ERS-169

Truck Crop Production Practices

MARION COUNTY, OREGON

Labor, Power, and Materials, by Operation

Farm Production Economics Division
Economic Research Service
U. S. Department of Agriculture

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Crossley S-D Surveys, Inc., New York City, N. Y., prepared the sample, conducted the field interviewing, and tabulated the statistical data under a contract with the U.S. Department of Agriculture.

HOW TO USE THE DATA

Different kinds of data are needed for different purposes. Some persons have need for data on average labor, power, and material inputs, while others, particularly county agents and farm budgeters, prefer data for usual or typical labor, power, and material inputs. The data in this report are presented in such a way as to satisfy both these needs.

Tables 1 and 2 contain information on the characteristics of farms in the sample. The remaining tables are for specific crops. There are four tables and a chart for each crop. These four sets of tables are not numbered in the usual way but are designated by the letters A, B, C, and D.

The tables lettered A present quantities and costs of materials used and of contract work hired per acre. Cost items included are direct costs only; they do not include charges for such items as land, overhead labor, and capital. Data that present only direct costs are somewhat limited in use. They are applicable in computing costs incurred in connection with crop insurance programs and are useful in partial farm budgeting to compare costs of producing alternative crops when charges for overhead labor, machinery, land, and so on, are the same for either crop and, hence, need not be taken into account.

These data are not appropriate and would be misleading for use as the sole criteria in judging whether or not a farmer made a profit on a crop or whether he should stay in business, or in making cost comparisons with crops grown in other areas. For these purposes, total costs are required.

Tables designated B present the various operations performed on the crops, the most common size of equipment used, the average number of times the operation was performed, the acreage covered, the man and power inputs per acre, and the total labor and power used per acre. These data do not reflect an accurate picture of operations or inputs on any one farm; they are averages of all operations and inputs.

Tables designated C present usual or typical labor and power inputs by operation. The accompanying charts show the seasonality of the operation by periods.

Tables designated D present for each operation the composition of the work force by major sources of workers.

Data in these tables were obtained from a sample of growers and are subject to sampling error. For some crops, particularly those having limited numbers of observations, large sampling errors are possible. Therefore, these data should be considered as approximations.

Tables A, B, and D are offered for those persons interested in average requirements. However, extension economists, county agents, farm budgeters, and others may have more use for the data on usual or typical situations shown in table C for each crop.

Farm labor placement officials and others concerned with the problem of obtaining and placing workers may find tables B and D and the charts of value in determining the number of workers necessary for each operation, and the period of time during which local seasonal workers and those from other areas will be needed to supplement the regular farm labor force.

CONTENTS

Previous publications in this group of reports on 1959 truck crop production practices covered the following areas:

Publication No.	Area Covered
ARS 43-132	Columbia County, Wis.
ERS-45	Accomack and Northampton Counties, Va.
ERS-79	Broward and Palm Beach Counties, Fla.
ERS-82	Colquitt County, Ga.
ERS-115	Cameron and Hidalgo Counties, Tex.
ERS-128	Imperial County, Calif.
ERS-129	Monterey County, Calif.
ERS-166	San Joaquin County, Calif.

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TRUCK CROP PRODUCTION PRACTICES
MARION COUNTY, OREGON

Labor, Power, and Materials, by Operation

By

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INTRODUCTION

In 1963 U.S. production of truck crops for fresh market and processing occupied 3.3 million acres of cropland. These crops used slightly more than 1 percent of the total cropland. The farm value of truck crops harvested for sale exceeded $1.2 billion, or an average of $361 per acre harvested. 1/

Although the total acreage of truck crops is small, it is highly concentrated in areas with conditions favorable for production of these crops. The major areas are in California, Florida, Texas, the Eastern Seaboard from Georgia to Long Island, N. Y., the States bordering the Great Lakes, and the Pacific Northwest.

Truck crops in general require intensive labor. These requirements are highly seasonal--with several labor peaks--the highest occurring at harvesttime.

Most truck-crop operations other than land preparation are difficult to mechanize. Thinning and weeding are two preharvest operations still performed largely by hand labor. Harvesting of a majority of truck crops is still predominantly a hand operation. Most of these crops require repetitive pickings, which must be timely, as quality deteriorates very rapidly if the crops are not harvested at the optimum time.

These high labor demands have been difficult to meet, particularly during peak periods of weeding, thinning, and harvesting. Most truck-crop areas do not have sufficient local labor available to handle the crops during these periods. This has led many thousands of workers to migrate from one area to another during the peak seasons. In addition, many thousands of foreign workers are imported annually to help satisfy these heavy seasonal labor demands.

1/ U.S. Department of Agriculture Crop Reporting Board. Vegetables--Fresh Market 1963 Annual Summary--Acreage, Production, and Value of Principal Commercial Crops. Vg. 2-2-(63).

U.S. Department of Agriculture Crop Reporting Board. Vegetables--Processing 1963 Annual Summary--Acreage, Production, and Value of Principal Commercial Crops. Vg. 3-2-(63).

Purchased inputs comprise a high proportion of the total inputs in the production of these crops. Most labor is hired. Fertilizer, seed, pesticides, and containers are significant items that are usually purchased. From 1953 to 1962, prices of these inputs increased relative to prices received for truck crops.

To gain further knowledge of some of the inputs involved in production of vegetables, information regarding the 1958-59 crop was obtained from 2,496 vegetable growers in 12 areas.2/ The areas sampled were the counties of (1) Erie, N. Y., (2) Accomack and Northampton, Va., (3) Colquitt, Ga., (4)Broward and Palm Beach, Fla., (5) Cameron and Hidalgo, Tex., (6) Berrien and Van Buren, Mich., (7) Columbia, Wis., (8) Yakima, Wash., (9) Marion, Oreg., (10) Imperial, Calif., (11) Monterey, Calif., and (12) San Joaquin, Calif.

The areas included in the survey were selected on the basis of importance of seasonal and overall production, diversity of crops grown--both for fresh market and for processing--and number and proportion of farmers harvesting truck crops for sale.3/

The survey population was defined as all farmers producing truck crops for sale whose farm headquarters were located within the survey area, except those residing outside the county and more than 20 road miles from their headquarters in the survey area. Within the survey area, a randomized area sampling plan was used to obtain the desired number of respondents.

This is the 9th in a group of publications containing information on labor requirements, production practices, and costs involved in the production of truck crops for fresh market and processing. Information in this report was obtained from 164 producers in Marion County, Oreg. The area studied is shown in figure 1.

A separate report covering all 12 areas presents information on the extent to which production of truck crops has become vertically coordinated by either ownership or contractual agreements.4/

2/ The Crossley S-D Surveys, Inc., under U.S. Department of Agriculture, Agricultural Research Service contract #12-14-100-3826 (43) conducted the field survey and made preliminary tabulations. The author is responsible for the analysis of the data.

3/ Based on U.S. Department of Commerce, Census of Agriculture, vols. I and II, 1954, and on the 1958 annual summaries of the series cited in footnote 1.

4/ Mighell, Ronald L., Jones, Lawrence A., and Gavett, Earle E. Contract Production of Truck Crops, 12 Selected Areas, United States. ERS-152, U.S. Dept. Agr., March 1964.

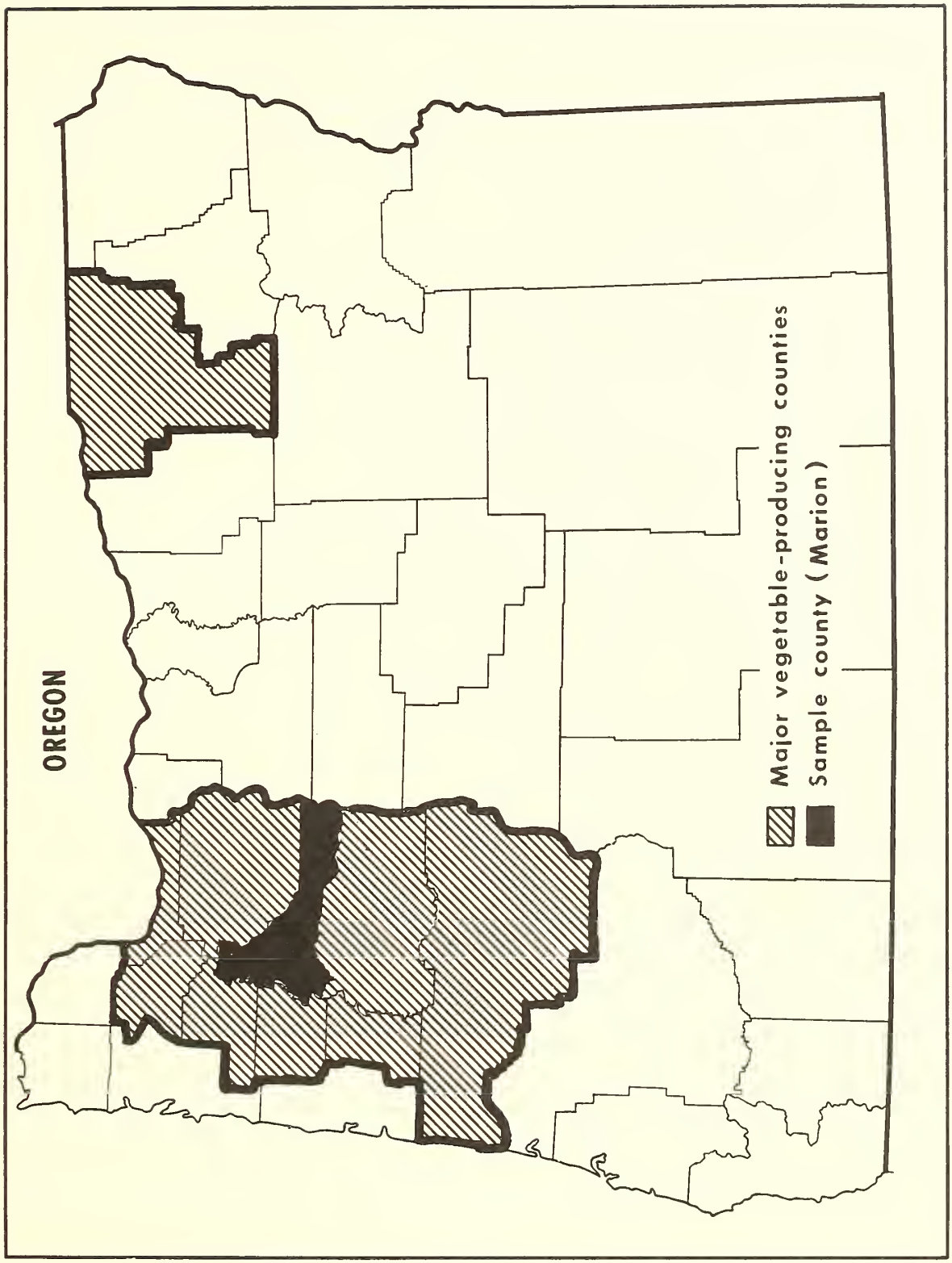
OREGON
Major vegetable-producing counties
Sample county (Marion)

Figure 1

CHARACTERISTICS OF MARION COUNTY, OREGON

Oregon is a major vegetable-producing State. Sales from vegetables are from $23 to $35 million annually. Processing crops account for about 70 percent of the State's vegetable returns. Comparing the leading processing vegetable States in 1963, Oregon ranked sixth in acreage harvested, sixth in production, and third in value of sales (see footnote 1, p.1).

Snap beans and green peas are the principal processing crops grown in Oregon. In 1963, these two crops accounted for 82 percent of the processing vegetable sales; 59 and 23 percent, respectively.

Marion County--located in the Willamette Valley--is one of Oregon's most important vegetable-producing counties. In 1959, Umatilla County led the State in value of vegetable sales--$5,311,288--primarily from the sale of green peas. However, Marion County was second in sales--$4,430,642--returned from sale of a variety of crops. In addition to its importance as a vegetable producer, Marion County led the State in strawberry production.5/

The 1959 census reported Marion County had 447 vegetable growers or 19 percent of the 2,370 growers in the State. These growers had 10 percent of the State vegetable acreage, but sales from this acreage accounted for 20 percent of the total returns for vegetables in Oregon. The high value of Marion County vegetable crops--$412 per acre--compared with the State average--$220--attests to the importance of the Blue Lake snap bean industry. This high yielding crop generally is sold for $115 to $130 per ton and returns per acre range from $800 to $1,200. One-third of the 1959 Oregon snap bean acreage was grown in Marion County.

While strawberries are not a truck crop, strawberry acreage, production, and value data are presented in vegetable crop reports. Oregon, in 1962, led the Nation in the value of strawberry production sold for processing (see footnote 1, p.1). Marion County is the center of the Oregon strawberry industry, having one-fourth of the growers and 30 percent of the 1959 harvested acreage.

In the winter of 1959-60 information regarding the 1959 production of truck crops and strawberries was obtained by interviewing operators of 164 farms. The survey farms represented a 37-percent sample of all farms harvesting truck crops for sale. On the average, the survey farms had 97.1 acres of cropland. Vegetables or strawberries were grown on 19 acres. About two-thirds of the farmers grew only one crop (table 1).

Snap beans and sweet corn were grown on 31 farms; strawberries, on 91. In addition, 26 growers set out new plantings of strawberries (table 2). Most strawberry fields are kept for 4 years. The first year they are nonproductive; so three crops of berries are harvested from a field before it is turned under. This report presents information on the growing and harvesting of five truck crops, four for processing and one for fresh market. In addition, information is presented for establishing strawberry plantings, as well as for production from existing fields.

5/ U.S. Department of Commerce, Census of Agriculture, vol.1, pt.47, 1959.

Table 1.--Sample farms: Number, average acreage of cropland, and distribution of truck crops produced by farms in each size group, Marion County, Oreg., 1959

Cropland operated (acres)	Farms in size group	Average acreage of cropland per farm	Distribution of farms, by number of crops produced						
			1	2	3	4	5	6	7
	Number	Acres	Farms	Farms	Farms	Farms	Farms	Farms	Farms
Under 15.0	29	8.6	25	3	1	---	---	---	---
15.0 to 29.9	26	21.0	20	4	1	---	---	---	1
30.0 to 49.9	27	39.3	20	6	1	---	---	---	---
50.0 to 99.9	29	70.2	18	5	4	2	---	---	---
100.0 to 149.9	23	120.2	15	5	2	1	---	---	---
150.0 to 299.9	18	215.3	8	8	---	1	1	---	---
300.0 and over	12	437.1	5	6	1	---	---	---	---
Total or average	164	97.1	111	37	10	4	1	0	1

Table 2.--Truck crops grown for fresh market and for processing on 164 farms, by acreage harvested, Marion County, Oreg., 1959

Crop	Farms on which crops were grown for--		Total acreage harvested			Average acreage harvested per farm		
	Fresh market	Processing	Fresh market	Processing	All	Fresh market	Processing	All
	Number	Number	Acres	Acres	Acres	Acres	Acres	Acres
Snap beans	0	31	0	557	557	0	18	18
Broccoli	0	12	0	278	278	0	23	23
Cauliflower	0	12	0	113	113	0	9	9
Sweet corn	1	31	5	869	874	5	28	27
Dry onions	9	1	116	1	117	13	1	12
Strawberries--								
Producing fields	4	91	19	823	842	5	9	9
New fields	0	26	0	202	202	0	8	8
Other crops1/	---	---	25	30	55	---	---	---
Total or average	---	---	165	2,873	3,038	---	---	19

1/ Includes beets, cabbage, cantaloups, carrots, cucumbers, lettuce, sweet peppers, radishes, spinach, squash, and tomatoes.

In the Willamette Valley, insufficient rainfall occurs during the growing season for optimum growth of truck crops. Therefore, most truck crops are irrigated. In this survey, the amount of labor used for irrigating was obtained; the amount and cost of water, equipment used, and method of distribution were not obtained.

The data presented reflect vegetable production practices and costs for 1959. Since that time, changes have occurred in the commercial production of vegetables. Hence, these data should not be misconstrued to represent current vegetable production practices, inputs, and costs.

VEGETABLES FOR FRESH MARKET

Truck crops were classified as fresh market vegetables if they were intended for this use at time of planting and were sold as such at time of harvesting. The following crop was grown expressly for fresh market use.

Onions

Figure 2 and tables A, B, C, and D present data on the growing and harvesting of 105 acres of dry onions for fresh market on 8 farms in 1959. The average yield was 435.5 hundredweight per acre.

Tractors were the chief source of power on these farms. Unless otherwise indicated, they were used for operations listed.. Size of tractor was not obtained in the survey, but size of equipment used indicates the average tractor was about a 2-plow tractor having a drawbar horsepower rating of 15 to 20.

The onion growers interviewed in this survey are progressive. They have materially reduced the labor input on this crop by adoption of mechanization and technology. All acreage was treated with a chemical weedkiller. This greatly reduced hoeing and weeding time per acre. In harvesting, this crop was 100 percent machine lifted, turned, loaded, and hauled. Such operations totaled less than 1.5 hours per ton.

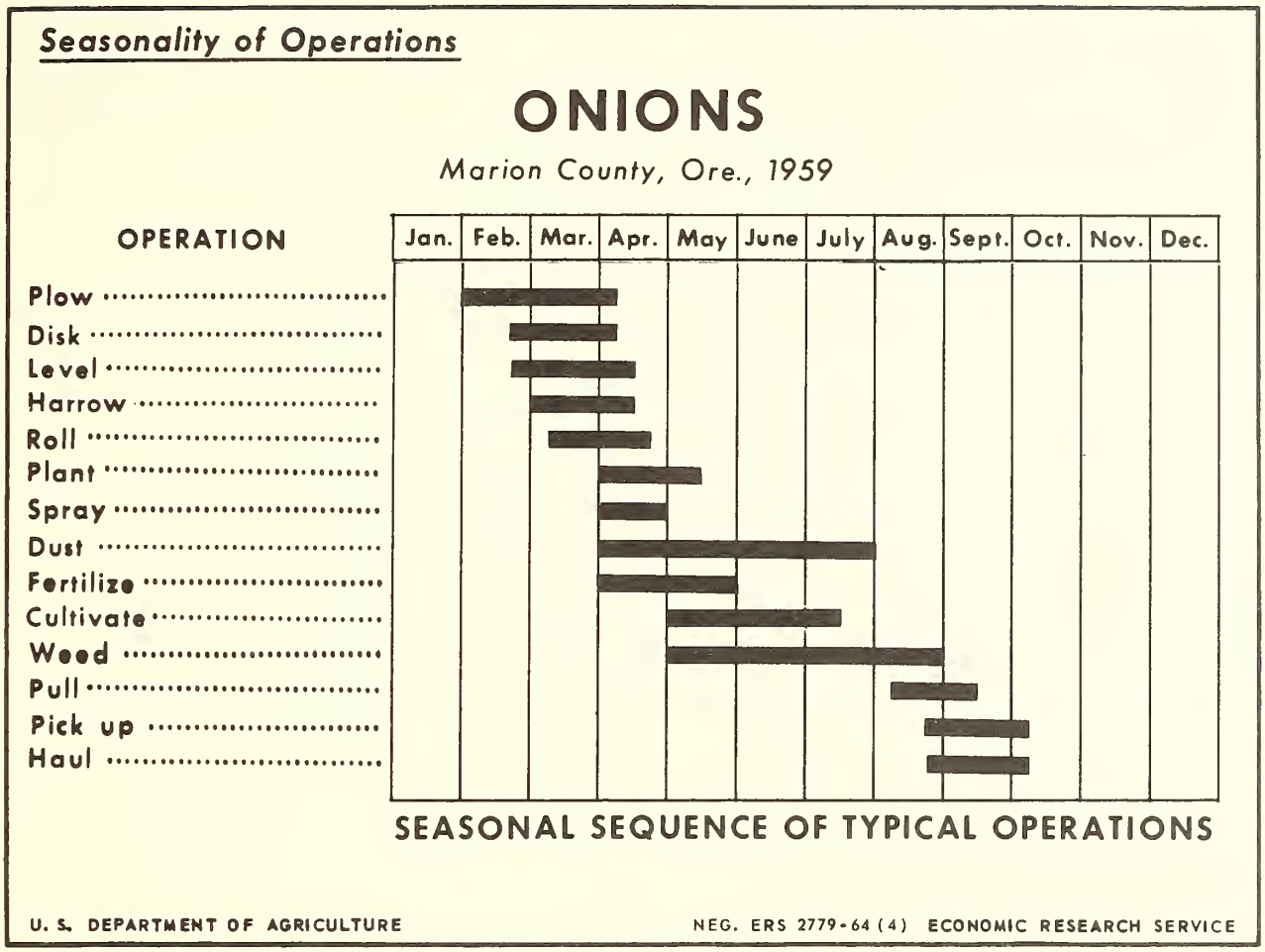
Seasonality of Operations
ONIONS
Marion County, Ore., 1959
OPERATION
Jan.
Feb.
Mar.
Apr.
May
June
July
Aug.
Sept.
Oct.
Nov.
Dec.
Plow
Disk
Level
Harrow
Roll
Plant
Spray
Dust
Fertilize
Cultivate
Weed
Pull
Pick up
Haul
SEASONAL SEQUENCE OF TYPICAL OPERATIONS
U. S. DEPARTMENT OF AGRICULTURE
NEG. ERS 2779-64 (4) ECONOMIC RESEARCH SERVICE

Figure 2

Table A.--Onions: Materials used and contract work hired, averages for 105 acres on 8 farms, Marion County, Oreg., 1959

Item	Unit	Units per acre covered	Price per unit	Cost per acre covered	Percentage of total acreage covered	Cost per acre, total acreage
		Number	Dollars	Dollars	Percent	Dollars
Materials used:						
Seed	Pound	3.3	2.06	6.80	100	6.80
Fertilizer nutrients--						
N	Pound	25.7	1/	43.67	100	43.67
P_2O_5	Pound	131.4	1/			
K_2O	Pound	76.1	1/			
Spray, weedkiller	Quart	19.2	1.81	34.75	100	34.75
Dust, DDT	Pound	234.3	.10	23.43	100	23.43
Total	---	---	---	---	---	108.65
Contract work hired:						
Dust by plane	Application	1.7	1.71	2.91	49	1.43
Plant	Acre	1.0	5.00	5.00	5	.25
Pull onions	Acre	1.0	5.00	5.00	11	.55
Turn onions	Acre	1.0	5.00	5.00	7	.35
Total	---	---	---	---	---	2.58
Total materials and contract work	---	---	---	---	---	2/ 111.23

1/ Data not available.

2/ Average yield per acre--435.5 hundredweight. Average cost of materials and contract work per hundredweight--$0.26.

Table B.--Onions: Labor, power, and machinery used in producing and harvesting, averages for 105 acres on 8 farms, Marion County, Oreg., 1959

Operation	Type and size of equipment	Time per acre, once over		Times over, acreage covered	Percentage of total acreage covered	Time per acre, total acreage	
		Man	Power			Man	Power
		Hours	Hours	Number	Percent	Hours	Hours
Preharvest:							
Subsoil	2-shank chisel	1.3	1.3	1.0	18	0.2	0.2
Plow	2-bottom 16-in. moldbd.	2.2	2.2	1.0	100	2.2	2.2
Disk	7-foot tandem	.6	.6	3.6	58	1.3	1.3
Level	8 x 24-foot level	.6	.6	4.1	90	2.2	2.2
Harrow	12-foot spiketooth	.4	.4	3.8	82	1.2	1.2
Float	10-foot float	.9	.9	3.9	40	1.4	1.4
Roll	10-foot roller	.6	.6	1.2	90	.6	.6
Plant 1/	4-row planter	1.6	1.2	1.0	100	1.6	1.2
Irrigate	---	1.7	---	7.9	39	5.2	---
Spray	8-row boom sprayer	.6	.6	1.7	100	1.0	1.0
Dust	8-row duster	.3	.3	6.5	100	2.0	2.0
Dust (custom)	Plane	.1	.1	1.7	49	.1	.1
Fertilize	6-row distributor	1.1	.7	1.0	100	1.1	.7
Cultivate	4-row shovel	2.3	2.3	2.1	82	4.0	4.0
Hoe	---	3.6	---	5.0	16	2.9	---
Weed	---	6.5	---	6.0	81	31.6	---
Total	---	---	---	---	---	58.6	18.1
Harvest:							
Pull 1/	4-row puller	1.6	1.6	1.0	100	1.6	1.6
Turn 1/	4-row puller	2.3	2.3	1.0	46	1.1	1.1
Pick up	4-row loader	14.8	3.7	1.0	100	14.8	3.7
Haul	Truck	12.3	8.1	1.0	100	12.3	8.1
Total	---	---	---	---	---	29.8	14.5
Total preharvest and harvest	---	---	---	---	---	2/ 88.4	2/ 32.6

1/ Includes custom operations. 2/ Average yield per acre--435.5 hundredweight. Average labor and power used per hundredweight--0.20 hour and 0.07 hour, respectively.

Table C.--Onions: Usual labor and power inputs, Marion County, Oreg., 1959

Operation	Times over	Time per acre, once over		Time per acre, total	
		Man	Power	Man	Power
	Number	Hours	Hours	Hours	Hours
Plow	1	2.2		2.2	2.2
Disk	4	.6	6	2.4	2.4
Level	4	.6	.6	2.4	2.4
Harrow	4	.4	.4	1.6	1.6
Roll	1	.6	.6	.6	.6
Plant	1	1.6	1.2	1.6	1.2
Spray	2	.6	.6	1.2	1.2
Dust	6	.3	.3	1.8	1.8
Fertilize	1	1.1	.7	1.1	.7
Cultivate	2	2.3	2.3	4.6	4.6
Weed	6	6.5	---	39.0	---
Pull	1	1.6	1.6	1.6	1.6
Pick up	1	14.8	3.7	14.8	3.7
Haul	1	12.3	8.1	12.3	8.1
Total	---	---	---	87.2	32.1

Table D.--Onions: Distribution of workers performing specified operations, by type of worker on 8 farms, Marion County, Oreg., 1959

Operation	Type of worker		
	Operator and unpaid family	Year-round hired	Local seasonal
	Percent	Percent	Percent
Subsoil	100	0	0
Plow	88	12	0
Disk	75	25	0
Level	100	0	0
Harrow	86	14	0
Float	67	33	0
Roll	100	0	0
Plant	80	10	10
Irrigate	40	20	40
Spray	100	0	0
Dust 1/	88	12	0
Fertilize	80	10	10
Cultivate	100	0	0
Hoe	33	0	67
Weed	48	0	52
Pull 1/	78	11	11
Turn 1/	100	0	0
Pick up	38	0	62
Haul	25	0	75

1/ Excludes custom operations.

VEGETABLES FOR PROCESSING

Truck crops were classified as processing vegetables if they were intended for this use at time of planting and were sold as such at time of harvesting. Vegetables discussed in this section were grown and harvested for processing use. Strawberries are included.

Snap Beans

Figure 3 and tables A, B, C, and D present data covering the growing and harvesting of 474 acres of snap beans on 29 farms in 1959. The average yield per acre was 8.61 tons.

Tractors were the chief source of mechanical power. Size of tractor was not obtained, but size of equipment used indicates the average tractor was about a 2-plow tractor with a drawbar horsepower rating of 15 to 20.

The Oregon snap bean processing industry is based upon the production of a premium quality, small, round-podded bean. The Blue Lake variety of bean and those having desirable qualities similar to the Blue Lake were pole- or runner-type beans. The rank vine growth of these indeterminate plants required support. In the Willamette Valley, the physical structures established were essentially wire trellises. Large end posts were set and braced to resist tipping. Heavy galvanized wires (number 12 gauge) were strung from these posts, and smaller stakes were used for intermediate support. Twine was tied to the wires to provide support for the climbing beans.

Trellising is a costly process. Replacement of posts, wires, stakes, staples, and twine averaged $36.51 per acre in 1959 (table A). In addition, the labor involved in staking, wiring, and twining averaged 35 hours per acre. After harvest, the clearing of the fields--removing stakes, wires, twine, and vines--took another 9 hours per acre.

These costs are compensated for by extremely high yields. The 29 survey farms harvested an average of 8.61 tons of beans per acre, compared with the United States average of 2.3 tons.

Preharvest costs, while high, are overshadowed by the harvesting requirements; piece rates paid pickers averaged $2.75 per hundredweight, or $473.55 per acre. The labor used in harvesting approached 1,140 hours per acre, mostly for picking. The picking crew was composed primarily of local seasonal workers--72 percent, but domestic migratory workers--26 percent--were also important.

Other than for harvesting, domestic migratory workers were seldom used on snap beans. Local seasonal workers assisted the farm family on most jobs.

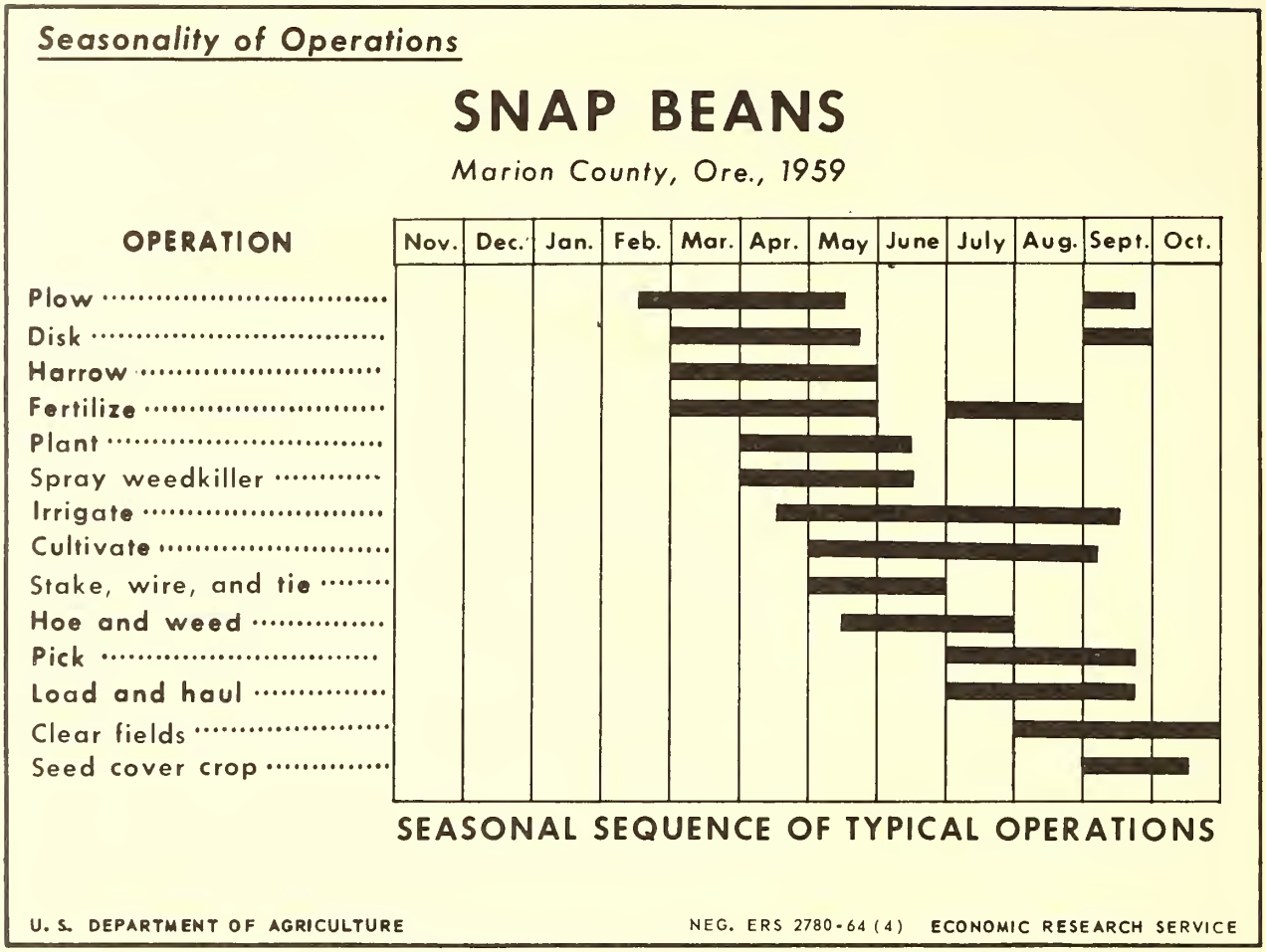
Seasonality of Operations
SNAP BEANS
Marion County, Ore., 1959
OPERATION
Nov.
Dec.
Jan.
Feb.
Mar.
Apr.
May
June
July
Aug.
Sept.
Oct.
Plow
Disk
Harrow
Fertilize
Plant
Spray weedkiller
Irrigate
Cultivate
Stake, wire, and tie
Hoe and weed
Pick
Load and haul
Clear fields
Seed cover crop
SEASONAL SEQUENCE OF TYPICAL OPERATIONS
U. S. DEPARTMENT OF AGRICULTURE
NEG. ERS 2780-64 (4) ECONOMIC RESEARCH SERVICE

Figure 3

Table A.--Snap beans: Materials used and contract work hired, averages for 474 acres on 29 farms, Marion County, Oreg., 1959

Item	Unit	Units per acre covered	Price per unit	Cost per acre covered	Percentage of total acreage covered	Cost per acre, total acreage
		Number	Dollars	Dollars	Percent	Dollars
Materials used:						
Seed, bean	Pound	28.7	0.39	11.19	100	11.19
Seed, rye (cover crop)	Pound	98.9	.038	3.76	58	2.18
Weedkiller, premerge	Quart	2.8	1.36	3.81	68	2.59
Fertilizer nutrients--						
N	Pound	77.9	1/	38.90	100	38.90
P_2O_5	Pound	166.5	1/			
K_2O	Pound	52.7	1/			
Dust	Pound	112.5	.152	17.10	29	4.96
Slug bait	Pound	11.1	.172	1.91	14	.27
Posts	Each	29	.63	18.27	31	5.66
Stakes	Each	393	.04	15.72	45	7.07
String	Pound	33.2	.53	17.60	100	17.60
Wire	Pound	189.6	.11	20.86	24	5.01
Staples	Pound	4.3	.34	1.46	80	1.17
Sacks	Each	96	.19	18.24	60	10.94
Baskets	Each	20	1.00	20.00	2	.40
Pickers' tickets	Thousand	.8	2.06	1.65	100	1.65
Total	---	---	---	---	---	109.59
Contract work hired:						
Dust by plane, no materials	Pound	52.3	.06	3.14	18	.57
Dust by plane, includes materials	Acre	1.0	11.60	11.60	6	.70
Plant cover crop	Hour	.4	3.50	1.40	3	.04
Total	---	---	---	---	---	1.31
Total materials and contract work	---	---	---	---	---	2/ 110.90

1/ Data not available. 2/ Average yield per acre--8.61 tons. Average cost of materials and contract work per ton--$12.88.

Table B.--Snap beans: Labor, power, and machinery used in producing and harvesting, averages for 474 acres on 29 farms, Marion County, Oreg., 1959

Operation	Type and size of equipment	Time per acre, once over		Times over, acreage covered	Percentage of total acreage covered	Time per acre, total acreage	
		Man	Power			Man	Power
		Hours	Hours	Number	Percent	Hours	Hours
Preharvest:							
Plow	2-bot. 16-in. moldbd.	1.3	1.3	1.2	100	1.6	1.6
Disk	8-foot tandem	1.1	1.1	3.5	100	3.8	3.8
Harrow	8-foot springtooth	1.0	1.0	2.9	88	2.6	2.6
Roll	12-foot roller	.4	.4	5.0	6	.1	.1
Float	10-foot float	1.1	1.1	1.0	28	.3	.3
Spread slug bait	10-foot seeder	.5	.4	1.0	14	.1	.1
Fertilize	2-row applicator	.8	.8	1.7	70	1.0	1.0
Plant 1/	2-row planter	1.4	1.2	1.0	100	1.4	1.2
Spray weedkiller	2-row sprayer	.8	.8	1.0	68	.5	.5
Irrigate	---	3.8	---	8.0	88	26.8	---
Cultivate	1-row cultivator	2.0	2.0	4.0	96	7.7	7.7
Cultivate and fertilize	1-row cultivator/ attach.	1.3	1.3	1.4	11	.2	.2
Stake, wire, and tie	---	36.8	---	1.0	78	28.7	---
Stake, wire, and tie	Stake setter, stringer	27.3	5.2	1.0	22	6.0	1.1
Hoe and weed	---	13.8	---	1.7	62	14.5	---
Weed and train vines	---	11.6	---	1.0	6	.7	---
Dust (custom)	Plane	2/	2/	1.4	24	2/	2/
Dust	1-row duster	.5	.5	1.5	15	.1	.1
Dust	---	3.4	---	3.4	2	.2	---
Clear fields	---	8.5	---	1.0	27	2.3	---
Clear fields	Truck	12.7	3.3	1.0	52	6.6	1.7
Seed cover crop	10-foot drill	1.1	.8	1.0	3/ 58	.6	.5
Total	---	---	---	---	---	105.8	22.5
Harvest:							
Pick	---	146.4	---	7.6	100	1,112.6	---
Load and haul	Truck	3.3	2.7	7.6	100	25.1	20.5
Total	---	---	---	---	---	4/ 1,137.7	20.5
Total preharvest and harvest	---	---	---	---	---	1,243.5	4/43.0

1/ Includes some fertilization.
2/ Less than 0.05 hour.
3/ Includes 3 percent seeded by custom operator.
4/ Average yield per acre--8.61 tons. Average labor and power used per ton--144.4 hours and 5.0 hours, respectively.

Table C.--Snap beans: Usual labor and power inputs, Marion County, Oreg., 1959

Operation	Times over	Time per acre, once over		Time per acre, total	
		Man	Power	Man	Power
	Number	Hours	Hours	Hours	Hours
Plow	1	1.3	1.3	1.3	1.3
Disk	4	1.1	1.1	4.4	4.4
Harrow	3	1.0	1.0	3.0	3.0
Fertilize	2	.8	.8	1.6	1.6
Plant	1	1.4	1.2	1.4	1.2
Spray weedkiller	1	.8	.8	.8	.8
Irrigate	8	3.8	---	30.4	---
Cultivate	4	2.0	2.0	8.0	8.0
Stake, wire, and tie	1	36.8	---	36.8	---
Hoe and weed	2	13.8	---	27.6	---
Clear fields	1	12.7	3.3	12.7	3.3
Seed cover crop	1	1.1	.8	1.1	.8
Pick	7.6	146.4	---	1,112.6	---
Load and haul	7.6	3.3	2.7	25.1	20.5
Total	---	---	---	1,266.8	44.9

Table D.--Snap beans: Distribution of workers performing specified operations, by type of worker on 29 farms, Marion County, Oreg., 1959

Operation	Type of worker			
	Operator and unpaid family	Year-round hired	Local seasonal	Domestic migratory
	Percent	Percent	Percent	Percent
Plow	75	9	13	3
Disk	81	11	4	4
Harrow	87	4	9	0
Roll	100	0	0	0
Float	100	0	0	0
Spread slug bait	80	0	20	0
Fertilize	86	0	9	5
Plant	77	7	10	6
Spray weedkiller	81	13	6	0
Irrigate	52	4	39	5
Cultivate	81	8	8	3
Cultivate and fertilize	100	0	0	0
Stake, wire, and tie	36	2	56	6
Hoe and weed	14	0	83	3
Weed and train vines	100	0	0	0
Dust 1/	100	0	0	0
Clear fields	59	4	37	0
Seed cover crop 1/	70	6	24	0
Pick	2	0	72	26
Load and haul	76	19	5	0

1/ Excludes custom operations.

Figure 4 and tables A, B, C, and D present data covering the production of broccoli from 275 acres on 13 farms in 1959. The average yield per acre of cut broccoli spears was 51.4 hundredweight.

Tractors were the chief source of power on these farms. Unless otherwise indicated, they were used for operations listed. Size of tractor was not obtained in the survey, but size of equipment used indicates the average tractor was a 2- or 3-plow tractor with a drawbar horsepower rating of 15 to 30.

Broccoli culture is similar to that for cauliflower. Better plants and better yields can be obtained by growing plants in a plantbed and then transplanting to the field after the ground warms up. Broccoli plants are rather vigorous growers and need fairly wide spacing in the field. On the average, 8,000 plants were set per acre. One acre of plantbed produced enough plants for setting 16.0 acres of field broccoli.

Harvesting of broccoli is essentially a continuous process. Once the field starts producing, it is cut every 4 to 7 days. On the survey farms, broccoli acreage was cut an average of five times.

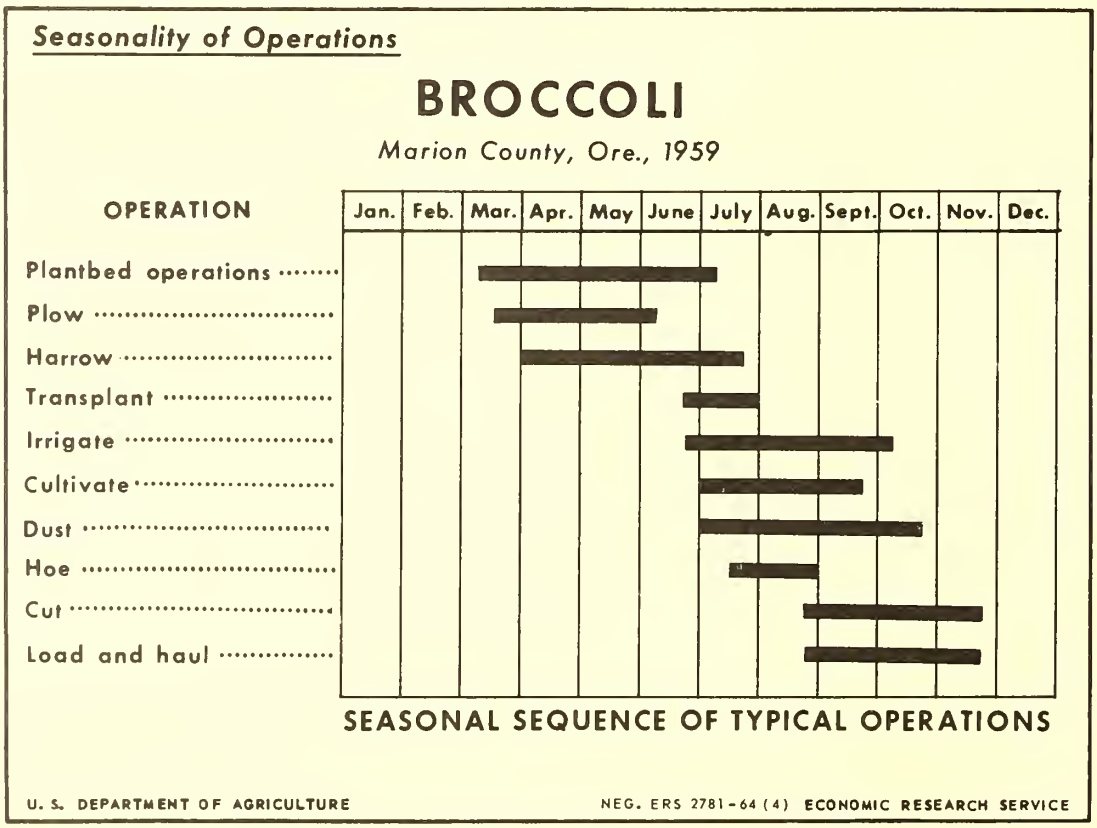

Figure 4

Table A.--Broccoli: Materials used and contract work hired, averages for 275 acres on 13 farms, Marion County, Oreg., 1959

Item	Unit	Units per acre covered	Price per unit	Cost per acre covered	Percentage of total acreage covered	Cost per acre, total acreage
		Number	Dollars	Dollars	Percent	Dollars
Materials used:						
Plantbed (14.7 acres on 11 farms):						
Soil insecticide	Cwt.	1.22	9.79	11.94	31	3.70
Seed	Pound	3.88	8.32	3.23	100	3.23
Fertilizer nutrients--						
N	Pound	41.2	1/	21.88	100	21.88
P_2O_5	Pound	71.2	1/			
K_2O	Pound	49.8	1/			
Dust, assorted	Pound	213.0	.12	25.56	92	23.52
Plant dip, chlordane	Quart	1.0	2.56	2.56	100	2.56
Total per acre of plantbed	---	---	---	---	---	54.89
Total per acre of field broccoli 2/	---	---	---	---	---	3.43
Field (275 acres on 13 farms):						
Plants raised	---	---	---	3.43	85	2.92
Plants purchased	Thousand	8.0	2.50	20.00	15	3.00
Fertilizer nutrients--						
N	Pound	89.1	1/	34.95	100	34.95
P_2O_5	Pound	124.7	1/			
K_2O	Pound	93.1	1/			
Lime	Ton	1.0	20.00	20.00	11	2.20
Dust	Pound	173.0	.13	22.49	75	16.87
Spray materials	Pound	2.6	.62	1.61	18	.29
Spray materials	Quart	3.8	2.75	10.45	16	1.67
Total	---	---	---	---	---	61.90
Contract work hired:						
Apply dust, no materials	Acre	2.8	2.29	6.41	44	2.82
Apply dust, includes dust	Acre	2.0	6.80	13.60	39	5.30
Apply spray, no materials	Acre	1.0	3.00	3.00	11	.33
Machine transplant	Acre	1.0	16.20	16.20	22	3.56
Total	---	---	---	---	---	12.01
Total materials and contract work	---	---	---	---	---	3/ 73.91

1/ Data not available.
2/ One acre of plantbed produced plants for 16.0 acres of broccoli.
3/ Average yield per acre--51.4 hundredweight. Average cost of materials and contract work per hundredweight--$1.44.

Table B.--Broccoli: Labor, power, and machinery used in producing and harvesting, averages for 275 acres on 13 farms, Marion County, Oreg., 1959

Operation	Type and size of equipment	Time per acre, once over		Times over, acreage covered	Percentage of total acreage covered	Time per acre, total acreage	
		Man	Power			Man	Power
		Hours	Hours	Number	Percent	Hours	Hours
Plantbed (14.7 acres on 11 farms):							
Plow	3-bot. 16-in. moldbd.	1.1	1.1	1.0	100	1.1	1.1
Disk and roll	8-foot tandem and roll	2.2	2.2	6.0	100	13.2	13.2
Harrow	10-foot spiketooth	3.4	3.4	5.1	70	12.1	12.1
Float	10 x 20-foot float	.9	.9	1.0	40	.4	.4
Apply insecticide	10-foot spreader	2.1	2.1	1.0	31	.7	.7
Fertilize	10-foot spreader	1.0	1.0	1.0	100	1.0	1.0
Seed	4-row seeder	11.1	6.5	1.0	67	7.4	4.4
Seed	---	13.3	---	1.0	33	4.4	---
Irrigate	---	5.0	---	1.8	80	7.2	---
Cultivate	2-row cultivator	7.2	7.2	2.0	65	9.4	9.4
Hoe	---	16.0	---	1.0	44	7.0	---
Dust	4-row duster	1.1	1.1	2.0	70	1.5	1.5
Dust	---	5.0	---	2.2	26	2.9	---
Dig and dip plants	---	320.0	---	1.0	100	320.0	---
Total	---	---	---	---	---	388.3	43.8
Total per acre of field broccoli 1/	---	---	---	---	---	24.3	2.7
Field (275 acres on 13 farms)--							
Preharvest:							
Plantbed	---	24.3	2.7	1.0	85	20.7	2.3
Plow	3-bot. 16-in. moldbd.	1.4	1.4	1.0	96	1.3	1.3
Disk	10-foot tandem	.9	.9	4.1	40	1.5	1.5
Lime	Truck spreader	.2	.2	1.0	11	2/	2/
Harrow	10-foot spiketooth	.7	.7	2.9	75	1.5	1.5
Float	10 x 20-foot float	.5	.5	1.0	19	.1	.1
Transplant	2-row transplanter	12.0	1.8	1.0	78	9.4	1.4
Transplant (custom)	2-row transplanter	12.0	1.8	1.0	22	2.6	.4
Fertilize	2-row applicator	1.2	1.2	1.1	48	.6	.6
Irrigate 3/	---	1.9	---	5.6	100	10.6	---
Cultivate and fertilize	2-row cult./attach.	1.8	1.8	1.5	45	1.2	1.2
Cultivate	2-row cultivator	.8	.8	3.0	64	1.5	1.5
Dust	4-row duster	.3	.3	2.9	63	.5	.5
Dust (custom)	Plane	.1	.1	4.8	46	.2	.2
Spray (custom)	4-row boom sprayer	.5	.5	1.0	11	.1	.1
Spray	4-row boom sprayer	.5	.5	1.1	23	.1	.1
Hoe	---	5.2	---	1.3	58	3.9	---
Weed	---	9.0	---	1.0	3	.3	---
Total	---	---	---	---	---	56.1	12.7
Harvest:							
Cut	---	28.3	---	5.0	100	141.5	---
Load and haul	Truck	1.6	.7	5.0	100	8.0	3.5
Total	---	---	---	---	---	149.5	3.5
Total preharvest and harvest	---	---	---	---	---	4/ 205.6	4/ 16.2

1/ One acre of plantbed per 16.0 acres of broccoli. 2/ Less than 0.05 hour. 3/ Includes some fertilizing. 4/ Average yield per acre--51.4 hundredweight. Average labor and power used per hundredweight--4.00 hours and 0.32 hour, respectively.

Table C.--Broccoli: Usual labor and power inputs, Marion County, Oreg., 1959

Operation	Times over	Time per acre, once over		Time per acre, total	
		Man	Power	Man	Power
	Number	Hours	Hours	Hours	Hours
Plantbed operations	1	24.3	2.7	24.3	2.7
Plow	1	1.4	1.4	1.4	1.4
Harrow	3	.7	.7	2.1	2.1
Transplant	1	12.0	1.8	12.0	1.8
Irrigate	6	1.6	---	9.6	---
Fertilize	1	1.2	1.2	1.2	1.2
Cultivate	3	.8	.8	2.4	2.4
Dust	3	.3	.3	.9	.9
Hoe	1	5.2	---	5.2	---
Cut	5	28.3	---	141.5	---
Load and haul	5	1.6	.7	8.0	3.5
Total	---	---	---	208.6	16.0

Table D.--Broccoli: Distribution of workers performing specified operations, by type of worker on 275 acres on 13 farms, Marion County, Oreg., 1959

Operation 1/	Type of worker			
	Operator and unpaid family	Year-round hired	Local seasonal	Domestic migratory
	Percent	Percent	Percent	Percent
Plow	60	20	20	0
Disk	64	18	18	0
Lime	0	0	100	0
Harrow	60	20	20	0
Float	100	0	0	0
Transplant 2/	21	0	66	13
Fertilize	75	0	25	0
Irrigate	31	4	50	15
Cultivate and fertilize	25	37	38	0
Cultivate	55	18	27	0
Dust 2/	70	20	10	0
Spray 2/	50	0	50	0
Hoe	0	14	62	24
Weed	100	0	0	0
Cut	7	4	66	23
Load and haul	41	0	59	0

1/ Excludes plantbed operations.
2/ Excludes custom operations.

Cauliflower

Figure 5 and tables A, B, C, and D present data on the production of 93 acres of cauliflower on 11 farms in 1959. The average yield per acre was 73 hundredweight.

Tractors were the chief source of power on these farms. While size of tractor was not obtained in the survey, size of equipment used indicates the average tractor was a 2- or 3-plow tractor having a drawbar horsepower rating of 15 to 30.

Ten of the 11 farms studied grew their own plants. Plantbeds required more than 500 hours of labor per acre, but 1 acre of plantbed produced plants for 20.2 acres of cauliflower.

All plants set in the fields were transplanted by machine. Growers who did not own a transplanter, contracted with a machine owner to do the job.

Harvesting of cauliflower required about 80 hours of labor per acre. Workers cut the heads and placed them in "tote" boxes attached to a tractor. The typical crew in 1959 comprised one tractor operator and four cutters. This crew averaged slightly over 1 hour of labor to harvest 1 hundredweight of cauliflower. In harvesting the crop, to obtain high quality heads, they went over the acreage an average of four times.

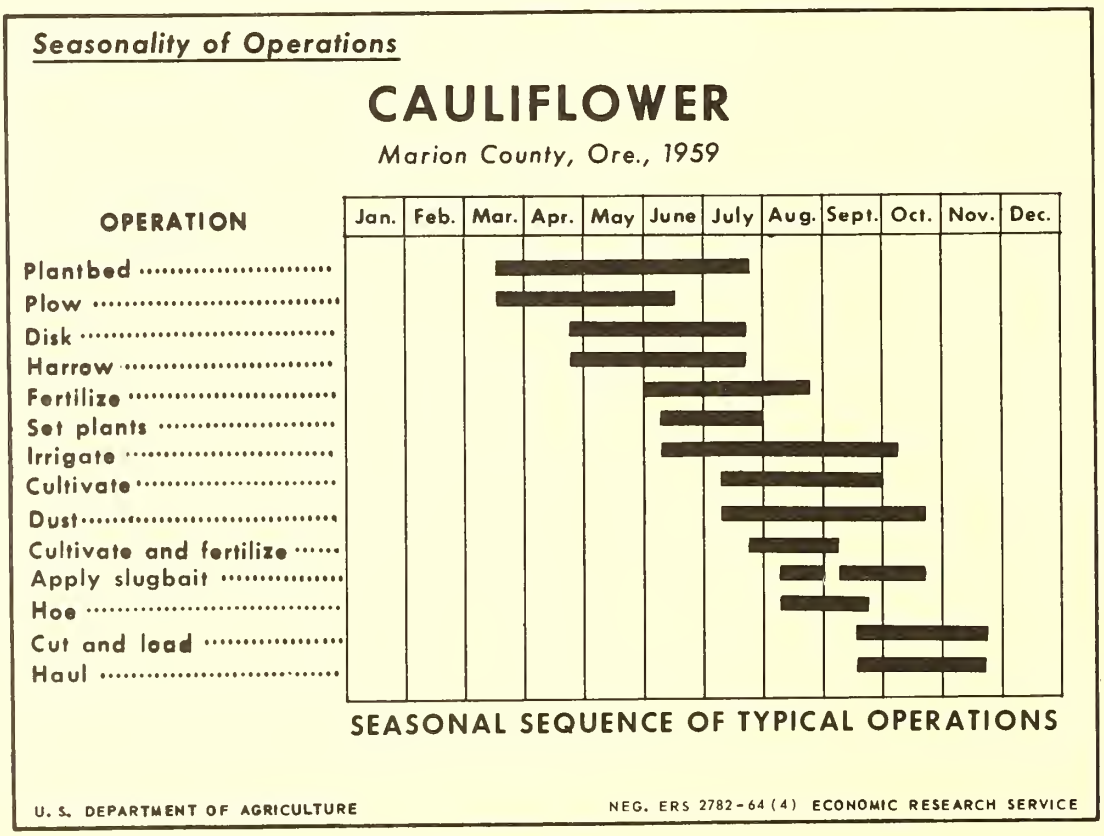

Figure 5

Table A.--Cauliflower: Materials used and contract work hired, averages for 93 acres on 11 farms, Marion County, Oreg., 1959

Item	Unit	Units per acre covered	Price per unit	Cost per acre covered	Percentage of total acreage covered	Cost per acre, total acreage
		Number	Dollars	Dollars	Percent	Dollars
Materials used:						
Plantbed (4.1 acres on 10 farms):						
Seed	Pound	6.6	14.81	97.75	100	97.75
Soil insecticide	Pound	60.0	.16	9.60	78	7.49
Fertilizer nutrients--						
N	Pound	30.8	1/	25.14	27	6.79
P_2O_5	Pound	47.6	1/			
K_2O	Pound	16.8	1/			
Dust	Pound	303.1	.14	42.43	100	42.43
Plant dip	Pint	.7	1.27	.89	100	.89
Total per acre of plantbed	---	---	---	---	---	155.35
Total per acre of field cauliflower 2/	---	---	---	---	---	7.69
Field (93 acres on 11 farms):						
Plants raised	---	---	---	7.69	89	6.84
Plants purchased	Thousand	7.0	2.50	17.50	11	1.92
Slug bait	Pound	35.8	.17	6.09	80	4.87
Fertilizer nutrients--						
N	Pound	126.8	1/	35.90	100	35.90
P_2O_5	Pound	124.5	1/			
K_2O	Pound	98.8	1/			
Dust	Pound	109.4	.15	16.41	85	13.95
Spray, DDT	Pound	6.4	.23	1.47	24	.35
Spray, demeton	Pint	1.1	3.45	3.80	16	.61
Total	---	---	---	---	---	64.44
Contract work hired:						
Machine transplant	Acre	1.0	13.25	13.25	47	6.23
Fertilize by plane, no materials	Acre	1.0	2.25	2.25	9	.20
Dust by plane, no materials	Acre	1.0	2.25	2.25	37	.83
Total	---	---	---	---	---	7.26
Total materials and contract work	---	---	---	---	---	3/ 71.70

1/ Data not available.
2/ One acre of plantbed produced plants for 20.2 acres of cauliflower.
3/ Average yield per acre--73 hundredweight. Average cost of materials and contract work per hundredweight--$0.98.

Table B.--Cauliflower: Labor, power, and machinery used in producing and harvesting, averages for 93 acres on 11 farms, Marion County, Oreg., 1959

Operation	Type and size of equipment	Time per acre, once over		Times over, acreage covered	Percentage of total acreage covered	Time per acre, total acreage	
		Man	Power			Man	Power
		Hours	Hours	Number	Percent	Hours	Hours
Plantbed (4.1 acres on 10 farms):							
Plow	2-bot. 16-in. moldbd.	4.0	4.0	1.0	100	4.0	4.0
Disk	5-foot tandem	2.0	2.0	4.0	100	8.0	8.0
Harrow	8-foot spiketooth	2.8	2.8	4.0	100	11.2	11.2
Float	10 x 30-foot float	4.0	4.0	1.0	30	1.2	1.2
Apply soil insecticide	2-row spreader	2.0	2.0	1.0	78	1.6	1.6
Seed	2-row seeder	10.4	10.4	1.0	55	5.7	5.7
Seed	---	45.3	---	1.0	45	20.4	---
Fertilize	2-row applicator	2.0	2.0	1.0	27	.5	.5
Irrigate	---	8.9	---	3.1	30	8.3	---
Cultivate	2-row cultivator	14.7	14.7	2.7	21	8.4	8.4
Cultivate	---	19.2	---	5.0	70	67.2	---
Weed	---	120.0	---	1.0	10	12.0	---
Dust	---	10.0	---	3.0	100	30.0	---
Dig and dip plants	---	330.7	---	1.0	100	330.7	---
Total per acre of plantbed	---	---	---	---	---	509.2	40.6
Total per acre of field cauliflower 1/	---	---	---	---	---	25.2	2.0
Field (93 acres on 11 farms)							
Preharvest:							
Plantbed	---	25.2	2.0	1.0	89	22.4	1.8
Shred stalks	5-foot rotary	.4	.4	1.0	22	.1	.1
Plow	3-bot. 16-in. moldbd.	1.3	1.3	1.0	96	1.2	1.2
Disk	8-foot tandem	.9	.9	2.8	58	1.5	1.5
Harrow	10-foot spiketooth	1.3	1.3	3.4	72	3.2	3.2
Float	10 x 30-foot float	.5	.5	1.0	24	.1	.1
Roll	8-foot roller	1.0	1.0	1.0	11	.1	.1
Set plants (custom)	2-row transplanter	12.7	2.6	1.0	47	6.0	1.2
Set plants	2-row transplanter	14.5	2.6	1.0	53	7.7	1.4
Irrigate	---	2.7	---	5.6	100	15.1	---
Cultivate	2-row cultivator	1.4	1.4	2.8	86	3.4	3.4
Dust	4-row duster	.6	.6	3.0	87	1.6	1.6
Fertilize	2-row applicator	.8	.8	1.4	88	1.0	1.0
Cultivate and fertilize	2-row cult./attach.	1.8	1.8	1.8	56	1.8	1.8
Fertilize (custom)	Plane	2/	2/	1.0	9	2/	2/
Apply slug bait	---	1.1	---	1.6	80	1.4	---
Hoe	---	7.9	---	1.2	67	6.3	---
Weed	---	64.0	---	1.0	20	12.8	---
Spray	4-row boom sprayer	.9	.9	2.0	24	.4	.4
Dust (custom)	Plane	2/	2/	1.0	37	2/	2/
Total	---	---	---	---	---	86.1	18.8
Harvest:							
Cut by hand and load	Tractor and tote box	19.7	2.0	4.0	100	78.8	8.0
Haul	Truck	1.0	1.0	4.0	100	4.0	4.0
Total	---	---	---	---	---	82.8	12.0
Total preharvest and harvest	---	---	---	---	---	3/ 168.9	3/ 30.8

1/ One acre of plantbed produced plants for 20.2 acres of cauliflower. 2/ Less than 0.05 hour.
3/ Average yield per acre--73 hundredweight. Average labor and power used per hundredweight--2.31 hours and 0.42 hour, respectively.

Table C.--Cauliflower: Usual labor and power inputs, Marion County, Oreg., 1959

Operation	Times over	Time per acre, once over		Time per acre, total	
		Man	Power	Man	Power
	Number	Hours	Hours	Hours	Hours
Plantbed operations	1	25.2	2.0	25.2	2.0
Plow	1	1.3	1.3	1.3	1.3
Disk	3	.9	.9	2.7	2.7
Harrow	3	1.3	1.3	3.9	3.9
Set plants	1	14.5	2.6	14.5	2.6
Irrigate	6	2.7	---	16.2	---
Cultivate	3	1.4	1.4	4.2	4.2
Dust	3	.6	.6	1.8	1.8
Fertilize	1	.8	.8	.8	.8
Cultivate and fertilize	2	1.8	1.8	3.6	3.6
Apply slug bait	2	1.1	---	2.2	---
Hoe	1	7.9	---	7.9	---
Cut and load	4	19.7	2.0	78.8	8.0
Haul	4	1.0	1.0	4.0	4.0
Total	---	---	---	167.1	34.9

Table D.--Cauliflower: Distribution of workers performing specified operations, by type of worker on 11 farms, Marion County, Oreg., 1959

Operation 1/	Type of worker			
	Operator and unpaid family	Year-round hired	Local seasonal	Domestic migratory
	Percent	Percent	Percent	Percent
Shred stalks	100	0	0	0
Plow	67	25	0	8
Disk	86	14	0	0
Harrow	63	25	12	0
Float	0	100	0	0
Roll	100	0	0	0
Set plants 2/	62	0	37	1
Irrigate	66	0	17	17
Cultivate	100	0	0	0
Dust 2/	90	10	0	0
Fertilize 2/	80	10	10	0
Cultivate and fertilize	83	17	0	0
Apply slug bait	70	0	20	10
Hoe	0	0	25	75
Weed	0	0	12	88
Spray	100	0	0	0
Cut and load	33	1	42	24
Haul	100	0	0	0

1/ Excludes plantbed operations.
2/ Excludes custom operations.

Figure 6 and tables A, B, C, and D present data on sweet corn production from 849 acres on 31 farms in 1959. The average yield of sweet corn delivered at the processor's dock was 5.31 tons per acre.

Tractors were the chief source of power on these farms. Size of tractor was not obtained in the survey, but considering the size of equipment used it appears that the average tractor was a 2- or 3-plow tractor having a drawbar horsepower rating of 15 to 30.

The growing of sweet corn for the cannery is essentially a family enterprise. Preharvest work averaged 18 hours per acre and was performed primarily by the operator and his family. Harvesting was completed with 2-row cornpickers and attendant trucks. No hand picking was done. On more than half of the acreage, sweet corn was harvested by custom operators. On the farmer-harvested acreage, local seasonal workers generally assisted the farmers by driving trucks. The farmers usually operated the mechanical pickers.

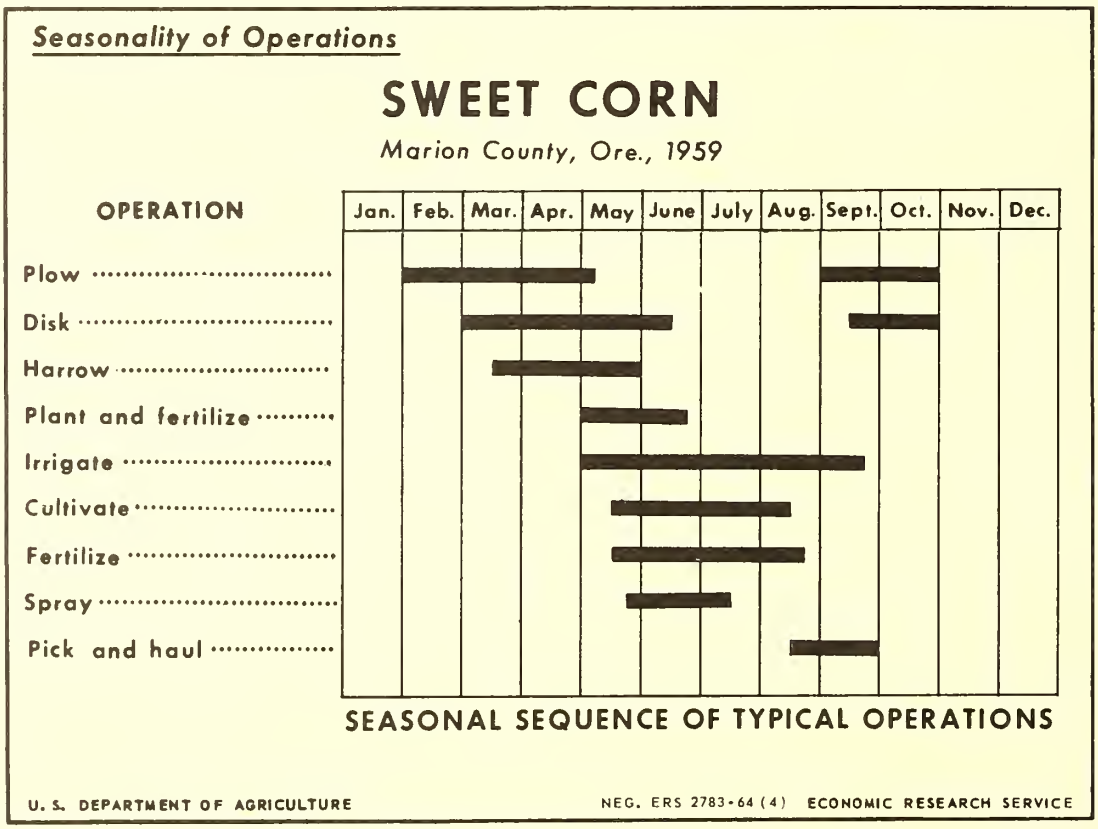

Figure 6

Table A.--Sweet corn: Materials used and contract work hired, averages for 849 acres on 31 farms, Marion County, Oreg., 1959

Item	Unit	Units per acre covered	Price per unit	Cost per acre covered	Percentage of total acreage covered	Cost per acre, total acreage
		Number	Dollars	Dollars	Percent	Dollars
Materials used:						
Seed	Pound	9.7	0.37	3.59	100	3.59
Fertilizer nutrients--						
N	Pound	112.1	1/			
P_2O_5	Pound	65.6	1/	23.91	100	23.91
K_2O	Pound	27.2	1/			
Spray	Quart	2.8	1.28	3.58	54	1.93
Spray, Eptam	Pound	3.2	3.38	10.82	11	1.19
Total	---	---	---	---	---	30.62
Contract work hired:						
Pick and haul	Ton	5.66	5.50	31.13	45	14.01
Pick	Ton	4.83	3.00	14.49	14	2.03
Total	---	---	---	---	---	16.04
Total materials and contract work	---	---	---	---	---	2/ 46.66

1/ Data not available.
2/ Average yield per acre--5.31 tons. Average cost of materials and contract work per ton--$8.79.

Table B.--Sweet corn: Labor, power, and machinery used in producing and harvesting, averages for 849 acres on 31 farms, Marion County, Oreg., 1959

Operation	Type and size of equipment	Time per acre, once over		Times over, acreage covered	Percentage of total acreage covered	Time per acre, total acreage	
		Man	Power			Man	Power
		Hours	Hours	Number	Percent	Hours	Hours
Preharvest:							
Plow	3-bot. 14-in. moldbd.	1.1	1.1	1.0	100	1.1	1.1
Disk	10-foot tandem	1.1	1.1	2.7	76	2.3	2.3
Harrow	10-foot springtooth	.5	.5	2.3	91	1.0	1.0
Roll	10-foot roller	.4	.4	1.7	15	.1	.1
Float	10 x 30-foot float	.4	.4	1.0	14	1/	1/
Plant and fertilizer	2-row planter/attach.	.9	.7	1.0	100	.9	.7
Irrigate	---	3.1	---	3.8	67	7.9	---
Cultivate	2-row cultivator	.8	.8	2.8	100	2.2	2.2
Fertilize	2-row applicator	.5	.5	1.0	52	.3	.3
Cultivate and fertilize	2-row cult./attach.	1.2	1.2	1.0	23	.3	.3
Spray	2-row sprayer	.6	.6	1.0	55	.3	.3
Hoe	---	11.3	---	1.0	16	1.8	---
Total	---	---	---	---	---	18.2	8.3
Harvest:							
Pick (custom)	2-row picker	2.5	1.3	1.0	14	.4	.2
Pick	2-row picker	2.5	1.3	1.0	41	1.0	.5
Pick and haul (custom)	2-row picker, truck	5.4	3.0	1.0	45	2.4	1.4
Haul	Truck	2.2	1.1	1.0	55	1.2	.6
Total	---	---	---	---	---	5.0	2.7
Total preharvest and harvest	---	---	---	---	---	2/ 23.2	2/ 11.0

1/ Less than 0.05 hour. 2/ Average yield per acre--5.31 tons. Average labor and power used per ton--4.4 hours and 2.1 hours, respectively.

Table C.--Sweet corn: Usual labor and power inputs, Marion County, Oreg., 1959

Operation	Times over	Time per acre, once over		Time per acre, total	
		Man	Power	Man	Power
	Number	Hours	Hours	Hours	Hours
Plow	1	1.1	1.1	1.1	1.1
Disk	3	1.1	1.1	3.3	3.3
Harrow	2	.5	.5	1.0	1.0
Plant and fertilize	1	.9	.7	.9	.7
Irrigate	4	3.1	---	12.4	---
Cultivate	3	.8	.8	2.4	2.4
Fertilize	1	.5	.5	.5	.5
Spray	1	.6	.6	.6	.6
Pick and haul (custom)	1	5.4	3.0	5.4	3.0
Total	---	---	---	27.6	12.6

Table D.--Sweet corn: Distribution of workers performing specified operations, by type of worker on 31 farms, Marion County, Oreg., 1959

Operation	Type of worker			
	Operator and unpaid family	Year-round hired	Local seasonal	Domestic migratory
	Percent	Percent	Percent	Percent
Plow	70	8	22	0
Disk	68	16	16	0
Harrow	74	7	19	0
Roll	80	0	20	0
Float	100	0	0	0
Plant and fertilize	75	5	20	0
Irrigate	62	5	28	5
Cultivate	71	10	19	0
Fertilize	93	7	0	0
Cultivate and fertilize	86	14	0	0
Spray	85	5	10	0
Hoe	42	4	35	19
Pick 1/	32	0	68	0
Pick and haul 1/	40	0	60	0
Haul	56	0	44	0

1/ Excludes custom operations.

Figure 7 and tables A, B, C, and D present data on the establishing of 217 acres of strawberries on 27 farms in 1959. There was no production from these fields during the survey year.

Tractors were the chief source of power on these farms. Unless otherwise indicated, they were used for operations listed. Size of tractor was not obtained in the survey, but considering the size of equipment used it appears that the average tractor was a 2-plow tractor having a drawbar horsepower rating of 15-20.

Generally, strawberry growers in the area maintain a planting for 4 years. Thus, three crops are harvested from a field before it is turned under. Data on the costs of materials, contract work, and labor used in establishing an acre of strawberries were divided by three, and each crop was assessed an equal amount for establishment.

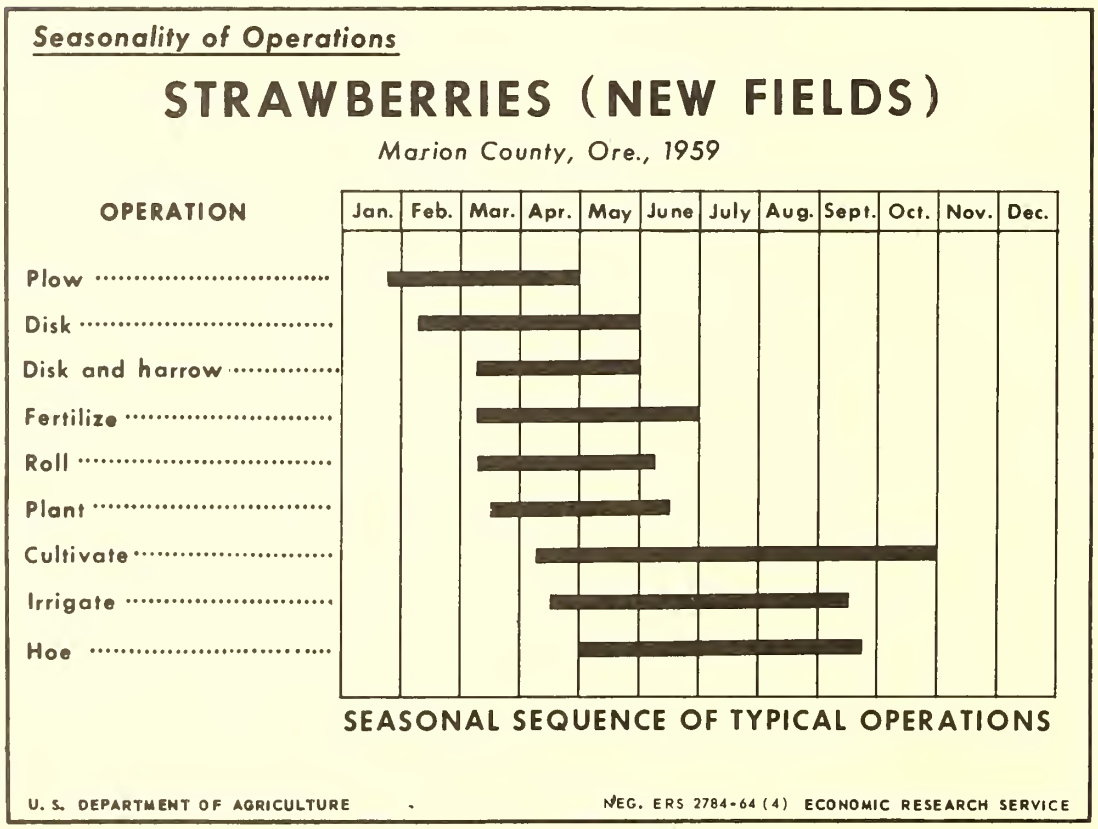

Figure 7

Table A.--Strawberries (new fields): Materials used and contract work hired, averages for 202 acres on 26 farms, Marion County, Oreg., 1959

Item	Unit	Unit per acre covered	Price per unit	Cost per acre covered	Percentage of total acreage covered	Cost per acre, total acreage
		Number	Dollars	Dollars	Percent	Dollars
Materials used:						
Plants	Thousand	7.8	15.30	119.34	100	119.34
Fertilizer nutrients--						
N	Pound	75.3	1/	42.67	100	42.67
P_2O_5	Pound	197.2	1/			
K_2O	Pound	78.9	1/			
Dust	Pound	116.5	.10	11.65	24	2.80
Spray	Gallon	1.65	15.69	25.89	13	3.37
Soil insecticide	Acre	1.0	31.68	31.68	23	7.29
Total	---	---	---	---	---	175.47
Contract work hired:						
Plant	Acre	1.0	13.67	13.67	24	3.28
Disk	Acre	3.8	2.00	7.60	4	.30
Spray	Acre	1.0	3.00	3.00	10	.30
Total	---	---	---	---	---	3.88
Total materials and contract work	---	---	---	---	---	2/ 179.35

1/ Data not available.

2/ Estimated life of new fields is 4 years (3 crops). Cost of materials and contract work per acre, per crop--$59.78.

Table B.--Strawberries (new fields): Labor, power, and machinery used in producing, averages for 202 acres on 26 farms, Marion County, Oreg., 1959

Operation	Type and size of equipment	Time per acre, once over		Times over, acreage covered	Percentage of total acreage covered	Time per acre, total acreage	
		Man	Power			Man	Power
		Hours	Hours	Number	Percent	Hours	Hours
Subsoil	7-shank chisel	2.1	2.1	1.1	17	0.4	0.4
Plow	2-bot. 14-in. moldbd.	2.1	2.1	1.0	87	1.8	1.8
Disk 1/	8-foot tandem	1.4	1.4	3.3	57	2.6	2.6
Harrow	8-foot springtooth	1.3	1.3	2.5	25	.8	.8
Disk and harrow	8-ft. disk/8-ft. spike	.7	.7	3.8	54	1.4	1.4
Fertilize	2-row distributor	1.4	.9	1.5	85	1.8	1.2
Apply soil insecticide	2-row applicator	1.1	1.1	1.0	23	.3	.3
Roll	10-foot roller	.7	.7	1.0	76	.5	.5
Plant	2-row planter	12.0	2.3	1.0	74	8.9	1.7
Plant (custom)	2-row planter	12.0	2.3	1.0	24	2.9	.6
Plant	---	48.0	---	1.0	2	1.0	---
Replant	---	2.7	---	1.0	33	.9	---
Cultivate	2-row shovel	1.6	1.6	5.0	90	7.2	7.2
Irrigate	---	6.9	---	2.2	79	12.0	---
Cultivate and fertilize	2-row shovel/attach.	2.6	2.6	1.1	41	1.2	1.2
Hoe	---	38.7	---	2.8	88	95.2	---
Spray 1/	4-row boom sprayer	.5	.5	1.0	13	.1	.1
Dust	4-row duster	.5	.5	1.0	24	.1	.1
Weed	---	19.3	---	2.2	10	4.2	---
Total	---	---	---	---	---	2/ 143.3	2/ 19.9

1/ Includes custom operations.

2/ Estimated life of the new fields is 4 years (3 crops). Labor and power used per acre, per crop--47.8 hours and 6.6 hours, respectively.

Table C.--Strawberries (new fields): Usual labor and power inputs, Marion County, Oreg., 1959

Operation	Times over	Time per acre, once over		Time per acre, total	
		Man	Power	Man	Power
	Number	Hours	Hours	Hours	Hours
Plow	1	2.1	2.1	2.1	2.1
Disk	3	1.4	1.4	4.2	4.2
Disk and harrow	4	.7	.7	2.8	2.8
Fertilize	2	1.4	.9	2.8	1.8
Roll	1	.7	.7	.7	.7
Plant	1	12.0	2.3	12.0	2.3
Cultivate	5	1.6	1.6	8.0	8.0
Irrigate	2	6.9	---	13.8	---
Hoe	3	38.7	---	116.1	---
Total	---	---	---	162.5	21.9

Table D.--Strawberries (new fields): Distribution of workers performing specified operations, by type of worker on 26 farms, Marion County, Oreg., 1959

Operation	Type of worker				
	Operator and unpaid family	Year-round hired	Local seasonal	Domestic migratory	Foreign
	Percent	Percent	Percent	Percent	Percent
Subsoil	100	0	0	0	0
Plow	81	4	15	0	0
Disk 1/	73	0	27	0	0
Harrow	100	0	0	0	0
Disk and harrow	80	0	20	0	0
Fertilize	65	0	35	0	0
Apply soil insecticide	67	33	0	0	0
Roll	50	0	50	0	0
Plant 1/	20	0	80	0	0
Plant by hand	19	2	79	0	0
Cultivate	71	4	21	4	0
Irrigate	58	3	39	0	0
Replant	0	0	40	0	60
Cultivate and fertilize	44	11	45	0	0
Hoe	22	0	65	5	8
Spray 1/	75	0	25	0	0
Dust	75	0	25	0	0
Weed	29	0	14	29	28

1/ Includes custom operations.

Figure 8 and tables A, B, C, and D present data on the growing and harvesting of strawberries on 799 acres on 82 farms. The average yield of capped berries per acre was 3.59 tons.

Tractors were a chief source of power on these farms. Size of tractor was not obtained in the survey. However, size of equipment used for operations listed indicates the average tractor was about a 2-plow tractor having a drawbar horsepower rating of 15 to 20.

Nearly 1,000 hours of labor was required to grow and harvest an acre of strawberries in 1959. This total includes nearly 50 hours of labor that was used in a prior year for establishing the planting. Annual maintenance of fields totaled 91 hours per acre--about two-thirds of which was for hoeing.

The harvesting of 7,180 pounds of capped berries per acre took 859 hours, or about 8.35 pounds per hour. Most of the harvesting was done by local seasonal workers. They were paid piece rates of from 4 to 6 cents per pound.

There were no cost figures obtained for picking, boxes, carriers, and crates. Growers reported that these were provided by the processor without charge.

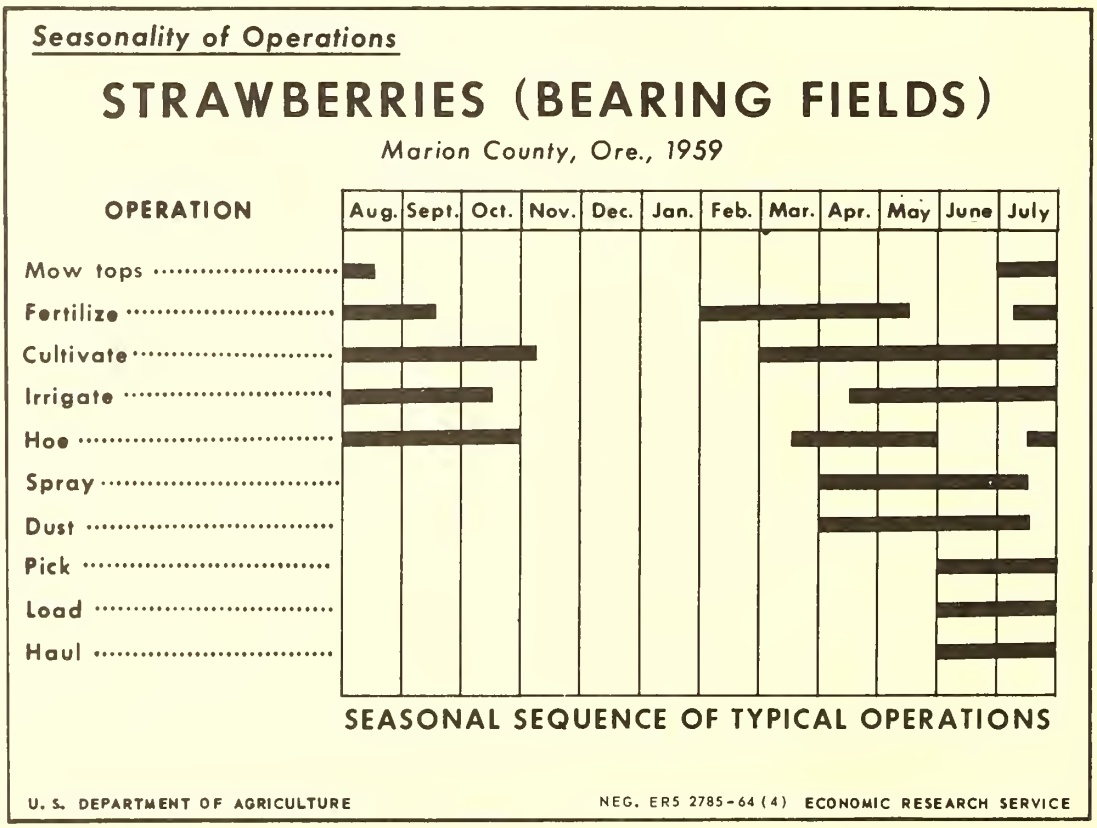

Figure 8

Table A.--Strawberries (bearing fields): Materials used and contract work hired, averages for 799 acres on 82 farms, Marion County, Oreg., 1959

Item	Unit	Units per acre covered	Price per unit	Cost per acre covered	Percentage of total acreage covered	Cost per acre, total acreage
		Number	Dollars	Dollars	Percent	Dollars
Materials used:						
Fertilizer nutrients--						
N	Pound	63.2	1/	30.00	100	30.00
P_2O_5	Pound	130.8	1/			
K_2O	Pound	95.9	1/			
Dust	Pound	109.8	.18	19.76	76	15.02
Spray	Gallon	2.7	3.38	9.13	12	1.10
Spray	Pound	62.0	.64	39.68	15	5.95
Slug bait	Pound	30.0	.16	4.80	8	.38
Total	---	---	---	---	---	52.45
Contract work hired:						
Apply spray, includes materials	Acre	1.1	18.25	20.08	28	5.62
Apply spray, excludes materials	Acre	1.0	4.00	4.00	3	.12
Apply dust, excludes materials	Acre	2.3	2.03	4.67	9	.42
Total	---	---	---	---	---	6.16
Total materials and contract work	---	---	---	---	---	58.61
Pro rata share of establishment costs 2/	---	---	---	---	---	59.78
Total	---	---	---	---	---	3/ 118.39

1/ Data not available. 2/ Cost of establishing fields was prorated over 3 crops.
3/ Average yield per acre--3.59 tons. Average cost of materials and contract work per ton--$32.98.

Table B.--Strawberries (bearing fields): Labor, power, and machinery used in producing and harvesting, averages for 799 acres on 82 farms, Marion County, Oreg., 1959

Operation	Type and size of equipment	Time per acre, once over		Times over, acreage covered	Percentage of total acreage covered	Time per acre, total acreage	
		Man	Power			Man	Power
		Hours	Hours	Number	Percent	Hours	Hours
Preharvest:							
Mow tops	1-row rotary chopper	1.3	1.3	1.0	97	1.3	1.3
Fertilize	1-row distributor	1.7	1.6	1.4	100	2.4	2.2
Cultivate	2-row shovel	1.8	1.4	6.4	99	11.4	8.9
Irrigate	---	4.3	---	3.1	100	13.3	---
Cultivate and fertilize	2-row shovel/attach.	1.9	1.9	1.2	36	.8	.8
Hoe	---	21.2	---	2.8	100	59.4	---
Weed	---	10.0	---	1.5	3	.4	---
Spray	4-row boom sprayer	.6	.6	2.6	24	.4	.4
Spray (custom)	4-row boom sprayer	.6	.6	1.0	31	.2	.2
Dust	4-row duster	.5	.5	2.8	72	1.0	1.0
Dust (custom)	4-row duster	.5	.5	2.3	9	.1	.1
Apply slug bait	---	2.4	---	1.0	8	.2	---
Total	---	---	---	---	---	90.9	14.9
Harvest:							
Pick	---	158.6	---	5.3	100	840.6	---
Load	Truck	1.4	.9	5.3	100	7.4	4.8
Haul	Truck	2.1	1.8	5.3	100	11.1	9.5
Total	---	---	---	---	---	859.1	14.3
Total preharvest and harvest	---	---	---	---	---	950.0	29.2
Pro rata share of establishment 1/	---	---	---	---	---	47.8	6.6
Total	---	---	---	---	---	2/ 997.8	2/ 35.8

1/ Labor and power used in establishing the fields was prorated over 3 crops.
2/ Average yield per acre--3.59 tons. Average labor and power used per ton--277.9 hours and 10.0 hours, respectively.

Table C.--Strawberries (bearing fields): Usual labor and power inputs, Marion County, Oreg., 1959

Operation	Times over	Time per acre, once over		Time per acre, total	
		Man	Power	Man	Power
	Number	Hours	Hours	Hours	Hours
Pro rata share of establishment 1/	1	47.8	6.6	47.8	6.6
Mow tops	1	1.3	1.3	1.3	1.3
Fertilize	1	1.7	1.6	1.7	1.6
Cultivate	6	1.8	1.4	10.8	8.4
Irrigate	3	4.3	---	12.9	---
Hoe	3	21.2	---	63.6	---
Spray (custom)	1	.6	.6	.6	.6
Dust	3	.5	.5	1.5	1.5
Pick	5.3	158.6	---	840.6	---
Load	5.3	1.4	.9	7.4	4.8
Haul	5.3	2.1	1.8	11.1	9.5
Total	---	---	---	999.3	34.3

1/ Labor and power used in establishing the fields was prorated over 3 crops.

Table D.--Strawberries (bearing fields): Distribution of workers performing specified operations, by type of worker on 82 farms, Marion County, Oreg., 1959

Operation	Type of worker			
	Operator and unpaid family	Year-round hired	Local seasonal	Domestic migratory
	Percent	Percent	Percent	Percent
Mow tops	93	2	5	0
Fertilize	76	4	16	4
Cultivate	84	4	11	1
Irrigate	72	3	20	5
Cultivate and fertilize	82	0	18	0
Hoe	25	1	46	28
Weed	78	0	22	0
Spray 1/	57	0	43	0
Dust 1/	76	6	16	2
Apply slug bait	93	0	7	0
Pick	5	0	83	12
Load	50	0	0	50
Haul	88	2	10	0

1/ Excludes custom operations.

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