both groups averaged 7 hours per acre (table 5). Three upland and 10 muck growers used garden tractors on their carrot enterprises.

Table 5. PHYSICAL INPUTS TO GROW AN ACRE OF CARROTS FOR PROCESSING 25 Farms, Western New York, 1960

Item	Upland farms	Muck farms	Your farm
Number of farms		<u></u>	
Average acres of carrots	20	16	
Average yield per acre (tons)		20 20	
Tons sold per acre	19	20	
Labor (hours)			
Operator	9	18	•
Family	1 30	3	<u>विकासी</u> सामग्रीकार के लेखा
Other	30	12	23.115.11.4.5.1
Total	40	33	
Tractor hours	7	7	
Truck miles	7	3	
Manure (tons)	1.	•	
Fertilizer (lbs.)	••	•	**
Nitrogen	123	111	
Phosphorus	156	182	as 61 a = 1 c .
Potassium	189	171	*************************************
Seed used (lbs.)	1,2	1.8	September 1985

Seeding

The present recommended rate of seeding is 2 to 4 pounds per acre. Only 6 growers followed these recommendations; the range of actual use was 0.8 to 3.5 pounds per acre, with an average of 1.2 pounds for the upland enterprises and 1.8 pounds for the muck enterprises. Many growers reported that their seed was supplied by the processor. The varieties most commonly used were Nantes, Chantenay Red Cored and Royal Chantenay. Row width ranged from 13 to 24 inches on the upland enterprises, averaging 19 inches; the muck enterprises ranged from 12 to 22 inches, averaging 16 inches. Planting started as early as April 20 and ran until June 28; 10 growers planted in May and 12 growers in June.

Fertilizer

The 1960 recommended rate of fertilizer for muck soils for carrots was 1200 pounds of 5-10-15 or equivalent per acre, for upland sandy soil 600 to 900 pounds 8-16-16 and for loam soils 500 to 700 pounds 10-20-10. The general practice was to use more than this amount of fertilizer, depending on the farmer's past experience and estimate of the existing level of fertility of his soil.

Cultivation and Spraying

Only 3 upland growers cultivated more than the group average of 4 times, with one grower reporting 7 cultivations. These growers hand weeded twice; however, one grower reported hand weeding 4 times.

The muck growers as a group averaged 4 cultivations with one grower indicating he cultivated 8 times. These growers, as a group only, hand weeded once, but one grower hand weeded 4 times.

Spraying was done, on the average, 3 times by each group.

COSTS IN GROWING

The average cost of growing carrots on upland farms was \$172. On muck farms it was \$210. The difference was \$38 or about 20 per cent. Although higher labor requirements on upland farms, as previously noted, resulted in higher labor cost on those farms, this was more than offset by higher costs elsewhere, especially the land costs, in the production of muck carrots (table 6).

Table 6. COSTS TO GROW AN ACRE OF CARROTS FOR PROCESSING 25 Farms, Western New York, 1960

Item	Upland	Muck	Your
	farms	farms	farm
Number of farms	11	14	
Average acres of carrots	20	16	
Average yield per acre (tons)	19	20	
Tons sold per acre	19	20	
Growing cost: Labor Power Weed spray Insect spray Fertilizer and lime Manure Seed Land Special equipment General equipment Overhead Interest Other	\$ 52 10 21 2 42 5 20 4 5 7 1	\$ 47 11 26 6 45 1 3 42 7 5 8	
TOTAL GROWING COST	\$1.72	\$210	

Most growers spent between \$150 and \$210 per acre to grow carrots. Three growers, all muck farmers, spent more than \$240 per acre (table 7). The upland growers generally had a lower level of costs than the muck farmers.

Table 7. DISTRIBUTION OF GROWING COST PER ACRE 25 Farms, Western New York, 1960		
Growing cost	g cost Number of farms	
	Upland	Muck
\$120 - 150 151 - 180 181 - 210 211 - 240 241 or more	3 · 2 5 1	3 4 4 3

Labor was the greatest single cost. This was followed by fertilizer and lime, land and spray material costs. These four itmes were approximately three quarters of the total cost of growing carrots (figure 2 and figure 3).

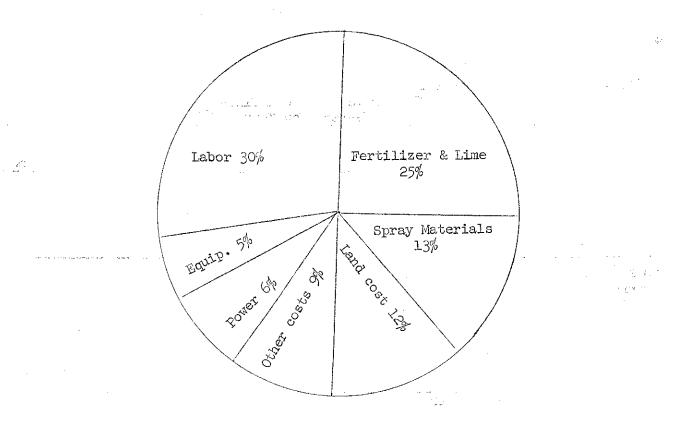


Figure 2. PERCENTAGE DISTRIBUTION OF AVERAGE COSTS TO GROW AN ACRE OF UPLAND CARROTS
11 Upland Farms, Western New York, 1960

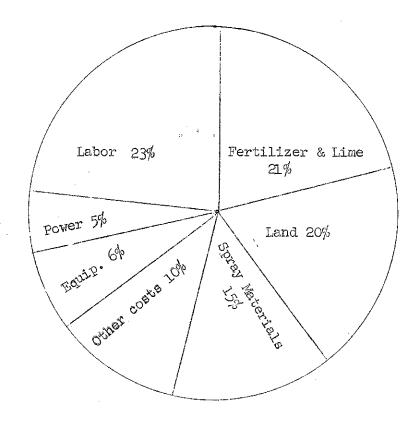


Figure 3. PERCENTAGE DISTRIBUTION OF AVERAGE COSTS TO GROW AN ACRE OF MUCK CARROTS
14 Muck Farms, Western New York, 1960

PRACTICES AND INPUTS USED IN HARVESTING

Labor

In harvesting very slightly less labor was spent per acre of carrots on the muck as compared with the upland farms. The averages were 47 and 49 hours respectively (table 8). The tractor hour requirements were about the same for each group of farms with about 5 hours per acre.

Table 8. PHYSICAL INPUTS TO HARVEST AN ACRE
OF CARROTS FOR PROCESSING*
25 Farms, Western New York, 1960

Item	Upland farms	Muck farms	Your farm
Number of farms Average acres of carrots Average yield per acre (tons) Tons sold per acre	11 20 19 19	14 16 20 20	
Labor (hours) Operator Family Other Total	9 3 37 49	18 8 21 47	
Tractor hours Truck miles	5 51	6 89	

^{*}Includes store and sell labor

There were several different methods used in harvesting carrots. Some growers used a plow and hand labor to dig, top, sort and grade the crop. Others used a completely mechanical harvester which performed these operations and transfered the carrots to pallet boxes. There were all degrees of mechanization between these extremes. Most of the growers included in the study used more than one method because of varying soil and weather conditions.

COST IN HARVESTING

The cost per acre for harvesting carrots was \$122 for upland and \$125 for muck growers (table 9). The largest single charge was for labor. This was followed by the cost of special harvesting equipment. With three exceptions, all the harvesting was completely done by the grower. In those cases where custom harvesting was hired the grower supplied some of his own labor and that of his regular hired help and paid \$2.50 per ton for the custom work.

Table 9. COSTS TO HARVEST AN ACRE OF CARROTS FOR PROCESSING*
25 Farms, Western New York, 1960

[tem	Upland	Muck	Your
	farms	farms	farm
Number of farms	11	14	+435
Average acres of carrots	20 -	16	
Average yield per acre (tons)	19	20	
Tons sold per acre	19	20	
Harvesting cost: Labor Tractor Truck Custom work Special equipment Other TOTAL HARVESTING COST	\$ 71 7 9 8 22 5	\$ 64 9 17 14 19 2	

^{*}Includes store and sell costs

Because of the somewhat higher yields on the muck farms the cost per ton tended to be less than on the upland farms. The harvesting cost per ton ranged from \$2 to \$13 for muck farms and \$4 to \$12 for upland. Ten of the muck and six upland growers kept their harvesting costs below \$7 (table 10). One muck grower, however, had a per-ton harvest cost of \$13.

DISTRIBUTION OF HARVESTING COST PER TON 25 Farms, Western New York, 1960

Cost per ton	Number of farms	
	Upland	Muck
\$ 2 - 4.99 5 - 6.99 7 - 9.99 10 or more	2 1 3 2	5 5 1 3

RETURNS AND PROFITS

The upland farms had lower average yields than did the muck farms. Eight upland growers reported from 10 to 18 tons per acre; only three had 19 or more tons per acre. Seven muck growers had a yield of 19 or more tons per acre (table 11)

Table 11. DISTRIBUTION OF YIELD PER ACRE
25 Farms, Western New York, 1960

Tons per acre	Number o	of farms
	Ohronia	1.100.012
10 - 15 16 - 18 19 - 22 23 - 25 26 or more	2 6 1 1	3 1 2 4

The average return per acre of muck carrots were \$465. The return was slightly less, \$439 per acre, on the upland (table 12). This was mostly the result of difference in average yield. Both groups received an average price of \$23 per ton for their carrots.

Table 12. COST AND RETURN IN PRODUCING AN ACRE OF CARROTS FOR PROCESSING 25 Farms, Western New York, 1960

Item	Upland farms	Muck farms	Your farm
Number of farms	11	14	
Average acres of carrots	20	16	
Average yield per acre (tons)	19	20	
Tons sold per acre	19	20	
Growing cost	\$172	\$210	,
Harvesting cost	122	125	
Total production cost	\$294	<u>125</u> \$335	4.
Return	439	465	na kijema ni
PROFIT	\$145	\$130	

In spite of the lower yields, the lower total production cost (primarily lower growing cost) on the upland farms allowed those farmers to have a profit of \$145 per acre as compared with \$130 for the muck farms (table 12).

Distribution of Profit

Profit per acre varied greatly with both groups. Although the average was highest on the upland farms, the range was \$26 to \$370 per acre. Six upland farms had profits of \$151 or more (table 13).

The mack enterprises net returns varied from - \$108 to \$499, with 7 muck enterprises having profits of \$151 or more.

Table 13. DISTRIBUTION OF PROFIT PER ACRE OF CARROTS
25 Farms, Western New York, 1960

Profit per acre	Number	of farms
	Upland	Muck
\$ 0 or less	pu	2
1 - 50	3	1
51 - 100	i sw.,	
101 - 150	1	-
151 - 200	3	4
201 or more	3	3

FACTORS AFFECTING COSTS, RETURNS AND PROFITS

Yield

There appears to be a strong relationship between yield and profit. While higher yields generally cost more, the returns more than offset the added cost. The return per dollar of cost was greater with higher yields on both the upland and muck farms (table 14).

Table 14. AVERAGE YIELD PER ACRE AS RELATED TO COSTS AND PROFITS

	Upl	and farms	Muck	
	Low yield	High yield	Low yield	High yield
Number of farms	6	5	7	7
Average acres of carrots per farm	20	20	19	14
Range of yield, tons per acre	14-17	18-28	13-18	20-33
Average yield, tons per acre	16	22	15	25
Growing cost per acre	\$166	\$1.80	\$212	\$208
Harvesting cost per acre	120	124	103_	<u> 148 </u>
Production cost per acre	\$286	\$304	\$315	\$356
Returns per acre	355	540	358	572
Profit por acre	\$ 69	\$ <u>236</u>	\$ 43	\$216
Return per dollar of cost	\$ 1.27	\$ 1.80	\$ 1.17	\$ 1.65

Break-Even Point

40.0

At the average price of \$23 per ton it took 10 tons of carrots per acre for upland farmers and 12 tons for muck farmers to break even on their carrot production. These are, of course, average relationships and vary with the efficiency of production of the growers. Figures 4 and 5 relate yield to profit and show that almost any reasonable effort to increase yield would probably increase profit.

The second of th

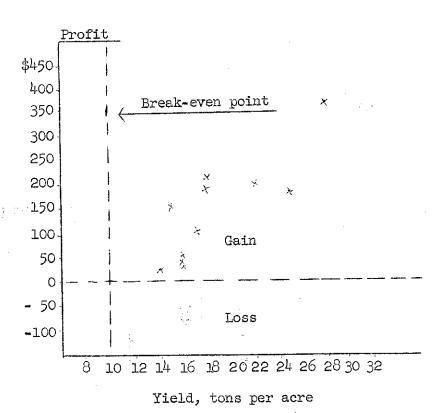


Figure 4. RELATIONSHIP BETWEEN YIELD AND PROFIT PER ACRE 11 Upland Farms, Western New York, 1960

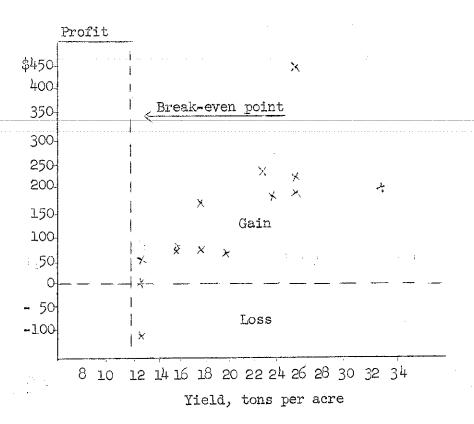


Figure 5. RELATIONSHIP BETWEEN YIELD AND PROFIT PER ACRE 14 Muck Farms, Western New York, 1960

Fertilizer Use

S.

As fertilizer costs increased (on both upland and muck enterprises) the total nutrients applied 1/, average yield per acre, profit and return per dollar of cost also increased (table 15).

Table 15. FERTILIZER COST PER ACRE OF CARROTS AS RELATED TO TOTAL NUTRIENTS APPLIED,
YIELD AND PROFIT PER ACRE

	Uplar	nd farms		farms		
	Low cost	High cost	Low cost	t High cost		
Number of farms Average yield, tons Average acres carrots	5 18 14	6 19 25	7 19 12	7 22 21		
Cost of fertilizer per acre Pounds of nutrients applied per acre Profit per acre	\$ 33 358 \$121	\$ 49 559 \$165	\$ 35 397 \$ 64	\$ 56 532 \$196		
Return per dollar of cost	\$ 1.48	\$ 1.54	\$ 1.18	\$ 1.64		

^{1/} Nutrients: Nitrogen, phosphorus and potash

Any relationship of nitrogen alone was obscured by the other nutrient factors. There does not appear to be the same yield response to nitrogen for carrots as for table beets and some other vegetable crops.

RANGE OF PHYSICAL F	need rabbi work grow & harvest Pounds per acre Planting acre an acre N P K date	tons hours ho	UPLAND FARMS	15	16 35 79 110 120 130 5/30-6/22 17 41 84 120 160 130 6/1-3	18 48 87 132 180 192 6/1-10 18 52 8 9 147 192 200 6/1-10 22 57 1 99 170 200 200 6/7-13	25 62 156 178 200 240 6/9 28 70 181 185 240 375 6/10-12	MUCK FARMS	12 75 100 27 75 150 16 88 150	16 24 51 90 150 5/3 /-/	18 29 68 100 175 159 5/9-7/1	20 32 78 113 200 180 5/15-6/15	23 38 85 LZU 200 200 6/1 24 43 86 123 200 200 6/5-7/6	26 44 88 125 200 200 6/10	26 8 52 96 141 240 208 6/12-15	33 56 8	rrayed independently - columns are not related to each other.
	acres per carrots acre			5.0 6.0 15 6.5		26.0 30.0 30.0										45.0 33	items arrayed independe
Table 16	Total cropland	acres		0.00 0.00	04.0 77.0 108.0	139.0 150.0 201.0	308.0		0.011	- 0,0 5,00,0	0,000 0 0,000 0,000 0,000 0,000 0,000 0,000 0,000 0,000 0,000 0 0,000 0	65°0	67.0	0,00	235.0	352.0	1/ A11 it

								:		
	Table 17.		RANGE OF	DOLLAR EP	IN PRODUC	CARROT York,	ROCESSING 1			
	Fertilizer cost per acre	Land cost per acre	Spray cost per acre	Growing cost per acre	Harvesting cost per acre	Total cost to grow & harvest per acre	Return per hour of labor	Returns per acre	Profit per acre	Return per dollar of cost
	6	dollars	dollars	dollars	dollars	dollars	dollars	dollars	dollars	dollars
					UPLAND FARMS	WE				
	86.92	10.00	7.88 17.04	122,54	62.30 66.85	1.99 224	1.32	282 306	98.5	1.08
	400 400 85 85	20.00	18.03 18.03 18.03	161.03	83.23 101.38	228 279	1 1 6 7 6 1 7 6 1	t-1 c 5 t-1 70 c	107	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
	41.97	20.00	22.85	188 .91 189.12	114.26	305	. W. W.	438 4443	153	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
- 15 -	46.35 50.10	25.00	24.25 26.16	190.92	152.72 155.69	345 348	3,68	4.50 5.32 5.32 5.32 5.32 5.32 5.32 5.32 5.32	196 205	1.55
-	53.10 61.58	25.00 30.00	26.33 44.56	192.58 214.64	159.59 227.79	375 417	5.64 7.36	580 718	219 370	.08 .08
					DINELVAL XIOLIN	TÍ.			•••	
					MOON PARK					
	00°00°00°00°00°00°00°00°00°00°00°00°00°	12.00	20°00	159.32	37.20	543 Cyc	0.39 74	308 %1%	- 108	0.75
	33.00 10.00 10.00	85.00 80 80.00 80 80 80 80 80 80 80 80 80 80 80 80 8	20. 4.00 7.00 7.00 7.00 7.00 7.00 7.00 7.	179.83	89.70 07.08	275	186	310	100	
	- 8 - 8 - 8 - 8 - 8 - 8 - 8 - 8 - 8 - 8	35.00	26.40	189.86	95.90	300	20.0 20.0 20.0 20.0	352	~%\	1.1.
	14 14 14	30.09 41.67	30.50	197.33 203.78	97.01 100.52	302 340	ଦ ଦ ବୁଦ୍ଧ ପ୍ୟୁ	406 425	9.2	1.24
	45.86 49.40	45.00 45.83	31.05	22.11.22	105.22	345	3. C. M. 2.	461	159	1.40
	50.96	16.00	35.54	223.07	128.14	352) 0 0	531	185	1.52
	58:12 58:12	50.00 50.00	39.00 39.88	232.60 249.94	139.01	359 368	4.60 90.7	544 447 858	198	1.53
	69,23	75.00	40,54	256.03	208.40	1	, o ,	688	231	1 -1 t
	\ < <u></u>	arreved	independently	CT. COTTUBUE	sere not related	10 CI	19.20	N.	V#4V	79.57 79.62